METHODOLOGICAL DOCUMENT
REDD+ PROJECTS

BCR0010
Improved Forest Management and Avoided Planned Forest Conversion (IFM & APFC)

BIOCARBON CERT®

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Acronyms and abbreviations

AFOLU	Agriculture, Forestry and Other Land Uses
AB	Aboveground biomass
AE	Annual emission
APFC	Avoided Planned Forest Conversion
BB	Belowground biomass
BCR	BioCarbon
BT	Total biomass
BCC	Biomass carbon content
CDM	Clean Development Mechanism
CF	Carbon fraction of the dry matter
CH_4	Methane
CO_2	Carbon dioxide
CO_{2e}	Carbon dioxide equivalent
CT	Total carbon dioxide equivalent; $tCO2e\ ha^{-1}$
ETF	Enhanced Transparency Framework
FAO	Food and Agriculture Organization of the United Nations
FSC	Change in the surface covered by forest
GHG	Greenhouse Gases
GIS	Geographic Information System
IFM	Improved Forest Management
IPCC	Intergovernmental Panel on Climate Change
N_2O	Nitrous oxide
REDD+	Reducing Emissions from deforestation, forest degradation and forest conservation, sustainable management or enhancement of forest carbon stocks.
SOC	Soil organic carbon
QA/QC	Quality Control/Assurance Control
UNFCCC	United Nations Framework Convention on Climate Change
VCC	Verified Carbon Credits

1 Introduction

This methodology provides the requirements and procedures to quantify and monitor greenhouse gas (GHG) emission reductions from project activities that prevent emissions resulting from the legally authorized or otherwise documented conversion of natural forest lands to land uses that would significantly and permanently reduce forest carbon stocks and ecological function, including conversion to agriculture, pasture, infrastructure, mining, or other extractive uses Avoided Planned Forest Conversion (APFC), as well as from the implementation of commercial timber harvesting under a legal forest management regime that would lead to forest degradation (Improved Forest Management, IFM).

The methodology applies to cases in which deforestation or timber extraction would occur in the absence of the project activity, and where the project results in the conservation or sustainable management of forest carbon stocks. It enables the development of integrated REDD+ projects, including landscape or mosaic initiatives with diverse drivers of forest loss or degradation.

The methodology applies only to cases where such conversion or harvesting is demonstrably planned and legally permitted, and where the project activity results in the effective conservation of forest carbon stocks and the maintenance of ecological integrity, within the AFOLU sector and limited to the quantification of avoided emissions.

This methodology is designed to ensure that GHG mitigation outcomes are real, measurable, additional, and verifiable. It covers procedures for baseline identification, additionality demonstration, emission quantification, leakage and uncertainty management, permanence risk mitigation, and long-term monitoring. The methodology is globally applicable and shall be used in conjunction with the BCR Standard and its applicable tools and guidance.

2 Objectives

The objectives of this methodological document (hereinafter referred to as "this methodology") are to:

(a) Provide criteria for the quantification of GHG emission reductions from project activities that avoid planned forest conversion (APFC) and/or improve forest management (IFM) to prevent emissions from legally permitted forest degradation;

(b) Establish procedures for the identification of the baseline scenario and the demonstration of additionality in accordance with the BioCarbon Additionality Tool;

(c) Define requirements for the monitoring, reporting, and verification of APFC and IFM project activities;

(d) Ensure that carbon credits issued under this methodology represent real, additional, conservative, and verifiable climate benefits;

(e) Support alignment with national GHG accounting frameworks and enable compatibility with corresponding adjustments, where applicable under international cooperation mechanisms;

(f) Ensure consistency with the BioCarbon GHG Crediting Program (BioCarbon Program) and alignment with internationally recognized principles for environmental integrity, transparency, and credit quality in carbon markets.

3 Version and validity

This document constitutes Version 1.0. August 4, 2025.

This version may be updated periodically to incorporate new scientific data, regulatory developments, or improvements in methodological practice. Project developers shall apply the version in force at the time of validation, unless otherwise specified by the BioCarbon Program. The project holders have a transition period of thirty calendar days to use the updated version after publication.

4 Scope

This methodology provides the basis for quantifying greenhouse gas (GHG) emission reductions from project activities that avoid planned forest conversion, where natural forest areas are under documented legal or regulatory threat of being converted to land uses that would result in a significant and long-term reduction of forest carbon stocks, biodiversity, or ecosystem function. Such planned conversion may involve deforestation for agriculture, livestock grazing, infrastructure, or mining, as well as transformation into forest plantations or other extractive land uses under legal permits or concessions.

This methodology applies exclusively to project activities that demonstrably prevent the implementation of legally authorized or documented forest conversion, including commercial timber harvesting under forest management concessions. It is applicable within the AFOLU sector and primarily covers avoided GHG emissions. Carbon removals may be included only when they are measurable, conservatively estimated, and verifiable, and shall be quantified in accordance with the applicable provisions of this methodology. The approach ensures that forest cover and ecological integrity are maintained in areas that would otherwise be degraded or converted in the absence of the project.

5 Normative references

The following normative references are essential for the application of this methodology. The user shall consult the latest available versions of each document:

(a) BioCarbon Standard, including all relevant program rules, eligibility conditions, and applicable procedures for GHG crediting activities;

(b) IPCC Guidelines for National Greenhouse Gas Inventories (2006 and 2019), Volume 4 – Agriculture, Forestry and Other Land Use (AFOLU);

(c) UNFCCC guidance, including decisions relevant to REDD+, Article 6 of the Paris Agreement, and the Enhanced Transparency Framework (ETF);

(d) National legal frameworks relevant to land use, land tenure, forest classification, deforestation permits, and concession systems in the host country.

5.1 Applicable tools

This methodology shall be applied in conjunction with the BIOCARBON PROGRAM and all applicable official tools issued by BioCarbon. The following tools are mandatory and shall be applied in full, as per the project's scope and characteristics:

(a) Baseline and Additionality Tool;

(b) Uncertainty Management Tool;

(c) Permanence and Risk Management Tool;

(d) Monitoring, Reporting and Verification (MRV) Tool;

(e) Avoiding Double Counting (ADC) Tool;

(f) Sustainable Development Safeguards (SDSs) Tool;

(g) Sustainable Development Goals (SDGs) Tool;

(h) Tool for Demonstrating Compliance with REDD+ Safeguards (mandatory for all REDD+ projects).

These tools form part of the normative framework of the BIOCARBON PROGRAM. Selective application or modification is not allowed. Project documentation shall demonstrate the complete and consistent application of each tool, as per the most recent version at the time of validation or verification. Failure to comply with these instruments shall result in ineligibility for registration, verification, or credit issuance.

BioCarbon reserves the right to develop, approve, and publish additional tools, templates, or guidance documents that supplement the BCR STANDARD and its methodologies. Any such instruments, once officially issued and published by the Program, shall be considered binding and shall be applied by all project holders from their effective date onward, unless stated otherwise in transitional provisions.

6 Applicability conditions

6.1 Avoided Planned Forest Conversion (APFC)

This component of the methodology applies only when all of the following conditions are met:

(a) The project area is classified as natural forest, as defined by the BCR Standard;

(b) There is a valid legal authorization or credible and dated documentation issued prior to the project start date, demonstrating intent and feasibility to convert the forest to a land use associated with a long-term and significant reduction in forest carbon stocks, biodiversity, or ecosystem function;

(c) The planned conversion may include:

i. Non-forest land uses such as agriculture, pasture, infrastructure, or mining; or

ii. Forest plantations or monocultures that do not retain the structure, species composition, or ecological function of the natural forest.

(d) In cases involving forest concessions or timber permits, the project activity shall fully suspend, cancel, or prevent the implementation of the authorized harvesting regime, resulting in the complete avoidance of degradation and the permanent conservation of the forest in its natural state;

(e) The project area shall be geographically delineated and consistent with the area covered by the conversion authorization;

(f) The planned conversion shall not be speculative, illegal, or undocumented;

(g) The area shall not be subject to sustainable forest management that maintains or enhances forest carbon stocks and ecological function.

6.2 Improved Forest Management (IFM)

This component of the methodology applies only when all of the following conditions are met:

(a) The project area is classified as natural forest, as defined by the BCR Standard;

(b) The area is subject to a valid legal instrument (e.g., concession, harvest permit) authorizing commercial timber extraction in the absence of the project;

(c) The baseline scenario reflects a credible, permitted harvesting regime that would lead to degradation of forest carbon stocks and ecological integrity over time;

(d) The project activity does not suspend the authorized forest use entirely, but instead implements improved forest management practices (e.g., reduced harvest intensity, extended cycles, enhanced protection) that result in measurable reductions in GHG emissions compared to the baseline;

(e) The forest remains under productive management, but with enhanced environmental outcomes, consistent with the goals of sustainable carbon crediting;

(f) The project proponent shall provide documented evidence of the baseline regime, including the legal basis and operational plans;

(g) If the project activity fully suspends the implementation of the authorized harvesting regime, and the resulting outcome is equivalent to the avoidance of planned forest conversion, the project shall be considered under the APFC component.

7 Terms and definitions

Unless otherwise defined herein, the definitions provided in the BioCarbon Glossary shall apply. Where applicable, terms are adapted from the IPCC 2006/2019 Guidelines and other internationally recognized sources. Definitions are presented in alphabetical order.

Additionality

A project activity is considered additional if the resulting GHG emission reductions would not have occurred in the absence of the project, and if the project is not legally required, is not financially attractive without carbon revenue, and is not common practice in the applicable sector and region.

Activity Data

Activity data refers to the area of natural forest that would have been affected by the implementation of a legally authorized or otherwise documented forest exploitation regime.

In the case of APFC activities, this may include areas under forest concessions or other authorized forest uses where planned interventions, such as harvesting operations defined in a forest management plan, would result in significant and long-term loss of forest carbon stocks or ecological integrity.

The activity data shall be estimated based on documented evidence of planned intervention (e.g., allowable cut volumes, spatial extent of harvest areas, or scheduled operational blocks) and shall represent the area where degradation would occur in the absence of the project activity.

[Source: Adapted from IPCC 2006 Guidelines, Vol. 4]

Authorized Activity

A land-use change or forest management action that has been granted formal approval through a legal authorization or is documented in an official instrument issued by a competent authority.

Under this methodology, authorized activities may include the implementation of legally approved forest management regimes or land-use operations that, while not formally changing the land-use classification, would result in significant and long-term loss of forest carbon stocks, biodiversity, or ecological integrity.

Avoided Planned Forest Conversion Area (APFC Area)

Avoided Planned Forest Conversion refers to project activities that prevent the implementation of a legally authorized or otherwise formally documented plan to convert natural forest to land uses that would result in a significant and long-term reduction of forest carbon stocks, biodiversity, or ecological function.

This includes planned conversion to non-forest uses, forest plantations, or intensive extractive regimes equivalent to functional degradation. The planned conversion shall be supported by a valid legal instrument or credible documentation issued prior to the project start date.

