**Document completion guidance**

The document is written from the perspective of a producer.

The red text must be adapted or overwritten by the project proponent.

The *red text in italics* explains the information required by the project proponent.

The underlined blue text provides a link to download the referenced document.

**Instruction:**

Before submitting your Project Description Document (PDD) for validation, ensure that all relevant indicators are completed, all red instructional text is removed, and all entry text is changed to black.

The black text consists of default entries applicable to most projects. The project proponent may modify these entries but must use track-change mode to highlight any changes.

**Please note:**

The final validated Project Description Document (PDD), along with the [Management Unit Report (MUR) – Annex to the PDD](https://www.carbon-standards.com/docs/transfer/4000191EN.xlsx) and the relevant C-Sink documentation, will be published in the Global C-Sink Registry. Additional annexes and files may be included at the discretion of the project proponent.

Any default text boxes that are not modified or removed will be considered as authored by the project proponent.

The Project Description Document (PDD) for Global Tree C-Sink projects covers the standard requirements for endorsement of the C-Sink Manager and accreditation of temporary C-Sinks from forest-related projects.

The information provided must be verifiable and correspond exclusively to the described project. Additional files and documentation must be submitted together with this PDD as indicated in the different sections.

**About the Structure of This Document:**

The PDD is structured to provide an overview of the project practices, carbon emissions and removals, spatial organization, monitoring, and other key elements for Tree C-Sinks. Each section is outlined below with a short description.

**Section 1. Project Description (p. 6-14)**

This section outlines the key components of the project design. Subsections 1.1 to 1.4 present the core aspects, including the project type, spatial boundaries, commencement of activities, and baseline scenario. Subsection 1.5 details the management plan, which encompasses project practices and internal controls essential for ensuring high-quality carbon removals. Subsections 1.6 to 1.9 define the approach to carbon removals and emissions, ownership structures, and the additionality framework established by the Global Tree C-Sink Standard.

**Section 2. Co-benefits (p. 15-16)**

This section evaluates the potential ecological and social benefits of the project under the Global Tree C-Sink Standard, covered in 2.1. Work Safety & Social Safeguards and 2.2. Biodiversity Ranking.

Section 3. Estimations of C-Sinks (p. 16-17)

This section provides a breakdown of the ex-ante calculation of C-Sinks (3.1.) and the potential climate services, such as Global Cooling Services (3.2.) and compensation of methane emissions in Biochar projects (3.3.).

Section 4. Determination of C-Sinks (p. 18-19, Appendix 3)

This section outlines the methodologies for quantifying the project’s carbon removals. Subsection 4.1 provides a detailed description of the Digital Measurement, Reporting, and Verification (dMRV) system and its service provider. A more comprehensive explanation of the carbon determination method can be found in Annex 3.

Section 5. Monitoring Plan (p. 19-24)

This section details the data collection and analysis methods for tracking carbon removals and emissions. Subsection 5.1. includes an extensive list of the parameters on biomass carbon stock, project emissions, and climate services. In addition, the main calculations for the standard are included in subsection 5.2.

Section 6. Certification & Registration (p. 25)

This section outlines the key data requirements for the certification and registration of Tree C-Sinks in the Global Tree C-Sink Registry.

Section 7. Public Consultation (p. 26)

This section provides guidance on the requirements for incorporating stakeholder feedback into future versions of the Global Tree C-Sink Standard.

Global Tree C-Sink

# Project Design Document

Logo of the project to be inserted here

Project name: [*Write the project name*]

Project ID: GCSPXXXX [*Assigned by CSI after project registration*]

C-Sink Manager: [*Write your organization name*]

Date of submission: [*Entered by the project proponent*]

PDD Version: Version 1.0 [*Starting from the first approved version]*

Methodology: Global Tree C-Sink, V1.0

Project location: Name of municipality; coordinates [*Reference region and coordinates where project activities takes place*]

Project registration date: 01.01.2025 *[Entered by CSI - Date where the project is approved for implementation by CSI]*

Project period: 2025 - 2045 *[The project period must be established based on growth projections obtained from the ‘expected C-Sink Curve’]*

Project summary: The agroforestry project aims to provide climate services through short-term carbon removals. The project also contributes to the increase biodiversity and slow down the environmental degradation caused by agricultural activities in the region.

Based on empirical data and the results of the expected C-Sink curve, the project has the potential of sequestering approx. 1610 CO2eq / year.

*[A short description not exceeding 150 words]*

Table of content

[Project Design Document 4](#_Toc189748394)

[1 General description of project 7](#_Toc189748395)

[1.1 Project overview 7](#_Toc189748396)

[1.2 Project spatial information 7](#_Toc189748397)

[1.3 Project start 8](#_Toc189748398)

[1.4 Baseline scenario 8](#_Toc189748399)

[1.5 Management plan 9](#_Toc189748400)

[1.5.1 General project management 9](#_Toc189748401)

[1.5.2 Quality assurance and internal controls 12](#_Toc189748402)

[1.6 Project boundary 12](#_Toc189748403)

[1.6.1 Carbon Removals – C-Sinks 12](#_Toc189748404)

[1.6.2 Project Emission Portfolio 13](#_Toc189748405)

[1.7 Eligibility 14](#_Toc189748406)

[1.8 Ownership 14](#_Toc189748407)

[1.8.1 C-Sink Ownership 14](#_Toc189748408)

[1.9 Additionality 14](#_Toc189748409)

[1.9.1 Regulatory Additionality 15](#_Toc189748410)

[1.9.2 Carbon Removal Additionality 15](#_Toc189748411)

[1.9.3 Ecological Additionality 15](#_Toc189748412)

[2 Co-benefits 16](#_Toc189748413)

[2.1 Work safety and social safeguards 16](#_Toc189748414)

[2.2 Biodiversity Ranking 17](#_Toc189748415)

[3 Estimation of carbon removals (ex-ante) and climate services 17](#_Toc189748416)

[3.1 Expected C-Sink Curve 17](#_Toc189748417)

[3.2 Global Cooling Services 18](#_Toc189748418)

[3.3 Compensation of CH4 Emissions from Biochar projects 19](#_Toc189748419)

[4 Determination of tree-based C-Sinks 19](#_Toc189748420)

[4.1 dMRV System 19](#_Toc189748421)

[4.1.1 dMRV Service Provider 20](#_Toc189748422)

[4.1.2 Description of the dMRV System 20](#_Toc189748423)

[4.2 Carbon Accounting Approach 20](#_Toc189748424)

[4.2.1 General description 20](#_Toc189748425)

[4.2.2 Carbon Stock Calculation 20](#_Toc189748426)