In cases where a forest concession or timber harvesting permit authorizes a regime of extraction that would result in substantial and irreversible degradation of natural forest, and the project activity fully suspends or permanently prevents its implementation, such activity may qualify under the APFC component of this methodology, provided that the resulting conservation outcome is functionally equivalent to the avoidance of forest conversion.

This definition does not include sustainable forest management practices that maintain or enhance forest carbon stocks, biodiversity, or ecological integrity, such as community forestry, reduced-impact logging, or conservation-oriented forest use.

Baseline Scenario

A counterfactual scenario that reasonably represents the anthropogenic greenhouse gas emissions that would occur in the absence of the proposed project activity. Under this methodology, for APFC activities, it corresponds to planned forest conversion. For IFM activities, it corresponds to emissions under the authorized harvesting regime.

[Source: Adapted from CDM Glossary and IPCC 2006 Guidelines]

Carbon Pools

A carbon pool is a system that has the capacity to store or release carbon. Examples include aboveground biomass (ABG), belowground biomass (BGB), litter, dead wood, and soil organic carbon (SOC).

[Source: IPCC 2006 Guidelines, Vol. 4, Glossary]

The selection of carbon pools for quantification shall follow IPCC guidance and be justified for conservativeness.

CO_2 Equivalent (CO_2e)

A metric measure used to compare the emissions of various GHGs based on their Global Warming Potential (GWP), expressed in units of CO_2.

Common Practice

A measure, technology, or land-use practice is considered common practice if it is widely adopted in the relevant sector and geographic area under similar circumstances and not supported by carbon finance or other exceptional incentives.

Conversion to Non-Forest Land

A direct, human-induced transformation of natural forest to another land-use category, such as agriculture, pasture, infrastructure, or mining, that results in the permanent and significant loss of forest carbon stocks, ecological integrity, or native biodiversity. This includes cases where tree cover is reduced below the national forest definition threshold, as well as cases where the structural or functional characteristics of the natural forest are no longer maintained.

[Adapted from IPCC 2006 Guidelines, Vol. 4, with modifications for alignment with BioCarbon definitions]

Credible Documentation

Verifiable, dated, and objective information issued or endorsed by a competent authority, institution, or source, demonstrating the existence, intent, and feasibility of a legally authorized activity relevant to the project's baseline scenario. Examples include forest management plans, concession contracts, official land-use plans, government resolutions, or notarized land titles. Documentation shall predate the project start date and be sufficient to support validation.

Emission Factor

A coefficient that quantifies the emissions or removals of a GHG per unit of activity data (e.g., tCO_2e per hectare of forest cleared). Emission factors shall be supported by scientifically robust and conservative data sources.

Forest

Land meeting the national forest definition, consistent with UNFCCC and IPCC guidance. Typically includes a minimum area (e.g., 0.5 ha), minimum canopy cover (10–30%), and minimum tree height (2–5 m). Temporarily unstocked areas may still qualify as forest.

GHG Project Activity

A specific set of actions that alter the conditions of a baseline scenario, leading to measurable reductions or removals of GHGs, and implemented in accordance with an approved methodology.

[Source: ISO 14064-2:2019]

High Conservation Value Forests (HCVF)

Forest areas that possess outstanding biological, ecological, social, or cultural values identified according to the High Conservation Value (HCV) framework, as recognized by standards such as the FSC.

These include areas with high biodiversity, rare ecosystems, essential ecosystem services, or sites critical to local communities and Indigenous Peoples.

HCVFs may be referenced in project activities (APFC or IFM) to justify enhanced protection, conservation-oriented management, or stakeholder engagement measures.

Improved Forest Management (IFM)

Improved Forest Management refers to project activities that take place within areas of natural forest subject to a valid legal concession, permit, or other authorization for commercial timber harvesting in natural forest, and that modify the baseline harvesting regime in order to reduce greenhouse gas emissions or enhance forest carbon retention. IFM reduces GHG emissions or enhances carbon retention through improved practices (e.g., reduced harvest intensity, extended cutting cycles) relative to the baseline scenario.

Under this methodology, IFM applies when the project does not suspend or cancel the authorized forest use entirely, but rather implements improved forest management practices, such as reducing harvest intensity, extending cutting cycles, or adopting reduced-impact logging, that result in measurable and verifiable climate benefits compared to the legally permitted baseline. The forest remains under productive use but is managed in a way that preserves or enhances its carbon stocks and ecological integrity.

If the project activity fully suspends or cancels the implementation of the legally authorized harvesting regime, and the expected baseline degradation would have resulted in a significant and long-term loss of forest carbon stocks and ecosystem function, the area shall be considered under the APFC component of this methodology.

Leakage

Greenhouse gas (GHG) emissions that occur outside the project boundary as a measurable and attributable consequence of the project activity. In the context of this methodology, leakage may result from the displacement of planned forest conversion (APFC) or legally authorized timber harvesting (IFM) to other areas, leading to unanticipated emissions elsewhere.

Legal Authorization

Any formal instrument issued by a competent authority that grants the right to implement forest management activities or other land-use operations in a defined area of natural forest.

This may include timber harvesting concessions, forest management plans, or other permits that authorize interventions with potential impacts on forest carbon stocks, biodiversity, or ecosystem function.

Non-Forest Land

Land that does not meet the national definition of forest, including permanent cropland, pastures, infrastructure, urban areas, or other land-use categories incompatible with forest cover.

Planned Forest Conversion (PFC)

Planned Forest Conversion refers to the legally authorized or otherwise formally documented conversion of natural forest lands to alternative land uses that result in a significant and long-term reduction in forest carbon stocks, native biodiversity, or ecological function.

APFC encompasses not only the planned and legally sanctioned conversion of natural forest to clearly non-forest land uses (e.g., agriculture, infrastructure, mining), but also cases where the forest is legally slated for transformation into forest plantations, monocultures, or other extractive systems that would substantially and permanently degrade its carbon storage capacity, native biodiversity, or ecological integrity.

The term also covers forest concessions or harvest permits that, if implemented, would cause irreversible degradation of natural forest, provided the project activity fully suspends or cancels the authorized intervention. By adopting this broader concept, the methodology ensures applicability to diverse real-world contexts, especially in jurisdictions where degradation pathways do not always correspond to formal changes in land-use classification but nonetheless result in measurable GHG emissions and ecological loss.

In this sense, PFC includes, but is not limited to:

(a) Deforestation, involving the conversion of forest land to non-forest uses such as agriculture, pasture, infrastructure, mining, or urban development;

(b) Commercial timber extraction under legal forest concessions or harvest permits, when such operations result in the systematic degradation of forest structure, carbon stocks, or ecological integrity beyond natural recovery capacity;

(c) Conversion to forest plantations or monocultures, where such change leads to the loss of natural forest structure, species composition, or ecological integrity;

(d) Other transformations that, despite retaining tree cover, cause substantial and irreversible ecological degradation.

Planed degradation

Refers to a legally authorized or documented human activity that results in a partial but sustained loss of forest carbon stocks, ecological integrity, or forest productivity, without a formal change in land-use classification.

This includes, for example, intensive timber harvesting under an approved forest management plan that causes long-term structural simplification or degradation of the forest ecosystem.

Such activities are considered planned degradation if they are documented in official permits, concessions, or management regimes, and would occur in the absence of the project activity.

Permanence

The extent to which the emission reductions achieved by the project activity are maintained over time. Permanence risks shall be addressed through monitoring, risk assessment, and compensation mechanisms.

Project Area

The geographically defined area of natural forest where the project activity is implemented, and over which the project proponent demonstrates legal authority, control, or long-term access. The project area shall correspond to the area subject to the legal authorization or credible documentation forming the basis of the baseline scenario and shall be clearly delineated for the purposes of monitoring, reporting, and verification.

Project Document

The official submission prepared by the project holder that includes all required information for validation, registration, and verification under the BIOCARBON PROGRAM.

Project holder

The legal entity or individual responsible for the design, implementation, and monitoring of the project activity, as defined under the applicable methodology, and for ensuring compliance with all relevant requirements of the BCR STANDARD, including the use of applicable tools, procedures, and safeguards.

Reference Region

A geographically defined area with similar ecological, socioeconomic, and legal conditions to the project area, used to justify baseline assumptions or analyze historic patterns of forest conversion.

Reserve

A quantity of Verified Carbon Credits (VCCs) withheld and deposited in a pooled or project-specific reserve account to insure against the risk of reversal. The buffer contribution is determined using the BioCarbon Permanence and Risk Management Tool.

Reversal

The release of previously credited GHG emission reductions or removals due to natural or anthropogenic causes. Reversals are classified as avoidable or unavoidable and are subject to compensation through reserve deductions.

Sustainable Forest Management (SFM)

Sustainable Forest Management refers to the application of forest management practices that ensure the long-term maintenance or enhancement of forest carbon stocks, biodiversity, and ecological integrity, while also allowing for the provision of social and economic benefits. These practices are implemented in a manner that preserves the natural structure, species composition, and functioning of the forest ecosystem, avoiding degradation or conversion. As such, activities consistent with sustainable forest management are not considered Planned Forest Conversion under this methodology.

Uncertainty

A quantitative expression of the level of confidence in a measured or estimated value, derived from factors such as data variability, methodological assumptions, and model limitations. Managed in accordance with IPCC guidance, and BCR Tool.

Verified Carbon Credit (VCC)

A unit issued under the BioCarbon Program representing one metric tonne of carbon dioxide equivalent (tCO_2e) reduced or removed, verified by an accredited Conformity Assessment Body and adjusted for leakage, uncertainty, and non-permanence risk.

8 Eligibility criteria

To be eligible under this methodology, the project activity shall take place within areas of natural forest, as defined by the BCR Standard, and shall prevent greenhouse gas emissions that would occur under a legally authorized or otherwise documented baseline scenario involving either:

(a) the prevention of a legally authorized activity that would result in a significant and long-term degradation of natural forest carbon stocks and ecosystem function (Avoided Planned Forest Conversion, APFC); or

(b) the modification of a permitted commercial timber harvesting regime to implement improved forest management practices that reduce GHG emissions relative to the baseline (Improved Forest Management, IFM)

The project holder shall hold a valid legal right or documented authority to implement the proposed activity within the project area, and shall provide verifiable evidence of ownership, control, or long-term access. The project shall not have been implemented prior to the project start date as defined in the BCR Standard and shall comply with all applicable legal and regulatory requirements at the national or subnational level.

Projects shall clearly indicate whether they correspond to the APFC or IFM component of this methodology, based on the nature of the intervention:

(a) APFC applies when the project fully suspends, cancels, or prevents a legally permitted activity that would otherwise result in forest conversion or functional degradation of the natural forest ecosystem;

(b) IFM applies when the project modifies, but does not eliminate, the authorized forest management regime, and implements improved practices that result in verifiable GHG emission reductions relative to the baseline.

In both cases, the project shall demonstrate compliance with the applicable tools and requirements of the BIOCARBON PROGRAM, including the Additionality Tool, the MRV Tool, the Uncertainty Assessment Tool, and the Permanence and Risk Management Tool. Projects shall not result in the double counting of emission reductions and shall establish effective measures for the prevention of leakage and the application of environmental and social safeguards.

Project activities that have already been implemented, are consistent with existing low-impact or conservation-oriented practices, or do not result in measurable and additional climate benefits beyond the baseline shall not be considered eligible under this methodology.

8.1 Eligibility of project areas

8.1.1 Avoided Planned Forest Conversion (APFC)

To be eligible under this methodology, areas subject to Avoided Planned Forest Conversion (APFC) activities shall meet the following conditions:

(a) Forest classification

The area shall be classified as natural forest, as defined by the BCR Standard. Forest status shall be supported by verifiable evidence such as historical satellite imagery, national forest inventories, land cover maps, or official forest classification systems.

(b) Continuity of forest cover

The area shall have maintained continuous natural forest cover for at least ten (10) years prior to the project start date. No evidence of prior conversion or degradation inconsistent with the project activity shall be present.

(c) Legal authorization of baseline activity

The area shall be subject to a valid legal instrument or credible documentation, issued prior to the project start date, that authorizes a baseline activity which would result in long-term and significant loss of forest carbon stocks, biodiversity, or ecosystem function.

This may include:

(a) Conversion to a non-forest land use (e.g., agriculture, infrastructure, mining); or

(b) Replacement of natural forest with forest plantations or monocultures; or

(c) Implementation of a timber harvesting regime under a forest concession that would result in substantial and irreversible forest degradation, and which the project fully suspends or prevents.

(d) Credible threat or implementation

The project holder shall provide clear and dated evidence that the authorized activity would be implemented in the absence of the project. Acceptable documentation includes:

i. Land-use change permits, forest management plans, or concession contracts;

ii. Investment plans, operational schedules, or regulatory obligations;

iii. Legal or contractual timelines and implementation conditions.

(e) Legal authority to implement the project activities

The project holder shall demonstrate legal control, long-term access, or enforceable rights to implement conservation-based activities within the project area, including consent from concessionaires or landowners where applicable.

(f) Exclusion conditions

The following areas shall not be eligible for APFC activities:

i. Forests under permanent legal protection or moratorium on conversion as of the project start date;

ii. Forest areas where the legal authorization has expired, been revoked, or is under legal dispute;

iii. Areas covered by jurisdictional REDD+ accounting unless corresponding adjustments or project exclusion are demonstrably in place.

8.1.2 Improve Forest Management (IFM)

To be eligible under this methodology, areas subject to Improved Forest Management (IFM) activities shall meet the following conditions:

(a) Forest classification

The area shall be classified as natural forest, as defined in the BCR Standard. Forest status shall be demonstrated using verifiable data sources such as forest inventories, remote sensing, or national forest maps.

(b) Continuity of forest cover

The area shall have maintained continuous natural forest cover for at least ten (10) years prior to the project start date. Historical evidence shall confirm the absence of recent conversion or degradation inconsistent with the proposed IFM activity.

(c) Legal authorization of baseline activity

The area shall be subject to a valid legal concession, permit, or forest management plan, issued prior to the project start date, authorizing the commercial harvesting of timber under a regime that would result in the degradation of forest carbon stocks or ecological function over time.

This may include:

i. Concessions or harvesting permits that prescribe intensive logging cycles;

ii. Management plans that allow clear-cutting or extraction exceeding recovery capacity;

iii. Operations with a demonstrated pattern of carbon-emitting practices.

(d) Credible implementation of the baseline scenario

The project holder shall provide evidence that the baseline harvesting regime would have been implemented in the absence of the project. Evidence may include:

i. Valid concession contracts with performance obligations;

ii. Scheduled harvest blocks, inventory-based extraction plans, or operational timelines;

iii. Historical harvesting data or recent activity in comparable forest units.

(e) Legal right to implement the IFM Activity

The project holder shall demonstrate clear legal authority to implement improved forest management within the concession or management area. This may include contractual rights, sub-concession agreements, or other legally recognized arrangements.

(f) Exclusion criteria

The following areas shall not be eligible for IFM activities:

i. Forests already subject to low-impact or conservation-oriented harvesting practices that maintain or enhance carbon stocks without additionality;

ii. Forest areas where the concession or permit has expired, been suspended, revoked, or is under legal dispute;

iii. Forests included in jurisdictional REDD+ or national accounting frameworks unless corresponding adjustments or exclusions are demonstrably in place.

8.1.3 Applicability to projects with multiple UMFs

This methodology is applicable to projects composed of multiple forest management units (UMFs) or concessions with different legal start and end dates. The overall crediting period of the project shall be defined by the earliest documented start date and the latest end date among all included and eligible units.

Each UMF shall independently meet the eligibility criteria, and the project holder shall provide:

(a) Clear documentation of legal authority and baseline conditions for each unit;

(b) Separate monitoring data and performance tracking for each UMF, even if data is later aggregated for reporting purposes;

(c) Transparent justification of how uncertainty, leakage, and permanence assessments apply to each unit or aggregated stratum.

If a UMF ceases to meet eligibility conditions during the quantification period (e.g., due to expiration of legal tenure), it shall be excluded from future crediting, but historical verified reductions remain valid if based on a compliant monitoring period.

This approach ensures methodological consistency while allowing the aggregation of spatially or administratively distinct forest units under a single project boundary.

8.2 Project activities and implementation measures

This methodology applies to project activities that demonstrably reduce or avoid greenhouse gas (GHG) emissions through specific interventions implemented in areas of natural forest. Two types of activities are covered under this methodology:

8.2.1 Avoided planned forest conversion (APFC) activities

APFC activities involve the complete avoidance of a legally authorized or documented plan to convert natural forest to a land use that would result in significant and long-term loss of forest carbon stocks, biodiversity, or ecological function.

Permissible interventions include:

(a) Suspension or revocation of authorized land-use change;

(b) Establishment of legal protections or conservation agreements;

(c) Implementation of surveillance, patrol, or access restriction measures;

(d) Engagement with landholders or concessionaires to formalize permanent conservation;

(e) Supporting activities to maintain forest integrity (e.g., fire prevention, invasive species control, boundary demarcation).

Excluded interventions:

(a) Partial conversion of forested areas;

(b) Commercial exploitation of forest resources inconsistent with conservation;

(c) Activities that shift degradation or deforestation to other areas.

8.2.2 Improved forest management (IFM) activities

IFM activities involve the modification of a legally authorized commercial timber harvesting regime in a natural forest area, with the objective of reducing emissions or increasing carbon stocks.

Permissible interventions include:

(a) Reduction in harvest intensity (e.g., fewer trees per hectare);

(b) Extension of harvest cycles or lengthening of rotation periods;

(c) Spatial reconfiguration of harvest blocks to protect high-carbon or sensitive zones;

(d) Implementation of reduced-impact logging techniques;

(e) Designation of exclusion areas or expanded riparian buffers;

(f) Transition from conventional extraction to protection-based or community-based forest management.

Excluded interventions:

(a) Continued implementation of business-as-usual harvest practices;

(b) Activities with negligible impact on GHG emissions or forest condition;

(c) Actions that result in carbon losses or ecosystem degradation.

Project holders shall describe all planned interventions in the Project Document, along with justification of their consistency with the applicable activity type (APFC and/or IFM), and provide evidence that such interventions will be implemented and monitored throughout the quantification period.

9 Project boundaries

9.1 Geographical boundaries

The geographical boundaries of the project shall encompass all areas of natural forest over which the project proponent has legal authority, and within which the project activity aims to avoid greenhouse gas emissions by either:

(a) preventing the implementation of a legally authorized or documented plan to convert the forest to an alternative land use (APFC); or

(b) modifying a legally permitted forest harvesting regime to reduce degradation and enhance forest carbon retention (IFM).

The project boundary shall include:

(a) the forest area under threat, as specified in valid legal instruments such as land-use plans, forest concessions, harvest permits, or development licenses;

(b) the leakage belt, where applicable, as defined in Section 12, to account for indirect emissions resulting from displacement of activities;

(c) the operational area where project activities are implemented and monitored.

The entire project boundary shall be clearly georeferenced using GIS, with shapefiles delineating spatial extent and associated attributes such as legal status, forest type, concession classification, and identified threat.

9.2 Temporal boundaries

The temporal boundary of the project shall begin on the project start date, as defined under the BioCarbon Program, and extend through the selected quantification period. No project activities shall have been implemented prior to the official start date.

For APFC activities, the temporal boundary shall correspond to the period during which the legally authorized or documented conversion of the forest would have taken place in the absence of the project. This period shall be supported by evidence such as implementation schedules, concession timelines, development plans, or other credible indicators of the expected timing of conversion.

For IFM activities, the temporal boundary shall reflect the operational period of the authorized timber harvesting regime, including the duration covered by the original concession or permit, and any extension introduced through the implementation of improved forest management practices under the project.

9.3 Carbon pools and sources of emissions

9.3.1 Carbon pools

The carbon pools shall be considered in the quantification of greenhouse gas (GHG) emissions and removals under this methodology, depending on the nature of the baseline scenario and the type of project activity, whether Avoided Planned Forest Conversion (APFC) or Improved Forest Management (IFM).

In accordance with the 2006 IPCC Guidelines for National Greenhouse Gas Inventories (Volume 4), the following carbon pools may be considered:

(a) Aboveground biomass

(b) Belowground biomass

(c) Dead wood

(d) Litter

(e) Soil organic carbon

The project holder shall include all carbon pools that are significantly affected by the baseline and project activities, unless a conservative exclusion can be justified. Pools may be excluded if:

(a) They are not expected to change under the baseline or project scenario; or

(b) Excluding them would result in a conservative estimate of mitigation results; or

(c) There is insufficient data, and their expected contribution is minor relative to total emissions.

Project holders shall identify and justify the carbon pools considered for quantification of greenhouse gas emission reductions. The selection shall be consistent with the project activity type (APFC or IFM), the applicable baseline scenario, and the principles of conservativeness and completeness.

The justification for inclusion or exclusion of each carbon pool shall be documented in the Project Document (PD), supported by literature, field data, or referenced methodologies.

APFC activities

For APFC activities, the baseline scenario shall reflect the carbon stock losses associated with the planned forest conversion (e.g., clearance, burning, soil disturbance), and the project scenario shall reflect the maintenance of carbon stocks in preserved pools. Pools typically considered include aboveground biomass, belowground biomass, and, where appropriate, dead wood and soil organic carbon.

This table shall be used by project holders to guide the justification of included and excluded carbon pools. Final selection shall be consistent with the baseline scenario, project scenario and the principles of conservativeness and completeness.