[5 Monitoring plan 21](#_Toc189748427)

[5.1 Monitored data 21](#_Toc189748428)

[5.1.1 Woody biomass carbon stock 21](#_Toc189748429)

[5.1.2 Emissions of projects activities 21](#_Toc189748430)

[5.1.3 Compensation of project emissions 25](#_Toc189748431)

[5.2 Standard Calculations 25](#_Toc189748432)

[5.2.1 Carbon expenditures 25](#_Toc189748433)

[5.2.2 Leakage Emissions 26](#_Toc189748434)

[6 Registration of C-Sink 26](#_Toc189748435)

[6.1.1 Calculation of Tree C -Sink 26](#_Toc189748436)

[7 Public consultation 27](#_Toc189748437)

[8 Annexes 27](#_Toc189748438)

[Appendix 1. Spatial Organization 28](#_Toc189748439)

[Appendix 2. Land Eligibility Evaluation 30](#_Toc189748440)

[Soil characteristics of the project 30](#_Toc189748441)

[MU Group 1 31](#_Toc189748442)

[Additional requirements for afforestation projects as established on 5.1 Baseline Land Use in the Global Tree C-Sink Standard, V1.0. 33](#_Toc189748443)

[Appendix. 3 dMRV: Carbon Stock Calculation 36](#_Toc189748444)

# General description of project

## Project overview

Trees and forest are essential components of the climate system and have a large potential for carbon sequestration in the form of temporary Carbon Sinks (C-Sinks). While not permanent, Biomass-based C-Sinks are an effective mechanism for capturing and storing carbon and contributing to global climate goals.

Select the type of project:

Afforestation

Plantation

Urban trees

Natural restoration

Conversion of monoculture forest or perennial plantations

|  |
| --- |
| **Provide a description of project addressing the project type, the form in which the project generates additional carbon removals, the land use and degradation prior to the project, and other additional social and ecological benefits derived from its implementation.** The text must not exceed 400 words. |
|  |

## Project spatial information

Complete the table below with the necessary information about the project location

|  |  |
| --- | --- |
| **Project region** | *This is the reference region / jurisdiction where the project takes place.* |
| **Project coordinates** | *These are the coordinates of the project area* |
| **Project area (ha, two decimals)** | e.g. 800.00 |
| **Map** | *Include an image of the project representing the spatial boundaries.* |
| **Shapefile** | *Write down the name of the project map shapefile. The file must be submitted along with this document.* |

Provide information about the included Management Units (MUs) in the section **Appendix 1. Spatial organization** from this document.

Individual requirements for the individual MUs are detailed in the **PDD – Management Unit.**

## Project start

Specify the date(s) when the project's initial activities took place. If these activities began on different dates across various management units, indicate the earliest date of land clearing, preparation, and tree planting.

|  |  |
| --- | --- |
| **Date(s) of land clearing and preparation** |  |
| **Date(s) of tree planting** |  |

## Baseline scenario

The baseline scenario for carbon removal accounting is the business-as-usual scenario where additional carbon removals do not occur outside the natural carbon cycles or current tree systems. This is equivalent to:

|  |
| --- |
| **Describe the baseline scenario in the project region. Include how management practices prior to the project implementation led to land degradation, carbon loss, biodiversity loss, etc.** |
|  |

## Management plan

The project practices must be aligned with the principles outlined in the Global Tree C-Sink Standard to prevent environmental degradation and promote sustainable practices in tree planting and restoration projects.

The key areas covered include sustainable land preparation, preserving remnant trees, appropriate use of fertilizers, maintaining permanent ground cover, and limiting irrigation. Additionally, projects must provide risk assessments and implement internal control systems to assure a high integrity of the tree-based carbon removals.

### General project management

A management plan is established for the entire project based on the project type. Any deviations from this plan at the management unit level must be detailed in the [Management Unit Report (MUR) – Annex to the PDD](https://www.carbon-standards.com/docs/transfer/4000191EN.xlsx) for each individual MU.

For projects consisting of multiple project types, a separate management plan must be provided for each type.

|  |  |
| --- | --- |
| **Project Type** | Agroforestry |

#### Land preparation

|  |
| --- |
| **Provide a detailed description of the land preparation process prior to tree planting. Ensure to cover the following aspects:**  ***Vegetation removal:*** *Specify the type of vegetation removed, the extent of removal, the methods used, and how the removed biomass is repurposed or managed.*  ***Retention of remnant trees:*** *Indicate whether any existing trees were retained and their purpose.*  ***Soil preparation:*** *Detail the soil preparation techniques, including conservation tillage practices (if applicable), the creation of planting pits (size, depth, spacing), and any other relevant measures.* |
|  |

#### Fertilizazion strategy

|  |
| --- |
| **Provide a detailed description of the fertilization strategy. Ensure to include the following details:**  ***Fertilizer products:*** *Specify the names of the fertilizers used, whether they are organic or mineral, and their N:P:K ratio.*  ***Timing and frequency:*** *Indicate the season and how often the fertilizer will be applied.*  ***Application rate:*** *State the quantity applied per hectare or per tree.*  ***Mode of application:*** *Describe the method used to apply the fertilizer.* |
|  |

#### Harvesting strategy

|  |
| --- |
| **If applicable, provide a detailed description of the anticipated harvesting strategy once the trees reach an economically viable size. Include the following details:**  ***Rotation cycle:*** *Indicate the duration of the cycle and the expected years of harvest.*  ***Harvest area:*** *Specify the area to be harvested per cycle.*  ***Post-harvest C-stock:*** *Estimate the proportion of carbon stock to be retained after harvesting (between 40-100%).*  ***Harvest method:*** *State whether only selective harvesting will occur and at what frequency and density.*  ***Habitat trees:*** *Specify the density of retained habitat trees.*  ***Non-timber forest products (NTFPs):*** *If no timber harvest is planned, list the NTFPs to be harvested.*  **For projects larger than 50 hectares, please supplement this section with a map indicating rotation areas and expected harvest years.** |
|  |

#### Re-planting after harversting

|  |
| --- |
| **Provide a detailed description of the re-planting strategy following harvest operations. Ensure to include the following details:**  ***Re-planting area:*** *Specify the anticipated area to be re-planted per rotation cycle.*  ***Re-planting plan:*** *Indicate the expected year of re-planting and the time interval between harvest and re-planting.*  ***Planting density and species:*** *Describe the anticipated planting density and the species composition.*  ***Source of planting material:*** *Specify the source of the planting material used for re-planting.* |
|  |

#### Ground cover management

|  |
| --- |
| **Provide a detailed description of the ground cover management. Ensure to include the following details:**  ***Type of ground cover:*** *Specify whether it consists of ground vegetation, litter layer, or other forms.*  ***Ground coverage:*** *Estimate the approximate coverage percentage (between 75-100%).*  ***Establishment strategy:*** *If no ground cover is present at the time of project start, describe the strategy and timeline for establishing it.*  **Note that canopy cover does not qualify as ground cover. Climate-positive management will be verified through the dMRV during the monitoring period.** |
|  |

#### Irrigation

|  |
| --- |
| **If applicable, provide a detailed description of the irrigation technology and system for the newly planted trees. Ensure to include the following details:**  ***Water source:*** *Specify the source of water used for irrigation.*  ***Irrigation technology:*** *Describe the method or technology used for water distribution.*  ***Irrigation frequency and water usage:*** *Indicate how often the trees will be irrigated and the amount of water used per hectare annually.*  ***Anticipated end of irrigation:*** *Provide the expected timeline for when irrigation will no longer be necessary.*  ***Evaporation losses:*** *Assess whether significant water losses from evaporation are expected.*  ***Fertilization via irrigation:*** *Specify if fertilizers are applied through the irrigation system.* |
|  |

### Quality assurance and internal controls

|  |
| --- |
| **Provide a detailed description of the strategy to insure and control the quality of the project. Ensure to provide details about:**  ***Tree survival rate****: Outline the methods used to achieve a high tree survival rate.*  ***dMRV application:*** *Describe the measures for training land managers (or other employees) on the dMRV system operations and tree monitoring.*  ***Data integrity:*** *Explain the steps taken to avoid double counting of trees, ensure data quality, and perform random sampling for plausibility checks.*  ***Conflict resolution and sanctions:*** *Detail the procedures for resolving conflicts of interest and the sanctions imposed if a land manager violates the management plan or submits false or low-quality data.* |
|  |

## Project boundary

The project boundary section provides an overview of the specific C-Sinks and GHG emissions that are attributed to the project activities and are subject to monitoring and reporting. A more specific definition of the parameters and the monitoring approach is presented in section 4. Monitoring plan.

### Carbon Removals – C-Sinks

Tree-based C-Sinks under this standard are designed exclusively for temporary climate services, specifically to mitigate immediate annual global warming effects of greenhouse gas (GHG) emissions.

The carbon removals from above-ground biomass (AGB) and below-ground biomass (BGB) of living tree are within the project boundaries.

Carbon sinks from soil organic carbon (SOC) and other carbon removal and emission reduction sources are excluded from Global Tree C-Sink projects.

The **above-ground biomass** pool is included for generation of temporary carbon removals.

The **below-ground biomass** pool is included for generation of temporary carbon removals.

The Global Tree C-Sink Standard does not currently mandate or certify assessments of soil organic carbon (SOC). If the principles of sustainable management and land eligibility of the standard are followed, SOC deterioration is unlikely and no quantitative SOC assessment is required. However, SOC-based C-Sinks may be certifiable in the future under a separate methodology. For projects seeking SOC certification through external schemes, a detailed authorization request must be submitted to Carbon Standards International (CSl).

|  |
| --- |
| **If applicable, provide information about the external program for SOC carbon removals.** |
|  |

### Project Emission Portfolio

The project emission portfolio is composed of all relevant emissions generated from the process of creating tree-based C-Sinks. This covers emissions from scope 1, scope 2, and fertilizer usage (see Table 4 in the Global Tree C-Sink Standard, V1.0).

Project emissions must be reported for each CSU using the [Management Unit Report (MUR) – Annex to the PDD](https://www.carbon-standards.com/docs/transfer/4000191EN.xlsx). Emissions may be initially recorded at the Management Unit level and then proportionally allocated to the respective CSUs within that unit.

The following activities are reported as part of the Project Emissions Portfolio:

Land preparation

Forest Management

Fertilization

Harvest

Transportation

Electricity

Other

The total Carbon Expenditures of the project are calculated in a yearly basis using *Equation 1*. This is done by aggregating the total recorded emissions and applying a safety margin of 10% to account for other scope 3 emissions:

*Equation 1*

|  |
| --- |
| **Carbon Expenditures (tCO2e/year-1)** = (annual scope 1 + scope 2 emissions (tCO2e)) \* 1.1 |

## Eligibility

Land eligibility is assessed providing data on soil types, historical land use, and land ownership. The criteria for evaluation of the project eligibility is evaluated at both the project and management level.

The information required for the Land Eligibility Evaluation is provided in Appendix 2.

## Ownership

### C-Sink Ownership

By default, the ownership of the potential C-sink belongs to the individual or entity that owns the material containing carbon in a stable form—such as living biomass.

When a carbon removal credit (C-Sink) is sold, the ownership of the C-Sink material and its associated carbon is transferred to the buyer. If the living biomass ownership is transferred (e.g. change of land owner) without the associated climate service (C-sink value), the C-Sink Manager must notify Carbon Standards International and assure the continuity of the carbon accounting monitoring.

## Additionality

The additionality of Global Tree C-Sink projects is demonstrated through: i) a measurable increase in carbon sequestration beyond the "business as usual" scenario, along with compliance with ii) regulatory and iii) ecological sustainability criteria.

### Regulatory Additionality

The C-Sink Manager is required to demonstrate that the tree planting and management activities for the project are not legally mandated in the country or region where the project is being implemented.

To meet this requirement: Review national, regional, and local regulations, permits, and legal frameworks to confirm that there are any binding legal obligations related to these activities. Any relevant legal documents, including permits and regulations, must be provided and submitted along with this document as evidence.

|  |
| --- |
| **Provide a detailed description of the regulatory additionality of the project** |
| After revision of the national forestry law, national law on climate change N23049, and decree on National Determined Contributions (CDM), it was determined that afforestation projects with the objective of producing carbon removal credits for trading in the voluntary carbon markets is allowed. |

### Carbon Removal Additionality

Carbon removal additionality refers to the measurable increase in carbon sequestration through the project activities compared to what would occur under the baseline scenario description in **Section 1.4 Baseline Scenario** of the PDD. This includes demonstrating that the project carbon removal potential goes beyond the capabilities of natural carbon sequestration processes.

### Ecological Additionality

The Global Tree C-Sink aims to promote projects that exhibit exceptional environmental integrity beyond the regulatory and carbon removal aspects of additionality.

The project must meet at least one of the following criteria for ecological additionality:

The project exhibits a clear deviation from local customary practices by establishing sustainable management systems (for instance, adopting agroforestry techniques in place of slash-and-burn methods).