Table 1. Selection of carbon pools for APFC activities

Carbon Pool		**Mandatory / Optional**	**Justification**
Baseline	Aboveground biomass	Mandatory Subject to removal through clearing, significant emissions	Emissions from biomass removal during forest conversion. Primary pool affected by conversion; represents largest emission source.
	Belowground biomass	Mandatory Removed or decomposed following disturbance of root systems	Root biomass is lost during conversion and contributes to emissions. Significant source if roots are extracted or soil is disturbed.
	Dead wood	Optional May be burned or displaced depending on clearing method	May be disturbed or burned during clearing; include if significant. Include if baseline activity disturbs or removes coarse woody debris.
	Litter	Optional Disturbed if conversion exposes or removes surface organic matter	Disturbed if conversion affects litter or surface soil carbon pools. Include if site preparation or land-use change disturbs surface litter or organic soil layer.
	Soil Organic Carbon (SOC)	Optional Lost through grading, tillage, or exposure of mineral layers	Include if mechanical conversion is expected to affect soil structure or content
Project scenario	Aboveground biomass	Mandatory Preserved and protected	Preservation of biomass prevents baseline.
	Belowground biomass	Mandatory	Preservation of root systems avoids belowground losses.

Carbon Pool		Mandatory / Optional	Justification
		Retained with undisturbed soil	
	Dead wood	Optional Retained in undisturbed forest	Usually preserved; exclude if disturbance is minimal.
	Litter	Optional Undisturbed litter layer maintained	Intact litter layer may be preserved under project.
	Soil Organic Carbon (SOC)	Optional Preserved with intact soil layers	Soil carbon preserved; include if disturbance avoided.

IFM activities

For IFM activities, the baseline scenario shall reflect the degradation of carbon stocks under the authorized timber harvesting regime, and the project scenario shall reflect the improvement or preservation of these stocks under modified management. Aboveground biomass is typically the most relevant pool, but belowground biomass and dead wood may also be considered depending on harvest intensity and techniques.

The following table describes how each carbon pool is treated under Improved Forest Management (IFM) activities. It distinguishes between the baseline and project scenario, indicates whether inclusion is mandatory or optional, and provides justification for each case based on expected impacts on carbon stocks.

Table 2. Selection of carbon pools for IFM activities

Carbon Pool		Mandatory / Optional	Justification
Baseline	Aboveground biomass	Mandatory Reduced through authorized timber extraction	Harvesting removes biomass; primary source of baseline emissions. Main source of emissions in harvesting; core basis for avoided degradation
	Belowground biomass	Optional May be impacted by harvesting intensity or soil exposure	May be affected by intensive extraction Include if harvesting techniques disturb root systems or soil
	Dead wood	Optional Damaged or removed during felling and skidding	Logging may disturb standing or fallen Include if disturbance affects coarse woody debris or legacy carbon

Carbon Pool		Mandatory / Optional	Justification
	Litter	Optional May be trampled or partially removed during operations	Litter is generally undisturbed by timber extraction Include if the baseline activity compromises litter or surface organic matter.
	Soil Organic Carbon (SOC)	Optional Disturbed through road construction or equipment compaction	Soil may be compacted by machinery or road construction Include if operations cause measurable impact on soil physical or chemical profile
Project scenario	Aboveground biomass	Mandatory Preserved or less disturbed under improved practices	Reduced harvest or protection preserves aboveground carbon
	Belowground biomass	Mandatory Retained through low-impact practices	Mostly preserved under improved management practices
	Dead wood	Optional Retained and managed to preserve ecological function	Deadwood retained or left intact under improved practices
	Litter	Optional Minimally affected under reduced-impact management	No change expected; exclude unless project alters disturbance
	Soil Organic Carbon (SOC)	Optional Preserved through better planning and restricted machinery	Avoided disturbance under improved management preserves SOC

9.3.2 Sources of emissions

The table below outlines the greenhouse gas (GHG) emission sources associated with Avoided Planned Forest Conversion (APFC) and Improved Forest Management (IFM) activities. It distinguishes between emissions expected under the baseline scenario and those that may occur under the project scenario, based on the type of authorized activity and the intervention applied.

Project holders shall use this table to identify which emission sources are relevant to their specific project context and to determine whether inclusion in the GHG quantification is required. Emission sources may be excluded only if demonstrated to be immaterial or if their exclusion leads to a conservative estimate of mitigation results. All decisions regarding inclusion or exclusion shall be clearly documented and justified in the Project Document (PD), in accordance with the principles of completeness, conservativeness, and transparency.

Table 3. Sources of emissions in APFC and IFM activities

Emission source	Baseline scenario APFC activities	Project scenario APFC activities	Baseline scenario IFC activities	Project scenario IFM activities
Aboveground biomass loss (CO_2)	Yes Emissions from biomass removal due to land-use conversion (forest clearance)	No Biomass does not change	Yes Emissions from authorized timber harvesting	Reduced Due to decreased harvest intensity or protected areas
Belowground biomass loss (CO_2)	Yes Emissions from biomass removal due to land-use conversion	No. Root systems maintained	Optional Include if harvesting practices disturb root biomass	Minimal If improved practices avoid disturbance
Deadwood disturbance (CO_2)	Conditional If deadwood is removed or affected by clearing	No. No disturbance expected	Yes If logging practices damage standing or fallen deadwood	Reduced Retained under improved management
Litter and surface organic matter (CO_2)	Conditional If conversion disturbs litter or topsoil organic layer	No. Litter or surface soil carbon remains intact	Optional Include if harvesting significantly disturbs surface organic material	Typically unchanged. Minimal expected disturbance
Soil carbon loss (CO_2)	Yes Emissions due to physical soil disturbance (e.g., grading, plowing)	No Soil structure maintained	Optional Include if machinery or road building causes compaction/disturbance	Reduced Use of low-impact practices minimizes disturbance
Biomass burning (CH_4, N_2O)	Yes if fire is used during land clearing or site preparation	No No burning occurs	If applicable, include only if burning is part of the operational practice	No Fire use avoided under improved management

Emission source	Baseline scenario APFC activities	Project scenario APFC activities	Baseline scenario IFC activities	Project scenario IFM activities
Fuel use and infrastructure (CH_4, N_2O)	No Emissions not typically material	No Unless minimal emissions from maintenance	Optional Include if significant machinery or road emissions occur	Present Include if fuel or equipment emissions are material
Fuel use and infrastructure (CO_2)	Yes Emissions from activities of mechanized operations in timber harvesting processes, including felling, skidding, loading and transportation. These emissions shall be included in baseline scenario where significant	Yes These emissions shall be included in the project scenario only if such operations are demonstrably reduced or avoided by the project activity	Yes Emissions from activities of mechanized operations in timber harvesting processes, including felling, skidding, loading and transportation. These emissions shall be included in baseline scenario where significant	Yes These emissions shall be included in the project scenario only if such operations are demonstrably reduced or avoided by the project activity

10 Baseline scenario and additionality

Project holders shall apply the BioCarbon Additionality Tool to identify a credible and conservative baseline scenario and to demonstrate the additionality of the proposed APFC and/or IFM activity. The use of this tool is mandatory and shall be completed in full, following the step-wise procedure and documentation requirements set forth therein.

The following subsections provide additional guidance to support the correct and consistent application of the Additionality Tool within the context of this methodology. This includes examples of acceptable baseline configurations, types of documentation, and considerations relevant to different activity types. These elements are intended to facilitate the practical implementation of the tool, but do not replace or override its requirements.

10.1 Baseline scenario identification

The baseline scenario shall represent the legally authorized or otherwise documented activity that would have been implemented in the absence of the APFC and/or IFM activities, and that would result in measurable GHG emissions.

For all activities, the baseline shall:

(a) Be technically and legally feasible;

(b) Be consistent with available documentation and implementation context;

(c) Reflect a legally and operationally plausible alternative, estimated conservatively;

(d) Be supported by verifiable evidence such as land-use permits, concessions, forest management plans, official development approvals, investment plans, or concession timelines.

10.1.1 Baseline scenario for APFC activities

For APFC activities, the baseline scenario corresponds to the implementation of a legally authorized or otherwise documented plan that would result in the conversion or substantial degradation of natural forest. This may include:

(a) The transformation of forest land to non-forest uses (e.g., agriculture, infrastructure, mining), or

(b) The replacement of natural forest with plantations, monocultures, or other extractive systems that do not maintain forest structure and function, or

(c) The implementation of a forest concession or timber harvesting regime that would lead to long-term ecological degradation, where the project activity fully suspends or cancels its execution.

The expected baseline activity shall be supported by valid documentation issued prior to the project start date and demonstrate a credible likelihood of implementation in the absence of the project.

If the legal instrument that defines the baseline activity (e.g., a forest management plan or concession) has a limited period of validity, the project holder shall provide evidence that its implementation is probable or routinely renewed under prevailing administrative practice or policy. In such cases, the continuation of the authorized activity beyond the formal validity period may be considered as part of the baseline scenario, provided that it is justified conservatively and does not contradict applicable laws or governance conditions.

10.1.2 Baseline scenario for IFM activities

For IFM activities, the baseline scenario corresponds to the implementation of a legally authorized forest management regime that allows commercial timber harvesting in natural forest. This regime shall be defined by a valid forest concession, management plan, or harvest permit issued prior to the project start date.

The baseline shall reflect:

(a) The planned harvest intensity (e.g., volume or number of stems per hectare);

(b) The spatial and temporal distribution of harvest blocks;

(c) Operational practices allowed under the permit, including felling methods, road construction, and equipment used;

(d) The expected impact of the baseline regime on carbon stocks and forest condition over time.

The project holder shall provide evidence that the baseline harvesting regime would have been implemented in the absence of the improved management activity, and that it would result in a measurable reduction in forest carbon stocks or ecosystem integrity.

Relevant documentation may include:

(a) Approved forest management plans;

(b) Concession contracts with performance obligations;

(c) Pre-harvest inventory data;

(d) Logging operation schedules or rotation plans;

(e) Historical harvesting practices in comparable areas under the same legal framework.

The selected baseline shall be realistic, conservative, and verifiable. If more than one plausible baseline scenario exists, the one leading to the highest emissions shall be selected unless a lower-emission scenario can be justified as more likely based on objective evidence.

10.2 Demonstration of Additionality

Project holders shall demonstrate that the APFC or IFM activity would not occur in the absence of carbon credit revenues or equivalent incentives. This demonstration shall follow the procedure set out in the BioCarbon Additionality Tool, and shall include the following:

(a) Identification of alternative scenarios to the proposed activity, including business-as-usual operations and plausible investment or management pathways;

(b) Barrier analysis or investment analysis, as applicable, showing that the project activity faces one or more financial, technological, institutional, or social barriers that would prevent its implementation without carbon finance;

(c) Assessment of common practice, demonstrating that the proposed activity is not widely adopted in the applicable region and sector, unless distinguishable by clear and verifiable features;

(d) Selection of the most plausible and conservative baseline scenario, consistent with the tool's step-wise procedure.

The project activity shall only be deemed additional if it passes the relevant steps of the Additionality Tool. Activities that are legally required, routinely implemented without carbon finance, or inconsistent with the additionality criteria of the program shall not be eligible for crediting under this methodology.

10.2.1 Application to APFC activities

For APFC activities, project holders shall demonstrate that the planned forest conversion would have occurred in the absence of the project, and that the activity to avoid such conversion is not legally required, not common practice, and not financially or operationally viable without carbon credit revenues or equivalent enabling conditions.