The tree planting initiative directly contributes to significant environmental improvements in the vicinity (examples include enhancing biodiversity through the introduction of diverse tree species, trees planted for water conservation, mitigating erosion, preventing landslides, or serving as firebreaks).

Evidence suggests that, in the absence of the tree planting initiative, alternative undertakings detrimental to the environment would have transpired (such as the establishment of a monocultural palm oil plantation).

Proof indicates a necessity for afforestation in specific areas, either to act as a protective buffer around national parks, to provide habitats for certain species (like gorilla sanctuaries), or to enhance various ecosystem services.

|  |
| --- |
| **Provide a detailed description of the ecological additionality of the project** |
| The tree planting initiative directly contributes to significant environmental improvements by enhancing biodiversity in the project area. We have introduced a mix of native tree species, which not only increase local biodiversity but also provide critical habitats for various wildlife, including endangered species.  These efforts have mitigated the risks of landslides in hilly areas prone to erosion, stabilizing the landscape and protecting nearby communities… |

# Co-benefits

## Work safety and social safeguards

This section addresses the essential work safety and social safeguards required for the project. Effective measures in these areas are critical to ensuring safe and responsible project operations while promoting the well-being and active participation of local communities and workers.

|  |
| --- |
| **Provide a detail description of the work safety and fire prevention strategy during operations in the management unit. Ensure to include details about***: Power tool handling, personal protective equipment, proficient use of chemical inputs, safety equipment and measures during harvest operations, fire prevention measures, training of the land managers.* |
| The work safety and fire prevention strategy during operations in the management unit is designed to prioritize the well-being of all personnel and the protection of the surrounding environment. The strategy includes the following key components:   * Power Tool Handling: All workers handling power tools will receive training in their safe use. Proper maintenance and inspection of tools will be conducted regularly to ensure they are functioning correctly and safely. * Proficient Use of Chemical Inputs: Only trained and certified personnel will be allowed to handle and apply chemical inputs. All chemicals will be stored in secure, clearly labeled containers. MSDS (Material Safety Data Sheets) will be available on-site for reference. Workers will be trained on safe handling, proper application techniques, and emergency procedures in the event of exposure. |

|  |
| --- |
| **Provide a detail description of the strategy to promote stakeholder engagement. Ensure to provide details about:** *Engagement in decision making process, employment in the project, benefit sharing from the project* |
| Our strategy for promoting stakeholder engagement focuses on building strong, transparent relationships with all relevant stakeholders, ensuring that they are actively involved in decision-making, benefit sharing, and employment opportunities within the project. The strategy includes the following key elements:   * **Engagement in the Decision-Making Process:** Stakeholders, including local communities, indigenous groups, and relevant authorities, will be actively engaged in the decision-making process from the early stages of the project. Regular consultation meetings will be held to gather input and address concerns. * Benefit Sharing from the Project: A fair and equitable benefit-sharing mechanism will be established to ensure that local communities receive tangible benefits from the project. This may include profit-sharing, access to project outputs (such as biochar or other products), or community development projects funded by a portion of the project’s revenue. |

## Biodiversity Ranking

In addition to providing climate services for global warming mitigation, the Global Tree C-Sink Standard emphasizes the promotion of co-benefits, such as enhanced biodiversity and nature conservation. This is facilitated through a biodiversity ranking system that establishes the minimum criteria for biodiversity management, which all projects must meet to qualify for certification.

The ranking establishes three levels of performance. **Level I** outlines the essential biodiversity and nature conservation requirements that are mandatory for certification. Projects that go beyond this minimum level are eligible for **Level II** and **Level III**, depending on the efforts to align with the more demanding criteria of higher biodiversity levels.

The achieved level is showed on the C-Sink certificate and listed in the Global C-Sink Registry, providing the potential for premium pricing for projects that focus on biodiversity co-benefits.

The biodiversity ranking is assessed for each management unit based on the information reported on the [Management Unit Report (MUR) – Annex to the PDD](https://www.carbon-standards.com/docs/transfer/4000191EN.xlsx)**.**

# Estimation of carbon removals (ex-ante) and climate services

## Expected C-Sink Curve

The expected C-Sink Curve, as defined in section 2.2 of the Global C-Sink Standard, V1.0, is the approach used to estimate the potential carbon removals of the project.

The underlying model must integrate parameters such as regional growth rates, species composition, climate, soil, planting density, and management practices. The model must also account for risks relevant to the project region, such as fire and infestations.

To allow for more precise estimations, the model must be updated every five years with data collected during the verification period through the dMRV system.

C-sink curves can be calculated for an entire management unit (MU) or across multiple MUs with similar characteristics, such as species composition and planting density. In such cases, the data must be disaggregated to reflect individual C-Sink Units (CSUs). If harvesting is not evenly distributed, these variations must be accounted for in the projections.

The procedures for endorsement of the Expected C-Sink Curve are outlined in the endorsement documentation. A more detailed description of the method is included in the Standard Operating Procedure of this calculation.

|  |
| --- |
| **2.1. Provide a general description of the approach for estimation of the Expected C-Sink Curve. Ensure to include details about:** calculations, equations, parameters, references, and data sources (e.g., growth curves from literature, models, or empirical data). |
|  |

## Global Cooling Services

C-Sinks as part of the Global Cooling Services (GCS) are quantified in units of t aCO2e ("ton annually stored CO2 equivalent"), which corresponds to the amount of CO2 removed from the atmosphere and stored for one year. For example, a carbon sink that sequesters 100 t CO2e over a 10-year period offsets the global warming effect of an equivalent 1000 t CO2e emission for those ten years.

Another principle to take into account is that C-Sinks can only be certified after the carbon expenditures for the corresponding year have been offset by persistent C-Sinks in the Global C-Sink Registry.

**Report the total expected C-Sinks and the expected Carbon Expenditures of 10 years for the entire project. The estimation of Carbon Expenditures is based on default values based on the planned project activities.**

|  |  |  |
| --- | --- | --- |
| **Year of operation** | **Total Expected C-Sinks (t CO2e)** | **Carbon Expenditures (t CO2e)** |
| 1 | X | X |
| 2 | X | X |
| 3 | X | X |
| 4 | X | X |
| 5 | X | X |
| 6 | X | X |
| 7 | X | X |
| 8 | X | X |
| 9 | X | X |
| 10 | X | X |
| sum | X | X |

|  |
| --- |
| **2.2. Provide a general description of the calculation of carbon expenditures for the first 10 years of the project. Specify the references and sources used in this calculation.** |
|  |

## Compensation of CH4 Emissions from Biochar projects

The methane emissions of Artisan projects may be elegible for compensation through the creation of temporary C-Sinks from tree projects. The Absolute Global Warming Potential of the methane attributed to biochar projects must be compensated by a same-sized absolute global cooling potential (AGCP) over a maximum of 20 years. The compensating global cooling starts in the same year as the CH4 emission occurred, provide annual global cooling in every following year, and finalize the compensation latest 20 years after the methane emission.