The additionality demonstration shall be based on the structure of the BioCarbon Additionality Tool and supported by evidence of:

(a) The existence of a legally authorized or formally documented plan for forest conversion, issued prior to the project start date;

(b) The credibility of the threat, including operational or financial readiness to implement the conversion;

(c) The absence of legal obligations to conserve the forest area;

(d) The lack of financial or institutional incentives that would have enabled forest protection without carbon finance.

Acceptable evidence includes:

(a) Land-use change permits, approved infrastructure or agricultural plans, or forest conversion authorizations;

(b) Investment contracts, development schedules, or documentation of imminent implementation;

(c) Ownership or concession documents that authorize conversion but do not impose conservation obligations;

(d) Documentation showing that in similar contexts, planned conversions are carried out as standard practice unless actively stopped.

The additionality of the APFC activity shall be demonstrated by showing that the conservation outcome would not occur under any of the realistic alternative scenarios identified, including continuation of the planned conversion or passive forest degradation. If the project activity consists only of suspending a conversion that was unlikely to be implemented or already restricted by other means, it shall not be considered additional.

Barrier analysis, investment analysis, or both may be applied depending on the circumstances. Common practice analysis is mandatory in all cases.

10.2.2 Application to IFM activities

For IFM activities, the project holder shall demonstrate that continuing the legally authorized timber harvesting regime represents the most plausible course of action in the absence of the project. The improved forest management intervention shall result in a measurable reduction in emissions or enhanced carbon retention and shall not be required by law or implemented widely in the region as standard practice.

Acceptable justifications may include:

(a) Financial analyses showing that the improved management regime is economically less attractive without carbon revenues;
(b) Documentation of institutional, regulatory, or operational barriers to implementing lower-impact practices;
(c) Evidence that similar concessions or forest units continue to apply conventional harvesting methods under the same jurisdiction and policy environment;

(d) Market or infrastructure constraints that limit voluntary adoption of improved management practices.

The additionality demonstration shall also account for:

(a) Whether the harvesting concession includes sustainability certifications or requirements that already mandate improved practices;
(b) Whether the project activity exceeds legal minimums or business-as-usual approaches;
(c) Whether the improvement is already being implemented in comparable contexts without carbon finance.

Project holders may rely on investment analysis, barrier analysis, or both, in accordance with the tool. The common practice analysis is mandatory in all cases. If any step fails to demonstrate that the activity is not business-as-usual or not financially or institutionally viable without carbon incentives, the project shall be deemed non-additional.

11 Quantification of GHG emission reductions

Project holders shall quantify the net greenhouse gas (GHG) emission reductions resulting from the implementation of APFC and/or IFM activities by comparing the emissions expected under the baseline scenario with those estimated under the project scenario, following a transparent, conservative, and verifiable approach. The quantification shall be based on the eligible carbon pools and emission sources identified in Sections 9 and 10 and shall be expressed in metric tonnes of carbon dioxide equivalent (tCO_2e).

Emission reductions may be estimated ex-ante and shall be updated ex-post based on monitored data. All assumptions, parameters, and calculation methods shall be clearly described in the Project Document (PD), be subject to validation and verification, and shall be consistent with the BCR Standard and applicable methodological tools.

11.1 Stratification and sampling design

Project holders shall define and apply a stratification and sampling design that ensures the representativeness, efficiency, and statistical robustness of data used for ex-ante and ex-post quantification of GHG emission reductions. The approach shall comply with the IPCC 2006 Guidelines (Volume 4, Section 3.3.1) and be consistent with the requirements of the BioCarbon Uncertainty Assessment Tool.

11.1.1 Stratification of the project area

The project area shall be stratified into relatively homogeneous units (strata) based on parameters that influence carbon stock or emission estimates. Stratification may be based on:

(a) Forest type or vegetation class;

(b) Management regime (e.g., harvest intensity zones in IFM);

(c) Accessibility or threat level (e.g., proximity to planned infrastructure in APFC);

(d) Historical degradation or disturbance patterns;

(e) Soil characteristics or slope (if soil carbon is included).

Each stratum shall be clearly mapped and georeferenced. Stratification shall be applied consistently in the baseline and project scenarios. Adjustments to strata may be made ex post (post-stratification) following field verification or remote sensing validation, provided that such changes are justified and documented.

11.1.2 Sampling design

A sampling plan shall be developed for any parameters estimated through field measurements (e.g., biomass, soil carbon). The sampling design shall:

(a) Be statistically valid and documented prior to implementation;

(b) Define the population, strata, sample frame, sample size, and sampling method;

(c) Use random, systematic, or stratified random sampling as appropriate;

(d) Be consistent across measurement campaigns, unless updates are justified;

(e) Minimize measurement error, bias, and variance.

Where possible, project holders should adopt stratified random sampling, as recommended by the IPCC, to improve efficiency and reduce uncertainty.

11.1.3 Sample size and precision targets

The number of plots or sampling units shall be sufficient to achieve:

(a) A minimum precision of ±10% at 90% confidence for key parameters affecting carbon stock estimation;

(b) Compliance with the thresholds set by the BioCarbon Uncertainty Assessment Tool;

(c) A balance between practicality and statistical rigor.

(d) Project holders shall provide a justification of the sampling intensity selected, including calculations of expected variance and error propagation.

National Forest Inventories may accept margins of error greater than ±10% at 90% confidence, due to their statistical nature, national scale, and policy-oriented objectives. Such practice may be recognized only as contextual reference.

Similarly, national GHG inventories may also accept margins of error greater than ±10% at 90% confidence. These criteria shall also be recognized only as contextual reference.

However, for the certification of GHG emission reductions and removals under the BioCarbon Standard, the threshold established in this Methodology shall strictly apply. Consequently, any error exceeding ±10% shall be adjusted through the application of conservativeness deductions, unless there is an explicit disposition issued by the national authority under Article 6 of the Paris Agreement, and only where such disposition does not compromise environmental integrity or alignment with the principles of BioCarbon Standard.

11.1.4 Data collection protocols

Sampling protocols shall include:

(a) Plot size and configuration (e.g., circular, nested, fixed area);

(b) Measurement variables (e.g., DBH, height, species);

(c) Equipment and calibration procedures;

(d) Plot marking, GPS recording, and metadata capture.

Standard operating procedures shall be documented, and quality assurance/quality control (QA/QC) measures shall be applied throughout the field campaign.

11.1.5 Documentation and replicability

The full stratification and sampling design, including maps, equations, justifications, and data sources, shall be included in the Project Document and updated during each monitoring period. All records shall be available for third-party validation and verification.

11.2 Net GHG Emission Reductions

Project holders shall present a conservative ex-ante estimation of the total **Net GHG Emission Reductions** expected from the implementation of the APFC and/or IFM activities. These estimates shall be consistent with the baseline scenario, monitoring approach, and all applicable quantification parameters described in this methodology.

Where applicable, project holders shall refer to the relevant parameter tables and quantification guidance sections to estimate specific inputs conservatively.

The Net GHG Emission Reductions for monitoring period *t* shall be calculated using the following equation:

$$ER_t = ER_{APFC,t} + ER_{IFM,t} - Lk_t$$

Where:

ER_t	=	Total emission reduction from project activities; t; tCO_2
ER_{APFC}	=	Emission reduction from Avoided Planned Forest Conversion; t; tCO_2
ER_{IFM}	=	Emission reduction from Improved Forest Management; t; tCO_2
Lk_t	=	Leakage; t; tCO_2
t	=	$t_2 - t_1$; year

11.2.1 General equation for estimating biomass from volume data

The emissions reductions shall be estimated through the carbon stocks in commercial timber volumes. All parameters used shall be transparently documented and sourced from national data, scientific literature, or IPCC defaults. Project holders shall ensure consistency in units, species grouping, and wood density factors.

The following equation shall be used to estimate total biomass from data of commercial wood volume, where project holders rely on volume-based forest inventory data. This equation is applicable to both APFC and IFM activities and shall be used consistently across baseline and project scenarios for the calculation of carbon stocks and GHG emissions or removals.

The estimate of total biomass for each species j at the sample plot level will be calculated as:

$$B_{TREE,j,p,i,t} = V_{TREE,j,i,p,t} \times D_J \times FEB_j \times (1 + Rj)$$

Where:

$B_{TREE,j,p,i,t}$	Biomass of trees of species j in sample plot p of stratum i at a point of time in year t; t d.m
$V_{TREE,j,i,p,t}$	Stem volume of trees of species j in sample plot p of stratum i at a point of time in year t, estimated by using the tree dimension(s) as entering data into a volume table or volume equation; m^3
D_J	Basic wood density of tree species j; t d,m; m^{-3}
BEF_j	Biomass expansion factor for conversion of stem biomass to above-ground tree biomass, for tree species j; dimensionless
Rj	The root-shoot ratio for tree species j; dimensionless
j	*Tree species*

The biomass $B_{TREE,j,p,i,t}$, maybe estimated for species and stratum using the annual volume per hectare. The annual volumes for each species are taken from the data resulting from the inventories at the date of monitoring.

The project holder shall provide the sources of all data used in the biomass estimation process. This may include published factors applicable to the species and ecological conditions of the project site, or project-specific data developed by the project holder, provided that their origin and applicability are transparently demonstrated.

The QA/QC procedures shall include verification of the validity and appropriateness of the equations and factors applied.

Based on the field measurement results, carbon stocks shall be calculated for each included carbon pool, expressed in tonnes of CO_2e as of the inventory date, in accordance with the requirements of this methodology.

Total biomass shall be calculated using the following equation:

$$BT_t = B_{TREE,j,p,i,t} + B_{Li,,i,t} + B_{Dw,j,p,i,t}$$

Where:

BT_t	Total biomass in sample plot p or stratum i; in year t; ; t d.m

$B_{TREE,j,p,i,t}$	Biomass of trees of species j in sample plot p of stratum i; in year t; t d.m
$B_{Li,j,p,i,t}$	Biomass of litter of stratum i; in year t; t d.m
$B_{Dw,j,p,i,t}$	Biomass of litter of stratum i; in year t; t d.m

11.2.2 Carbon Content estimation

The carbon content of biomass shall be estimated by applying a default or species-specific carbon fraction to the total dry biomass.

$$C_T = B_T \times CF$$

Where:

C_T	Carbon content (tonnes of carbon); tC
B_T	Total biomass (sum of ABG and BGB); t d.m
CF	Carbon fraction of dry biomass (default: 0.47)

The default carbon fraction (CF = 0.47) shall be applied unless scientifically robust, species-specific data are available and justified. This value is consistent with the IPCC 2006 Guidelines (Vol. 4, Ch. 4).