In order to claim that methane emissions where compensated it must be proven that

.

The resulting methane emissions of the produced biochar are calculated as below, with the GWP100 (CH4) value of 25 CO2e.

|  |
| --- |
| *If applicable, provide an estimation of the Absolut Global Cooling Potential AGCP of the tree biomass that can be transferred for compensation of CH4 emissions in Biochar projects.* |

# Determination of tree-based C-Sinks

## dMRV System

Tree-based C-Sinks are estimated by the monitoring of main parameters through a dMRV system. This service is run by an endorsed dMRV Service Provider (see list of [endorsed service providers](https://www.carbon-standards.com/en/standards/service-524~global-tree-c-sink.html)) and is the backbone for collecting and processing the C-Stock and Emission data necessary for the determination of the carbon removals.

Provide detailed information about the different components of the dMRV System.

### dMRV Service Provider

|  |  |
| --- | --- |
| **Name of employed dMRV application** | *Write down the information of the selected dMRV provider* |

### Description of the dMRV System

|  |
| --- |
| **3.1. Provide a general description of the dMRV System including details about:** tools, platform, monitoring, security, interconnectivity. |
|  |

## Carbon Accounting Approach

This section outlines the chosen carbon accounting method, demonstrating how it aligns with the project context while meeting the Global Tree C-Sink standard’s requirements for data accuracy, spatial coverage, and temporal resolution.

### General description

Select the carbon accounting method implemented in the project:

Single Tree-based

Other: Write down the common term for the technology

|  |
| --- |
| **3.2. Define the monitoring period in terms of monitored area (%) and frequency** |
| 100 % of the project area monitored on a yearly basis |

### Carbon Stock Calculation

A detailed description of the approach for the C-Stock calculation procedure integrated in the dMRV system is provided in Appendix 3. dMRV: Carbon Stock Calculation.

# Monitoring plan

The monitoring plan provides information about:

* The main paramaters integrated in the dMRV System and the frequency of the data collection.
* Relevant calculations for the standard.

More concrete information about the underlying procedures and infrastructure of the endorsed dMRV will be published by Carbon Standards.

The acquired data is included in the monitoring report for each verification period.

## Monitored data

Provide information about the monitored parameters of the C-Sinks and GHG Emissions within the project boundaries.

### Woody biomass carbon stock

Define the key parameters required for calculating biomass C-Stocks.

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameter** | **Unit** | **Monitoring Frequency** | **Source of data** |
| Tree count | - | Annual | Field measurement – dMRV |
| Field size | ha | - | Satellite data |
| Root-to-shoot ratio | - | Annual | Literature |
| Carbon fraction of dry biomass | t C / t dry matter | Annual | Literature |
| Wood density | g cm3 | Annual | Literature |
| Tree diameter at breast height (DBH) | cm | Annual | Field measurement – dMRV |
| Height of tree | m | Annual | Field measurement – dMRV |
| Average above-ground woody biomass stock | t C/ ha | Annual | Field measurement – dMRV |

### Emissions of projects activities

Provide information about the parameters to be monitored as required for the Project Emission Portfolio (Section 1.6.1 of this document). Justify the selection of different parameters and sources to be approved by Carbon Standards.

**The monitored values must be submitted in the Project Emission Portfolio corresponding to the verified period.**

**Note:** Ex-ante values are predefined for specific variables, as listed in the Global Tree C-Sink Standard, V1.0. These values may, however, be adjusted to better reflect the actual conditions of the project.

#### Land preparation

The following values are defined at the start of the project:

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameter** | **Ex-ante value** | **Unit** | **Source of data** |
| CO2 emissions from diesel | 0.00269 | t CO2e / liter of diesel | EPA (2023) |
| CO2 emissions from gasoline | 0.00235 | t CO2e / liter of gasoline | EPA (2023) |
| CO2 emissions from transportation | 0.111 | t CO2e / ton-km | UBA (2022) |
| CO2 emissions from electricity consumption | - | t CO2e / kWh | Use national factor |

The following values are defined during the monitoring of the project:

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameter** | **Unit** | **Monitoring Frequency** | **Source of Data** |
| Kilometers from transportation | km | Monthly | Measurement |
| Operating hours (per equipment) | hr | Monthly | Measurement (if required) |
| Fuel consumption (per type) | l | Monthly | Measurement (if required) |

#### Forest management

The following values are defined at the start of the project:

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameter** | **Ex-Ante Value** | **Unit** | **Source of Data** |
| CO2 emissions from diesel | 0.00269 | t CO2e / liter of diesel | EPA (2023) |
| CO2 emissions from gasoline | 0.00235 | t CO2e / liter of gasoline | EPA (2023) |
| CO2 emissions from transportation | 0.111 | t CO2e / ton-km | UBA (2022) |
| CO2 emissions from electricity consumption | - | t CO2e / kWh | Use national factor |

The following values are defined during the monitoring of the project:

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameter** | **Unit** | **Monitoring Frequency** | **Source of Data** |
| Kilometers from transportation | km | Monthly | Measurement |
| Operating hours (per equipment) | hr | Monthly | Measurement (if required) |
| Fuel consuption (per type) | l | Monthly | Measurement (if required) |

#### Fertilization

The following values are defined at the start of the project:

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameter** | **Ex-Ante Value** | **Unit** | **Source of Data** |
| CO2 emissions from diesel | 0.00269 | t CO2e / liter of diesel | EPA (2023) |
| CO2 emissions from gasoline | 0.00235 | t CO2e / liter of gasoline | EPA (2023) |
| CO2 emissions from transportation | 0.111 | t CO2e / ton-km | UBA (2022) |
| CO2 emissions from electricity consumption | - | t CO2e / kWh | Use national factor |
| CO2 emissions from NPK fertilizer use | 0.01 | t CO2e / kg | Walling and Vaneeckhaute (2020) |
| CO2 emissions from phosphate fertilizer (P2O5) | 0.001–0.0089 | t CO2e / kg | Walling and Vaneeckhaute (2020) |
| CO2 emissions from potassium fertilizer (K2O) | 0.0025 | t CO2e / kg | Walling and Vaneeckhaute (2020) |
| CO2 emissions from industrial lime use | 0.45 | t CO2e / ton | EEA (2016) |

The following values are defined during the monitoring of the project:

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameter** | **Unit** | **Monitoring Frequency** | **Source of Data** |
| Kilometers from transportation | km | Monthly | Measurement |
| Operating hours (per equipment) | hr | Monthly | Measurement (if required) |
| Fuel consuption (per type) | l | Monthly | Measurement (if required) |
| Fertilizer use (per type) | kg / ha | Monthly | Measurement |

#### Harvest

The following values are defined at the start of the project:

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameter** | **Ex-Ante Value** | **Unit** | **Source of Data** |
| CO2 emissions from diesel | 0.00269 | t CO2e / liter of diesel | EPA (2023) |
| CO2 emissions from gasoline | 0.00235 | t CO2e / liter of gasoline | EPA (2023) |
| CO2 emissions from transportation | 0.111 | t CO2e / ton-km | UBA (2022) |
| CO2 emissions from electricity consumption | - | t CO2e / kWh | Use national factor |

The following values are defined during the monitoring of the project:

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameter** | **Unit** | **Monitoring Frequency** | **Source of Data** |
| Kilometers from transportation | km | Monthly | Measurement |
| Operating hours (per equipment) | hr | Monthly | Measurement (if required) |
| Fuel consumption (per type) | l | Monthly | Measurement (if required) |

### Compensation of project emissions

The total annual emissions of the project must be offset by long-term carbon sinks (e.g. Biochar) before the registration of a Tree C-sink can be completed.

The quantity of annual Carbon Expenditures (y0) of the project, see section **4.2.1** below, must be equivalent to the quantity of persistent C-Sinks acquired in the C-Sink Registry.

|  |  |  |
| --- | --- | --- |
| **Parameter** | **Monitoring frequency** | **Source of data** |
| Carbon\_Expenditures\_y0 | Yearly | Annual Carbon Expenditures |
| Acquired\_Persistent\_C-Sinks | Yearly | Global C-Sink Registry |

## Standard Calculations

Provide information about how the monitored parameters are integrated into the calculations required for the standard.

### Carbon expenditures

The total carbon expenditures are calculated based on the results of the Project Emission Portfolio (**Section 4.1.2 Emissions of projects activities**). This represents sum of the total project emissions and the additional 10 % security margin for scope 3 emissions is calculated on an annual basis and reported to CSI.

Tree C-Sinks are only certified after the carbon expenditures accounted for the corresponding monitoring period are offset via the acquisition of persistent C-Sinks.

### Leakage Emissions

Leakage emissions are avoided as part of the requirements for land eligibility in **Section 5.1** of the Global Tree C-Sink guidelines. Therefore, carbon leakage—such as the displacement of settlements, agriculture, or pastoral activities resulting in emissions outside the project boundaries—is negligible and leakage emissions are considered zero. This claim is supported by the design principles of the project, which requires the use of abandoned, unutilized, or degraded land, avoiding the displacement of such activities.

If it is not possible to guarantee that displacement will be avoided, measures such as agroforestry, silvopasture, or designated grazing areas can be integrated into the project.

|  |
| --- |
|  |

# Registration of C-Sink

Tree C-Sinks (t CO2eq) are recorded in the C-Sink Registry through the **Bulk Upload Template**, which requires information about the coordinates, certification, related emissions, and details from the dMRV system for each C-Sink Unit. These C-Sink Units correspond to the plots where the trees are physically located.

Additionally, the following is required for registering the C-Sinks:

1. **KML file**: Georeferenced file of the land or area where the C-Sink is located.
2. **C-Sink establishment date**: Date when the biomass carbon removal was planted.
3. **Carbon removal verification date**: Date when the biomass carbon removal was verified.
4. **C-Sink Unit identification**: Information about the CSU, and its MU.
5. **Biomass amount**: Total dry tons of biomass.
6. **Carbon amount**: Carbon stored, measured in t CO2eq.
7. **Expected C-Sink Curve**: Projected carbon sequestration over the first 10-year period.
8. **Validation report**: Issued by the VVB.
9. **Monitoring report**: Issued by the C-Sink Manager.
10. **Confirmation of emission compensation**: Evidence of annual carbon expenditures offset by persistent C-Sinks.
11. **Issuance of C-Sink:** Ownership of the C-Sink, timestamp of creation and registration in the C-Sink Registry.

### Calculation of Tree C -Sink

Tree C-Sink are considered temporary C-Sinks and are registered in the Global C-Sink Registry exclusively for the corresponding year of verification, following the Global Cooling Services principles.

Under the condition that all GHG emissions generated during the corresponding year, the annual Tree C-Sinks are calculated directly from the biomass C-Stock:

Where the biomass dry weight is obtained from the dMRV measurements of the verification year and the carbon fraction (t C t-1 dry matter) is determined determined on the monitoring approach. The default tree vegetation Carbon Fraction is 0.47 t C t-1 dry matter, while the species-specific values can be obtained from literature.

#### Monitoring plan for Tree C-Sink:

|  |  |  |
| --- | --- | --- |
| **Parameter** | **Monitoring frequency** | **Source of data** |
| C\_Stock\_y0 | once | dMRV |
| C-Stock\_yX | annually | dMRV |

#### Calculation of C-Stock Changes

# Public consultation

During public consultation the following comments were raised:

*[This section must be filled earliest after the first feedback round with the VVB. The public consultation starts with handing in the PDD for validation. Carbon Standards International will upload it to its website for 30 days and informs the project proponent about the comments raised during this consultation. If there are comments raised the project proponent has to document in the table below if a comment was taken into account with a justification and an indication which sections of this document where affected]*

|  |  |  |
| --- | --- | --- |
| **Comment** | **Was comment taken into**  **account (Yes/ No)? Where?** | **Explanation/ justification (Why? How?)** |
| xx | xx | Xx |
| xx | xx | Xx |

# Annexes

List the annexes and files submitted along with this PDD

# Appendix 1. Spatial Organization

The spatial organization of the project consists of three levels:

* Project area (PA) is defined as the reference region where project activities take place, e.g. plantations in different localities across different municipalities. This may extend beyond lower jurisdictional boundaries such as states and provinces.
* Management unit (MU) is defined as the group of spatially contiguous land areas allocated for tree planting or regeneration activities. The MU must not be larger than 50 ha and must be associated with the project area.
* C-Sink units (CSU) are subdivisions of the MU. These may not be larger than 10 ha and are used as the primary unit for monitoring, reporting, and verification in the Global C-Sink Registry.