11.2.3 Inclusion of Soil Organic Carbon (SOC) and Litter

The inclusion of **soil organic carbon (SOC)** and **litter** as carbon pools is optional under this methodology. If included, project holders shall ensure that:

(a) These pools are likely to be significantly impacted by the planned baseline activity (e.g., soil removal, site grading, or intense mechanical disturbance);

(b) The project activity prevents such disturbance and maintains or enhances the pool;

(c) The estimation of carbon stocks and emissions follows a conservative, IPCC-aligned approach.

Estimation Method for SOC and Litter

SOC may be estimated using direct soil sampling, supported by lab analysis of organic carbon content and bulk density.

Alternatively, default values and emission factors from the IPCC 2006 Guidelines (Vol. 4, Table 2.3) may be applied.

Litter carbon may be estimated using field plots or default biomass factors, combined with the standard carbon fraction (CF = 0.37–0.47 depending on material type).

Emissions from SOC or litter disturbance must be included in the baseline scenario if the activity involves soil exposure, compaction, or mechanical clearing.

If SOC or litter pools are included in the quantification:

(a) The project holder shall provide baseline and project values or justifications;

(b) Uncertainty shall be assessed using the BioCarbon Uncertainty Tool;

(c) Sampling methods, laboratory procedures, and equations used shall be documented in the Project Document.

11.2.4 Emission reductions from APFC activities

Parameters and data requirements

The table below identifies the key parameters required for the quantification of emission reductions in APFC activities. It includes unit specifications, definitions, and recommended data sources. Project holders shall ensure that all parameters are applied consistently with the baseline scenario, and that values are justified using field measurements, national datasets, or IPCC guidance.

Where data are not directly available, conservative estimates may be used, provided that assumptions are transparently documented and supported by verifiable references in the Project Document (PD).

Table 4. Parameters and data (APFC activities)

Parameter	Symbol / Unit	Description	Data Source
Project area	A (ha)	Total area of natural forest covered by the planned conversion	GIS shapefiles, concession maps, legal documents
Conversion method	Qualitative / category	Type of conversion authorized (e.g., agriculture, infrastructure, plantation)	Permits, forest management plans, official documentation
Conversion schedule	Year(s) or phase schedule	Expected timing or phasing of the conversion activity	Concession timelines, investment plans, development permits
Aboveground biomass (baseline)	t C/ha or t d.m./ha	Estimated biomass stock subject to clearance in baseline	Field plots, forest inventory, national biomass maps, IPCC defaults
Belowground biomass (baseline)	t C/ha or t d.m./ha	Estimated belowground biomass associated with cleared vegetation	Root-to-shoot ratio, IPCC guidelines, national data
Biomass burning emissions	tCO_2e/ha	Emissions expected from planned burning of biomass residues	IPCC Vol. 4, national fire emission factors, peer-reviewed studies
Soil carbon loss	tCO_2e/ha	Emissions expected from disturbance or exposure of soils	IPCC soil carbon factors, national data, literature
Carbon fraction of biomass	t C/t biomass	Conversion factor from biomass to carbon content	IPCC 2006 defaults, national or peer-reviewed studies
CO_2, CH_4, N_2O emission factors	tCO_2e or tCH_4e per activity	Emission factors for gases released through clearing and disturbance	IPCC Vol. 2 and 4, national inventories, scientific literature

Quantification approach for APFC activities

For Avoided Planned Forest Conversion (APFC) activities, emission reductions shall be quantified by estimating the GHG emissions that would have occurred from the planned baseline activity (i.e., the authorized or documented forest conversion), and subtracting the emissions resulting from the project scenario, in which the forest is preserved.

The project scenario is assumed to generate no material GHG emissions, provided that no extraction, degradation, or disturbance occurs within the project area. If minimal emissions occur due to infrastructure maintenance or subsistence use, they shall be transparently estimated and included.

Emission reductions shall be calculated using the following equation:

$$ER_{APFC,t} = E_{APFC,baseline,t} - E_{APFC,project,t}$$

Where:

$ER_{APFC,t}$	=	Emission reductions in year t; tCO_2e
$E_{APFC,baseline,t}$	=	Estimated GHG emissions in year t resulting from the planned conversion; tCO_2e
$E_{APFC,project,t}$	=	Estimated GHG emissions in year t under the project scenario (typically zero); tCO_2e

$E_{baselinet,t}$ shall include, as applicable:

- CO_2 emissions from loss of aboveground and belowground biomass;
- CH_4 and N_2O emissions from biomass burning (if fire-based conversion is documented);
- CO_2 emissions from soil organic carbon loss due to disturbance (e.g., plowing, grading);
- Any infrastructure-associated emissions directly related to the conversion plan.

The calculation of baseline emissions shall:

- Be based on documented plans, permits, concessions, or development schedules issued prior to the project start date;
- Reflect realistic timing and spatial extent of conversion (e.g., phased implementation over years);
- Be aligned with carbon pools and emission sources identified in Sections 9;
- Be supported by conservative assumptions if precise data are unavailable.

$E_{project,t}$ may be considered zero if:

- The forest is fully protected, and no material intervention occurs;
- There is no biomass removal, degradation, or soil disturbance;
- Monitoring confirms continued ecological integrity of the project area.

If limited emissions occur (e.g., foot traffic, minor clearing, maintenance access), they shall be included in $E_{project,t}$ and justified.

Treatment of forest regrowth and removals

In APFC activities, the baseline typically results in deforestation or severe degradation, while the project maintains the carbon stocks. The methodology does not require quantifying net removals unless the project holder wishes to claim measurable carbon removals (e.g., secondary growth). In such cases, removals shall be:

(a) Quantified separately;

(b) Justified by monitoring or growth models; and

(c) Consistently excluded from the baseline scenario.

11.2.5 Emission reduction from IFM activities

Parameters and data requirements

For IFM activities, the quantification of emission reductions shall be based on a consistent set of parameters that reflect the difference in carbon emissions and removals between the baseline harvesting regime and the improved forest management scenario.

Project holders shall define and justify the use of each parameter in the Project Document (PD). All data sources shall be transparent, up-to-date, and verifiable. Preference shall be given to national datasets, IPCC defaults (Tier 1 or 2), or field measurements in accordance with the BIOCARBON PROGRAM monitoring requirements.

The parameters required for the quantification of emission reductions in IFM activities, along with their units, descriptions, and recommended data sources, are presented in the table below. Project holders shall apply these parameters consistently and justify all values used, in accordance with the methodological requirements.

Table 5. Parameters and data (IFM activities)

Parameter	Symbol	Unit	Description
Area under management	A	ha	Total forest area subject to the IFM activity
Volume harvested (baseline)	VBL	m^3/ha/year	Average harvest volume under the baseline scenario
Volume harvested (project)	VPJ	m^3/ha/year	Average harvest volume under the project scenario
Biomass expansion factor	BEF	t d.m./m^3	Factor to convert wood volume to dry biomass

Parameter	Symbol	Unit	Description
Carbon fraction of biomass	CF	t C/t biomass	Default value from IPCC or national inventory
CO_2 emission factor	$EFCO_2$	tCO_2/t C	Typically 44/12 (molecular weight ratio)
Emission from road/machinery use	Eroad,mu	tCO_2e/year	Optional: emissions from fuel and equipment used during harvest
Root-to-shoot ratio (if belowground biomass is included)	R/S	–	Ratio used to estimate belowground biomass
Regrowth rate (optional)	RG	tCO_2e/ha/year	Biomass increment under improved practices (if sequestration is claimed)

Data requirements and sources:

Harvest volumes shall be supported by concession plans, operational records, or comparable forest units.

BEFs and CFs shall be consistent across baseline and project scenarios.

If machinery emissions are included, fuel consumption data or standardized estimates shall be used.

Regrowth rates, if claimed, shall be based on species-specific growth curves, long-term monitoring data, or scientifically accepted models.

All parameters shall be applied consistently in baseline and project calculations, unless the methodological justification requires otherwise.

Quantification approach for IFM Activities

For IFM activities, emission reductions result from the difference in emissions between the baseline harvesting regime and the improved forest management regime. Where applicable, net sequestration benefits may also be included.

Emission reductions from IFM activities shall be calculated using the following equation:

$$ER_{IFM,t} = E_{IFM,baseline,t} - E_{IFM,project,t} + Removals_{project,t} - Removals_{baseline,t}$$

Where:

$ER_{IFM,t}$	=	Total Emission reductions from improved forest management in year t; tCO_2e
$E_{IFM,baseline,t}$	=	Estimated GHG emissions under the authorized baseline harvesting regime, in year t; tCO_2e
$E_{IFM,project,t}$	=	Estimated GHG emissions under the improved management regime, in year t (will be near zero, unless fires, degradation, or internal displacement occur within the project boundary); in year t; tCO_2e
$Removals_{project,t}$	=	Net carbon sequestration under improved management (if monitored and claimed); in year t; $tCO2$
$Removals_{baseline,t}$	=	Carbon sequestration under the baseline regime (may be zero or minor); in year t; $tCO2$

Key considerations:

- Baseline emissions shall be estimated using harvest volume, species composition, and expected biomass losses, based on approved forest management plans or concession history.
- Project emissions shall reflect reduced harvesting intensity, modified techniques, or protection zones.
- If regrowth or enhanced sequestration is claimed, it shall be monitored and verifiable.
- Removals under baseline may be excluded if negligible but shall be addressed explicitly.

11.2.6 Quantification of leakage

$$Lk_t = Lk_{APFC,t} + Lk_{IFM,t}$$

Where:

Lk_t	=	Total leakage from project activities; t; $tCO2$
$Lk_{APFC,t}$	=	Leakage from Avoided Planned Forest Conversion; t; $tCO2$
$Lk_{IFM,t}$	=	Leakage from Improved Forest Management; t; $tCO2e$

t = $t_2 - t_1$; year

12 Leakage management

Project holders shall identify, assess, mitigate, and account for any greenhouse gas (GHG) emissions that occur outside the project boundary as a result of the implementation of APFC and/or IFM activities.

This section follows the approach defined in the 2006 IPCC Guidelines (Vol. 4, Ch. 4.3.7), and outlines the requirements for effective leakage management, including risk identification, quantification, monitoring, and deduction from claimed emission reductions.

Leakage shall be addressed both ex-ante and ex-post, and all measures taken to minimize displacement effects shall be transparently documented and verifiable. The objective is to ensure that credited emission reductions reflect real, additional, and conservatively estimated climate benefits, in alignment with the BCR STANDARD.

This section sets out the requirements for identifying, monitoring, and accounting for leakage emissions to ensure that net GHG benefits represent real and conservative climate mitigation results.

12.1 Leakages coverage

Leakage refers to GHG emissions caused by the displacement of baseline activities or pressure to areas outside the project boundary. It shall be assessed ex-ante, monitored over time, and deducted from estimated emission reductions where material.

Leakage assessment shall apply to all APFC and IFM activities where there is a credible risk of:

(a) Shifting land-use change or degradation to other forested areas;

(b) Indirect market effects increasing pressure on forests or wood products;

(c) Unintended consequences that generate GHG emissions attributable to the project.

12.2 Types of leakage

The following types of leakage shall be considered:

(a) Activity-shifting leakage

Occurs when deforestation, degradation, or timber extraction is displaced to other areas as a result of restricted access or changes introduced by the project.

In APFC activities, this includes conversion pressures shifting to neighboring lands or to areas used by displaced users.

In IFM activities, this includes the relocation of timber extraction or logging operations to forests outside the project area.

(b) Market leakage

Occurs when the project reduces the supply of a commodity (e.g., timber), resulting in increased production or extraction elsewhere, potentially generating GHG emissions.

Market leakage shall be assessed if the project activity affects commercial supply chains in measurable ways.

(c) Indirect emissions from infrastructure or access

If project activities result in new roads, improved access, or unintended land speculation around the project boundary, such emissions shall be assessed and attributed if caused by the intervention.

12.3 Ex-Ante leakage risk identification

Project holders shall conduct an ex-ante assessment of potential leakage sources, covering:

(a) Nature and scale of the baseline activity;

(b) Likelihood and location of displacement;

(c) Users or actors likely to be affected;

(d) Alternative areas or activities available to absorb the displaced pressure;

(e) Existing land-use policies or tenure arrangements that may limit leakage.

This assessment shall inform the design of the leakage mitigation strategy and, where appropriate, the establishment of a leakage belt or designated leakage monitoring area. Such area shall be delineated outside the project boundary and used to detect potential displacement of baseline activities, consistent with the approach defined in Section 12 of this methodology.

12.4 Leakage monitoring area

A leakage monitoring area (also referred to as a leakage belt) is a geographically defined area outside the project boundary where the displacement of baseline activities may plausibly occur. Its purpose is to enable the detection and estimation of potential leakage emissions. The delineation of such area shall be based on an ex-ante risk assessment and include zones of potential activity-shifting or stakeholder displacement. Monitoring results within this area shall inform any required leakage deductions.

A leakage belt shall be established, defined as:

The geographic area outside the project boundary that is accessible to the actors, incentives, or drivers of planned deforestation displaced by the project.

The leakage belt shall meet the following conditions:

(a) Be contiguous or functionally connected to the project area;

(b) Be comparable in forest type, land tenure, and accessibility;

(c) Be at least equal to the potential mobility radius of displaced actors;

(d) Exclude areas with legal restrictions or full protection enforced prior to the project start date;

(e) Include areas with plausible potential for deforestation displaced by the project.

GIS shapefiles and justification of the leakage belt boundary shall be submitted as part of project documentation.

12.5 Quantification and deduction of leakage

If leakage is deemed likely and significant, project holders shall:

(a) Quantify leakage emissions using conservative assumptions, field data, or standardized factors;

(b) Apply a deduction from the total GHG emission reductions prior to reserve allocation;

(c) Clearly document all calculations and data sources in the PD.

12.5.1 Use of default leakage deduction factors

Where direct quantification of leakage emissions is not feasible due to the lack of data, methodological constraints, or uncertainty regarding the location of displaced activities, project holders may apply default deduction factors, provided that the level of leakage risk is assessed and transparently justified in the Project Document (PD).

The applicable deduction factor shall correspond to the level of leakage risk identified through a structured analysis and shall be applied to the total estimated emission reductions before any adjustments for uncertainty or non-permanence.

Table 6. Default leakage deduction factors

Leakage Risk Level	Conditions	Deduction Factor (% of ERs)
Low	No identified displacement risk; legal or physical barriers prevent leakage; leakage belt present	0%
Moderate	Potential for leakage exists, but mitigation measures are in place and likely to be effective	10%
High	High likelihood of displacement; limited mitigation; affected users or extractive agents displaced	20%

The following conditions shall be met in order to apply a default leakage deduction factor:

(a) The use of default factors is permitted only when direct field-based or modeled quantification of leakage is not feasible;

(b) The project holder shall conduct a leakage risk assessment addressing the drivers, actors, geographic context, and mitigation strategy;

(c) The justification for the selected risk level and deduction factor shall be clearly documented and subject to validation;

(d) The use of a lower factor than 20% shall be supported by credible evidence of leakage prevention measures or risk containment.

In cases where leakage is later observed to exceed the anticipated level, adjustments shall be made ex-post to reflect actual emissions.

12.6 Minimization measures and justification

Project holders shall design and implement measures to minimize leakage, such as:

(a) Engaging with affected stakeholders to provide alternatives (e.g., sustainable livelihoods, forest use plans);

(b) Integrating project activities with landscape-level planning or jurisdictional efforts;

(c) Establishing formal protection or management agreements in surrounding areas;

(d) Promoting sustainable supply alternatives to offset reduced availability (in IFM).

The PD shall describe all leakage prevention measures and explain how they reduce the likelihood or magnitude of displacement.

12.7 Exclusions and justified exceptions

Leakage may be considered negligible (and excluded from quantification) if:

(e) The planned deforestation agents are legally and contractually prevented from engaging in equivalent activities elsewhere;

(f) The project covers a concession with exclusive rights, and the project holder retains enforceable control;

(g) Displaced agents are fully absorbed into the project activities;

(h) The leakage belt is demonstrably non-forest or legally protected and enforced;

(i) The leakage assessment demonstrates <5% expected emissions increase relative to credited reductions.

All exclusions shall be clearly justified and validated, and subject to verification.

12.8 Monitoring and verification of leakage

Leakage risk and emissions shall be monitored throughout the quantification period. Monitoring shall include:

(a) Observations of land-use change in the leakage belt or at-risk zones;

(b) Changes in harvesting or land conversion patterns outside the project;

(c) Displacement of actors or resource use;

(d) Satellite imagery, field surveys, or government data where applicable.

Leakage emissions observed ex-post shall be deducted from the verified emission reductions. If leakage is found to be higher than anticipated, credit issuance shall be adjusted accordingly.

12.9 Treatment of leakage in Net Emission Reductions

All quantified and observed leakage emissions shall be deducted from the estimated emission reductions before applying any adjustments for uncertainty or non-permanence. The resulting figure shall be used to determine the net GHG emission reductions eligible for crediting under the BIOCARBON PROGRAM.

13 Permanence and reversal risk management

Project holders shall assess, mitigate, and manage the risk of reversal of emission reductions generated through APFC and IFM activities, and shall ensure that credited climate benefits represent long-term, durable results.

13.1 Definition and scope of reversal

A reversal refers to any unintentional or intentional event that leads to the release of previously credited greenhouse gas (GHG) emission reductions. This includes:

(a) Natural disturbances (e.g., fire, storms, pests, disease);

(b) Anthropogenic disturbances (e.g., illegal logging, encroachment, resettlement);

(c) Policy or legal changes that compromise forest protection or carbon stock maintenance;

(d) Management failures, project abandonment, or lack of enforcement.

Both APFC and IFM activities are subject to permanence risk, though the nature and probability of reversals may differ depending on the intervention and context.

13.2 Enhancement of Permanence

Project holders are encouraged to implement design features that reduce permanence risk, including:

(a) Legal land protection (e.g., conservation easements, community agreements);

(b) Adaptive forest management planning;

(c) Integration into jurisdictional or long-term policy frameworks;

(d) Transparent benefit-sharing and community participation.

13.3 Permanence and risk management tool

Project holders shall apply the BioCarbon Permanence and Risk Management Tool to assess the risk of reversal of credited GHG emission reductions or removals and to determine the appropriate reserve contribution.

The application of this tool is mandatory for all APFC and IFM activities and forms the basis for allocating Verified Carbon Credits (VCCs) to a project-specific reserve and to the general BioCarbon Reserve, as applicable.

This tool provides a quantitative, risk-weighted scoring system covering five categories:

(a) Legal/Tenure Risk

(b) Natural/Environmental Risk

(c) Financial/Operational Risk

(d) Governance/Political Risk

(e) Community/Stakeholder Engagement Risk

Each category is scored on a 1–5 scale using predefined criteria and guiding questions and is weighted according to its relative importance. The final risk score determines a reserve contribution of 10%, 20%, or 30%. This deduction is applied to the total verified emission reductions prior to credit issuance.

Project holders shall:

(a) Complete the full risk assessment as defined in Annex 1 of the tool;

(b) Submit evidence to justify each score assigned;

(c) Update the assessment at each verification event;

(d) Report any reversals and classify them as avoidable or unavoidable following Section 4.1 of the tool.

All reversals shall be addressed through the retirement of reserve credits, and, in the case of avoidable reversals, may trigger corrective actions or additional contributions.

14 Uncertainty assessment and conservative adjustment

Project holders shall assess and manage uncertainty in the quantification of GHG emission reductions in accordance with the BCR Tool Conservative Approach and Uncertainty Management. The application of this tool is mandatory for all APFC and IFM activities.

This ensures that Verified Carbon Credits (VCCs) issued under this methodology are based on transparent, conservative, and verifiable assumptions, consistent with IPCC principles and the integrity safeguards of the BIOCARBON PROGRAM.

The tool applies to all relevant parameters influencing the quantification of baseline and project emissions or removals, including:

(a) Activity data (e.g., area affected, harvest volumes);

(b) Emission or removal factors (e.g., biomass, soil carbon);

(c) Sampling and measurement systems;

(d) Modeling assumptions or expert judgment.

Project holders shall quantify combined uncertainty using either:

- Tier 1: Error propagation method (deterministic);
- Tier 2: Probabilistic method (e.g., Monte Carlo simulation), where applicable.

14.1 Required Confidence Level and Adjustment Rule

Uncertainty shall be expressed as a two-sided 90% confidence interval. The relative half-width of the interval shall be used to determine whether conservative adjustments are required:

(a) If the relative half-width is ≤ 30%, no deduction applies;

(b) If it exceeds 30%, the excess percentage shall be deducted from the estimated net GHG benefit.

14.2 Data quality and discount factors

If project data are derived from sources with lower quality (e.g., regional defaults), project holders shall apply the data quality discount factors provided in Annex D of the Tool. The highest applicable discount in the estimation chain shall be applied, unless:

(a) Project-specific data are used and validated, or

(b) Inputs are fully consistent with national GHG inventory parameters.

14.3 Documentation and transparency

Project holders shall document all uncertainty assessments in the Project Document and Monitoring Reports, including:

(a) Parameter-level uncertainty and source classification (input, model, fixed);

(b) Confidence interval calculation method (Tier 1 or Tier 2);

(c) Conservative adjustments and rounding;

(d) Spreadsheets and calculation tools enabling replication.

If expert judgment is applied, Annex G of the Tool shall be used to document the elicitation process.

All calculations of uncertainty shall be carried out by applying the BioCarbon Uncertainty Assessment Tool, in its most recent version.

The minimum statistical confidence level shall be 90%, using two-sided confidence intervals. The maximum acceptable margin of error shall be ±10% with respect to the estimated net GHG removals.

Where the error exceeds this threshold, project holders shall apply an obligatory conservativeness deduction, proportionally reducing the reported removals, as defined in the BioCarbon Uncertainty Assessment Tool.

All assumptions, parameters, sampling design, variance calculations, confidence intervals and deductions applied shall be fully documented in the Project Document and verified at each verification cycle.