Complete the table below with the necessary information about the Management Units contained within this projects and its corresponding

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **No** | **ID** | **Coordinates** | **Size (ha, two decimals)** | **MUR** |
| **1** | GCSPXXXX/01 [The ending -01 is added to the Project ID for MU 1] | *Write down the coordinates for CSU 1* | e.g. 10.00 | *Write down the link of its corresponding MUR* |
| **2** | *GCSPXXXX/02 [The ending -02 is added to the Project ID for MU 2]* | *Write down the coordinates for CSU 2* | e.g. 10.00 | *Write down the link of its corresponding MUR* |
| **3** | *…* | *…* | *…* | *…* |
| **4** | *…* | *…* | *…* | *…* |
| **5** | *…* | *…* | *…* | *…* |

Include a map image in Annex 1 that clearly depicts the CSUs for each MU.

# Appendix 2. Land Eligibility Evaluation

Document the information required for determining land eligibility as established in the Global Tree C-Sink Standard, V1.0.

## Soil characteristics of the project

**Soil data is evaluated at the project level.**

|  |  |
| --- | --- |
| **Soil type according to World Reference System** | e.g.  A= Acrisol  B= Nitisol  C= Leptosol |
| **Soil reference data** | e.g. Harmonized World Soil Database |
| **Year of data publication** | e.g. 2012 |
| **Name of soil map / GIS file** | *Write down the name of the file(s) submitted along this document* |
| **Retrieved** | *e.g. 03.05.2024* |

Include a figure of the soil map(s). In case of multiple figures, indicate which MUs are contained within the map.

**Historical land use and land cover (LULC)**

Considering that spatially adjacent Management Units (MUs) are likely to share a historical Land Use and Land Cover (LULC), the information may be recorded and reported in MU Groups.

A MU Group, for the purpose of land eligibility evaluation, is formed to represent MUs with identical pre-project conditions.

Create an MU Group by grouping MUs with identical historical LULC, and then provide the required information for the indicators listed below. For each additional MU Group with differing historical LULC, duplicate the fields and complete them accordingly.

### MU Group 1

|  |  |  |  |
| --- | --- | --- | --- |
|  | **ID** | **Coordinates** | **Size (ha)** |
| **MUs** | GCSPXXXX/01 | *Write down the coordinates for MU 1* |  |
| GCSPXXXX/02 | *Write down the coordinates for MU 2* |  |
| *…* | *…* |  |

|  |  |
| --- | --- |
| **Total MU Group Size (ha)** |  |

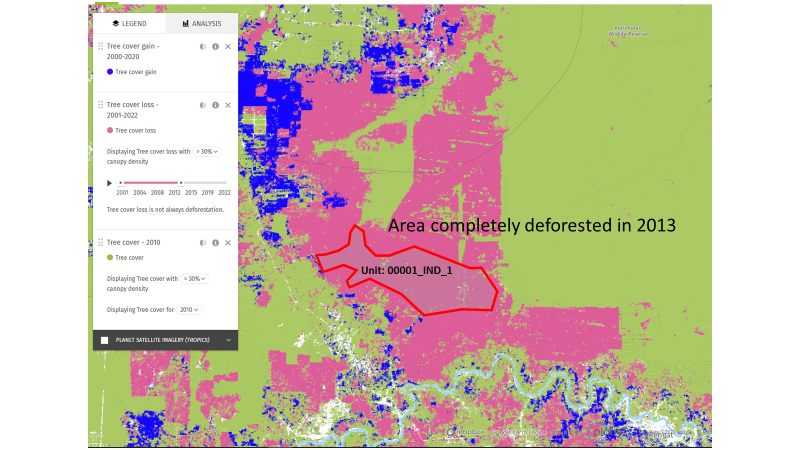
|  |
| --- |
| **Was the land covered by primary forest within the 10 years prior to the project start (initial planting activities)?** |
| e.g.  No.The primary forest in the respective management unit was lost 24 years ago. The land is partly barren/ party anthropogenic grassland for 11 years. |

Include evidence that i) no primary forest covered the management unit <=10 years before the beginning of the project and ii) no forest cover was present at the time of initial tree planting.

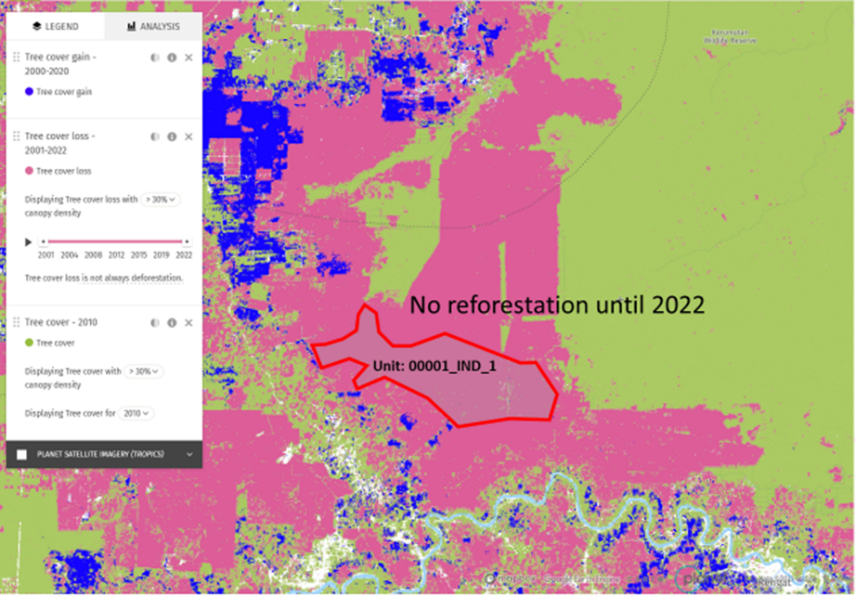
Evidence must be provided in the form of logging permits, landowner testimonies, satellite pictures (e.g. Landsat) or a *Global Forest Watch* Excerpt. Include additional evidence attached as separate georeferenced map or GIS file:

|  |  |
| --- | --- |
| **Forest cover reference data** | Global Forest Watch |
| **Time stamp of data** | 2013 to 2022 |
| **Name of map / GIS file** | *Write down the name of the file(s) submitted along this document* |
| **Retrieved** | *03.05.2024* |

**Include figures of the LULC maps in the period covered (indicate the start and end of the period). In case of multiple figures, indicate which MUs are contained within the map:**

**2013**

**2022**



### Additional requirements for afforestation projects as established on 5.1 Baseline Land Use in the Global Tree C-Sink Standard, V1.0.

The land for tree plantation within the MU Group is not covered by forest1 at the start of the project.

**If the land within the MU Group was occupied by primary or secondary forests 10 years before the project start:**

The new forest demonstrates a capacity to store at least 30% of the original carbon. Fill out the information on the section for Carbon Penalties below.