15 Monitoring requirements

Project holders shall establish and implement a monitoring plan that enables the accurate, transparent, and consistent collection of data required to quantify GHG emission reductions, assess risks of non-permanence, and verify the continued integrity of APFC and/or IFM activities.

Monitoring shall be conducted in accordance with the applicable parameters and frequency set out in this section, and shall cover all project areas, relevant carbon pools, emission sources, and leakage zones, as defined in previous sections of this methodology.

The monitoring plan shall be included in the Project Document and validated prior to credit issuance. All data collected shall be documented, archived, and made available for third-party verification.

15.1 General monitoring requirements

Monitoring shall be performed at regular intervals not exceeding five (5) years, or more frequently if required by the applied version of the methodology or tool.

All methods, sources, and tools used shall be clearly described and consistent over time, unless otherwise justified.

Spatial data shall be georeferenced using GIS-compatible formats (e.g., shapefiles) with unique identifiers and appropriate metadata.

Monitoring shall account for:

(a) Carbon pools included in quantification;

(b) Emission sources and sinks as per baseline and project scenarios;

(c) Leakage, if applicable;

(d) Reversal events or conditions;

(e) Changes in forest condition or land use.

15.2 Specific parameters to monitor

The following table summarizes the key parameters to be monitored under APFC and IFM activities.

Table 7. Parameters and data to monitor

Parameter	APFC Activities	IFM Activities
Forest cover and canopy integrity	Yes – to confirm that conversion is avoided and forest is conserved	Yes – to assess extent and condition of forest under improved management
Biomass changes (aboveground and belowground)	Optional – only if claiming removals or verifying stability of stocks	Yes – to quantify emissions avoided and monitor regrowth if included
Harvesting activity	Not applicable	Yes – to verify reduced extraction intensity, location, and techniques

Parameter	APFC Activities	IFM Activities
Evidence of baseline activity displacement	Yes – to support leakage monitoring	Yes – to identify potential displacement of logging operations
Soil condition (if included)	Optional – required only if included in quantification	Optional – if heavy equipment or disturbance expected
Fire, pests, or other disturbances	Yes – to detect and report potential reversal events	Yes – to support permanence risk tracking
Community and stakeholder engagement	Recommended – to support permanence and leakage mitigation	Recommended – to support improved management adoption and permanence

15.3 Data quality and management

All monitored data shall be:

(a) Complete and representative of the project area;

(b) Supported by documentation (e.g., photos, field forms, remote sensing outputs);

(c) Validated through internal QA/QC procedures;

(d) Stored for a minimum of 10 years or two crediting periods, whichever is longer.

Where sampling is used, it shall be based on statistically robust approaches (e.g., stratified random sampling, IPCC-compliant biomass plots).

If digital monitoring technologies (e.g., drones, LiDAR, remote sensing platforms) are used, methods shall be validated and reproducible.

In addition, field-installed sensors (e.g., meteorological stations, gas flux sensors, soil moisture probes, acoustic or optical detectors) may be used to complement remote sensing, provided that their outputs are integrated systematically, and that calibration, traceability, and data validation protocols are documented in the Monitoring Plan.

15.4 Monitoring of reversal risk and permanence conditions

Project holders shall monitor and report any changes that may affect the permanence of credited outcomes, including:

(a) Signs of illegal activity, degradation, or encroachment;

(b) Natural disturbances (fires, storms, pests);

(c) Changes in legal status, governance, or stakeholder agreements;

(d) Effectiveness of applied risk mitigation measures (e.g., patrols, firebreaks, community involvement).

Such data shall be used to update the Permanence Tool at each verification cycle and to support the classification of any potential reversal event as avoidable or unavoidable.

15.5 Monitoring frequency and data sources

The following table provides guidance on the recommended frequency and data sources for monitoring key parameters under this methodology. Project holders shall adapt these recommendations to the specific context of their APFC or IFM activity, ensuring consistency with the monitoring plan included in the Project Document. All monitoring activities shall support verifiable and conservative estimates of GHG emission reductions and risks to permanence.

Table 8. Monitoring frequency and data sources

Parameter	Recommended Monitoring Frequency	Data Sources / Methods
Forest cover and canopy integrity	Annually or every verification period	Satellite imagery, aerial photos, field surveys, GIS analysis
Aboveground biomass (if included)	Every 5 years or verification period	Field biomass plots, remote sensing (LiDAR), national datasets
Belowground biomass (if included)	Every 5 years or as justified	Root-to-shoot models, literature values, biomass studies
Harvesting activity (IFM only)	Annually or continuously if operations are active	Harvest records, concession reports, field checks, photos
Leakage indicators	Every verification period	Field visits, interviews, satellite data, leakage belt analysis
Soil condition (if included)	As needed; during disturbance-prone periods	Soil sampling, visual inspection, remote sensing if applicable
Disturbances (fire, pests, weather)	Continuously and after known events	Patrol reports, satellite alerts, meteorological data
Community/stakeholder engagement	Every verification period; more frequent if sensitive area	Surveys, meeting records, grievance logs, participation tracking

15.6 Data and record keeping

Project holders shall implement and maintain a data and record keeping system that ensures transparency, traceability, and accessibility of all information used in the design, implementation, monitoring, and verification of APFC and IFM activities.

The system shall enable independent verification of emission reductions, permanence risk management, and compliance with all applicable requirements of the BIOCARBON PROGRAM.

15.6.1 Minimum requirements

Project holders shall retain all relevant records and supporting documentation for a minimum of ten (10) years after the end of the last quantification period or for two (2) full verification cycles, whichever is longer. Records shall be:

(a) Accurate, complete, and consistent with the Project Document and monitoring plan;

(b) Archived in a secure, retrievable format;

(c) Made available to accredited Conformity Assessment Bodies (CABs) during validation and verification;

(d) Made available upon request for desk review by the BioCarbon Program or its designated representatives.

15.6.2 Types of records to be maintained

Project holders shall retain, at a minimum, the following:

(a) GIS files and maps delineating project boundaries, leakage belts, stratification, and monitoring plots;

(b) Forest inventories, biomass measurements, soil sampling data, and any raw field data collected;

(c) Satellite imagery, aerial photos, or drone outputs used for land cover assessment or monitoring;

(d) Legal documentation: permits, concessions, land titles, project authorization, community agreements;

(e) Monitoring and verification reports, field inspection records, and data analysis files;

(f) Evidence of stakeholder consultations, grievance redress logs, and benefit-sharing documentation;

(g) Financial or operational records relevant to baseline and project scenario implementation (e.g., harvest logs, activity reports);

(h) Risk assessment scores and justifications from the Permanence and Risk Management Tool;

(i) Documentation related to reversals, loss events, or leakage incidents, including mitigation actions and corrective measures.

15.6.3 Data integrity and version control

Project holders shall implement systems for quality assurance and version control, including:

(a) Consistent versioning of datasets and methodological inputs across reporting periods;

(b) Change logs for any corrections, updates, or revisions to original data;

(c) Timestamped backups and, where applicable, digital signatures or audit trails.

Any material changes to baseline assumptions, monitoring approaches, or risk assessments shall be fully documented and justified.

16 Quality Assurance and Quality Control (QA/QC)

Project holders shall implement a structured QA/QC system to ensure the accuracy, consistency, and transparency of all data, calculations, and procedures used in the quantification and monitoring of GHG emission reductions under this methodology.

This section establishes the requirements for implementing a robust Quality Assurance and Quality Control (QA/QC) to ensure that:

(a) All data and estimates are reliable, transparent, and verifiable;

(b) Errors, omissions, and inconsistencies are minimized;

(c) Monitoring, reporting, and verification (MRV) processes meet the highest standards of integrity;

(d) Claims of emission reductions are defensible before third-party audits, host country authorities, and market mechanisms.

The QA/QC procedures shall apply to both ex-ante and ex-post estimations and shall be documented in the Project Document and Monitoring Reports.

16.1 Quality Assurance (QA)

Quality assurance refers to procedures implemented to prevent errors and ensure that data collection, processing, and reporting conform to methodological requirements.

QA procedures shall include, as applicable:

(a) Independent review of stratification and sampling design;

(b) Validation of field crew training and calibration of measurement instruments;

(c) Cross-checks of input data, sources, and emission/removal factors;

(d) Peer review of emission reduction calculations prior to submission;

(e) Documentation of data sources, assumptions, and justifications.

16.2 Quality Control (QC)

Quality control refers to routine technical activities that verify the integrity of data and calculations.

QC measures shall include:

(a) Spot-checks or remeasurement of a subset of sample plots;

(b) Verification of field forms, GPS coordinates, and data entries;

(c) Consistency checks across datasets and versions;

(d) Use of version control and audit trails for any modification of values;

(e) Reproducibility of results using documented methods and tools.

16.3 Corrective actions and traceability

Any detected errors, inconsistencies, or deviations shall be corrected in a transparent manner and documented. The QA/QC system shall ensure that:

(a) All data used in calculations can be traced to original records;

(b) Changes in data or assumptions are justified and version-controlled;

(c) Results presented for verification are reproducible by an independent third party.

16.4 Documentation and archiving

All QA/QC actions shall be documented and archived. All monitored data shall be documented in a transparent manner and archived in digital format. At a minimum, the following shall be retained:

(a) Raw monitoring data and processing scripts or spreadsheets;

(b) Version-controlled emission reduction calculations;

(c) Field survey protocols and original field notes;

(d) Copies of external reports, assessments, and reviews;

(e) Documentation of all revisions or updates to the methodology application.

All information shall be stored for a minimum of 15 years or two full quantification periods, whichever is longer, and made available upon request by BioCarbon or third-party verifiers.

16.5 Continuous improvement

Project holders are encouraged to periodically review and update the QA/QC system, incorporating:

(a) Lessons learned from previous monitoring or audits;

(b) Technological advancements (e.g., new remote sensing tools, AI classification);

(c) Feedback from stakeholders, verifiers, and host country authorities;

(d) Updates to the BioCarbon Program, IPCC guidance, or international best practices.

17 Document Status and Publication Format

17.1 Status

This methodology has been developed and approved in accordance with the BioCarbon procedures for the development of mitigation methodologies. The current version is authorized for use in the BioCarbon Standard as of August 2025.

17.2 Version

Version 1.0. August 4, 2025

Approved by: Technical Committee of BioCarbon Cert

Supersedes: Not applicable (first version)

17.3 Publication Format

This methodology is published in digital format (PDF) on the official website of BioCarbon Cert. Any printed copies or unofficial reproductions shall be cross-checked against the version available in the official registry. In case of discrepancy, the digital version in force shall prevail.

18 References

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History of document

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Version	Date	Nature of the document
Public Consultation Version	June 30, 2025	Initial version of the Methodological Document
Version 1.0	August 4, 2025	Firs version of the Methodological document. Adjusted after the public consultation.

Note: Any future revisions to this document will be listed here, including the date, nature, and justification for the changes. All updated versions shall be made publicly available by the BioCarbon Program and clearly distinguished from earlier versions.