The reforested area possesses a minimum biodiversity ranking2 of Level II.

**If the land within the MU Group was NOT occupied by primary or secondary forests 10 years before the project start:**

The MU group is exempt from carbon penalties and proves a biodiversity rating of at least Level I. The project must demonstrate evidence of the forest1 classification.

1 Forest definition as established by the Global Tree C-Sink Standard, V1.0. Vegetation that falls short of the criteria defined for forests— specifically, an area of at least 0.5 hectares, trees reaching a minimum height of 5 meters, and a canopy cover of 30% or more—is classified as bushland rather than secondary forest.

2 As established in 3. Biodiversity Ranking in the Global Tree C-Sink Standard, V1.0.

#### Carbon Penalties

If the project land was previously occupied by primary or secondary forests within the last 10 years, the new forest must first recapture 30% of the carbon that was stored in the previous forest before any additional carbon sequestration can be claimed as new C-Sinks.

Based on the data (satellite imagery or historical land data) reported on Annex 2. Land Eligibility Evaluation of this PDD, it is determined whether forest cover existed within the project boundaries during the past decade. The carbon stock of the previous forest should be estimated using regional averages from the IPCC (Annex 3.A1) or through their own calculations. If the project developer has local data that significantly differs from IPCC estimates, an adjustment of benchmark values from different sources must be approved by Carbon Standards.

|  |  |  |
| --- | --- | --- |
| **Parameter** |  | **Sources** |
| **Size of previously forested area** | Area in hectares |  |
| **Type of forest** | Name of the forest type |  |
| **Total carbon stock of previous Forest (t CO₂e)** | t CO₂e based on IPCC or local calculations |  |
| **30% Carbon Penalty to be recaptured (t CO₂e)** | 30 % of the previous forest C-Stock |  |
| **Total carbon stock of forest from project (t CO₂e)** | t CO₂e based on IPCC or local calculations |  |

# Appendix. 3 dMRV: Carbon Stock Calculation

Provide a concrete explanation of the procedure for calculating the biomass C-Stock adapted from the method of the Endorsed dMRV Provider. This must include the reasoning behind the choice of measurement strategies, the selection of relevant databases, emission factors, default values, and allometric equations. Ensure to incorporate all necessary equations to calculate biomass and track carbon stock changes throughout the verification period, citing all sources and references to ensure accuracy and transparency.

Additionally, explain how the C-Stock calculations align with the approach used for ex-ante estimations in the expected C-Sink Curve. The level of detail in the calculations must be sufficient to allow independent review and verification, supporting any future refinements to the C-Sink Curve estimation process.

|  |
| --- |
| **Describe the data collection approach (data type, field inventory, sampling design)** |
| A single-tree tracking approach is implemented to monitor and estimate biomass carbon stock throughout the project. Each tree will be individually tracked with measurements collected via digital Monitoring, Reporting, and Verification (dMRV) tools that capture geolocation, species, diameter at breast height (DBH), and height. The system ensures that every tree, including the three main species in the project (Quercus pedunculata, Pinus caribaea, and Cedrela odorata), is georeferenced and monitored over time.  This approach eliminates the need for sampling plots since data will be gathered for every tree in the project area. For newly planted trees that have not yet reached a measurable DBH, a conservative default carbon sink value will be assigned until the trees mature. |

|  |
| --- |
| **Describe the procedure for biomass calculation** |
| For each individual tree, the allometric equations specific to the tree’s species and climatic zone will be used to estimate AGB. Only trees with a diameter at breast height (DBH) of 10 cm or greater were measured.  The data collection tool will automatically process the measurements and apply the calculation using the following species specific equations:  **Allometric Equations for AGB Calculation**   |  |  |  |  | | --- | --- | --- | --- | | **Species** | **Allometric Equation** | **Wood Density (ρ) (tonnes d.m./m³)** | **Source** | | *Quercus pedunculata* | AGB = 0.0673 × (ρD²H) 0.976 | 0.65 | Local forestry databases | | *Pinus caribaea* | AGB = 0.0505 × (ρD²H)1.27 | 0.52 | IPCC guidelines, Annex 3.A1 | | *Cedrela odorata* | AGB = 0.112 × (ρD²H)0.937 | 0.40 | Local tropical forest study |   Where:   * **ρ** = Wood density (tonnes of dry mass per cubic meter). * **D** = Diameter at breast height (DBH) in centimeters. * **H** = Tree height in meters.   For each species, AGB is calculated using the general formula:  AGB = 𝑎 × (𝜌𝐷2𝐻)𝑏    Where:  𝑎 and 𝑏 are constants specific to each species from the table above.  𝜌 is the wood density (tonnes d.m./m³).  𝐷 is the DBH (cm).  𝐻 is the tree height (m).  To estimate Belowground Biomass (BGB), a root-to-shoot ratio of 0.24 was applied, consistent with IPCC guidelines for tropical forests. The formula used is:  BGB = AGB × 0.24  The total biomass for each tree is calculated by adding AGB and BGB:  Total Biomass = AGB + BGB |

|  |
| --- |
| **Describe the procedure for carbon stock estimation** |
| The total biomass is converted to carbon stock using a carbon content factor of 0.47, which represents the proportion of biomass composed of carbon. The carbon stock per tree is:  Carbon Stock = Total Biomass × 0.47  These values are then aggregated across the project area. Based on tree density and the size of the project, the carbon stock at the start of the project for the three main species is represented in the following table:   |  |  |  |  | | --- | --- | --- | --- | | **Species** | **Size (ha)** | **Biomass dry weight (tonnes d.m./ha)** | **Biomass Carbon Stock (tonnes C / ha)** | | *Quercus pedunculata* | 110 | 177.3 | 309 | | *Pinus caribaea* | 35 | 96.7 | 168 | | *Cedrela odorata* | 10 | 27.3 | 47 | |

|  |
| --- |
| **Describe the ex-ante model integration** |
| The Expected C-Sink Curve will be developed using the anticipated growth rates for each species and regional data for forest growth. These ex-ante estimates will be adjusted using actual carbon stock data collected by the dMRV system. Updates to the Expected C-Sink Curve will occur every five years, based on the tree-specific data collected during the verifications.  A more broad explanation of the updated values is included in the monitoring report of the verification period in which the adjustments take place. |

|  |
| --- |
| **Describe the procedure for QA/QC** |
| To maintain high data quality, all measurements from the dMRV tools will undergo automated checks for accuracy and consistency. A subset of trees will also be remeasured to ensure the reliability of the data. All collected data will be archived for at least 10 years for third-party audits and ensure transparency and traceability throughout the project's duration. |