TERO.006 – ARR

VERSION 1.0

METHODOLOGY, AFOLU, ARR

TERO CARBON AVALIAÇÕES E CERTIFICAÇÕES S.A.

IDENTIFICATION

METHODOLOGY	TERO.006 – ARR
VERSION	1.0
STATUS	Under Public Consultation
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STANDARD	Tero Carbon Avaliações e Certificações S.A. (contato@terocarbon.com)
PROGRAM	Nature-Based Solutions (NBS)
SECTOR	Agriculture, Forestry, and Other Land Uses (AFOLU)
TYPE	Afforestation, Reforestation, and Revegetation (ARR)
ASSET GENERATED	Verified Carbon Credit (tCO_2e)
PROJECT ACTIVITIES	• Afforestation; • Reforestation; and • Revegetation.
GHG MITIGATION	Removal

LIST OF ACRONYMS

AGB	Above-Ground Biomass
AFOLU	Agriculture, Forestry, and Other Land Uses
ARR	Afforestation, Reforestation, and Revegetation
BAU	Business as usual
BGB	Below-Ground Biomass
CS	Carbon Stock
DBH	Diameter at Breast Height
DDW	Down and Dead Wood
GHG	Greenhouse Gas
KPI	Key Performance Indicator
LRA	Legal Reserve Area
MRV	Measurement, Reporting, and Verification
MUA	Multiple-Use Area
NBS	Nature-based Solutions
PA	Project Area
PB	Property Boundary
PPA	Permanent Preservation Area
SBCE	Brazilian Greenhouse Gas Emissions Trading System, em Portuguese, *Sistema Brasileiro de Comércio e Emissões*
TAC	Conduct Adjustment Agreements, in Portuguese, *Termo de Ajustamento de Conduta*

LIST OF PROGRAMS

Certification Program
Methodologies Program
Assets Program

LIST OF SUPPORTING DOCUMENTS

NAME	PROGRAM
Definitions	All
Project Additionality Demonstration Tool	All
Project Scale Analysis Tool	All
Socio-Environmental Safeguards Analysis Tool	All
Acceptance Criteria Analysis Tool for Project Verification	All
Land Tenure Compliance Analysis and Certification Tool	NBS
Methodological Basis and Methods for Estimating Carbon Stocks in AFOLU Projects	NBS
Non-Permanence Risk Analysis Tool and Buffer Reserve Calculation	NBS

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1. INTRODUCTION

EThis methodology establishes guidelines for implementing **Afforestation, Reforestation, and Revegetation (ARR)** projects aimed at removing greenhouse gases (GHGs) from the atmosphere and generating verified carbon credits. Based on nature-based solutions (NBS), the methodology adopts environmentally responsible strategies to restore or expand vegetation cover, including forests and other crops, in eligible areas within the AFOLU sector (Agriculture, Forestry, and Other Land Uses). In addition to contributing to climate change mitigation, the methodology promotes sustainable land management, biodiversity conservation, the restoration of ecosystem services, and social benefits for local communities.

2. SCOPE, ACCEPTANCE CRITERIA AND ACTIVITIES

2.1. Scope

This methodology applies to AFOLU sector projects that promote carbon removal through the establishment or restoration of vegetation cover.

2.2. Acceptance Criteria

This methodology applies to projects that meet the following acceptance criteria:

I. **Land Tenure Compliance:** The project must be implemented on rural properties with verified land tenure regularity, as defined by the "**Land Tenure Compliance Analysis and Certification Tool**" The property may be privately or publicly owned;

II. **Territorial Configuration:** The project area may be contiguous or consist of multiple land parcels, provided it forms an ecological mosaic that ensures biome connectivity and integrity;

III. **Project Area Location and Additionality:** The Project Area (PA) may be located within Permanent Preservation Areas (PPAs) and Legal Reserves (LRs). However, ARR activities cannot result from legal requirements, court orders, or formal commitments such as Terms of Conduct Adjustment (TACs) or mandatory environmental compensations;

IV. **Additional Socio-Environmental Impacts:** Beyond direct carbon removal, the project must demonstrate, through clear indicators, the occurrence of at least two additional socio-environmental benefits;

V. **Compliance with Socio-Environmental Safeguards**: The project must fully adhere to the socio-environmental safeguards established by the "**Socio-Environmental Safeguards Analysis Tool**";

VI. **Clear Identification of Key Roles**: The project must explicitly identify the key stakeholders responsible for its implementation. It is mandatory to designate at least one Primary Proponent, one Developer, one Generator, and one Implementer. Each role must be clearly defined, detailing the respective responsibilities and contributions to the project's execution; and

VII. **(Reforestation and Revegetation Only) Area Eligibility and Land Use History:** The area designated for reforestation and/or revegetation must demonstrate a minimum period of 5 (five) years between its conversion—characterized by the removal of the original vegetation—and the start of reforestation or revegetation activities. This requirement ensures suitable ecological conditions for the establishment of new vegetation cover.

2.3. Activities

This methodology provides for the generation of carbon credits (removal) through the following activities:

I. **Afforestation:** Involves the establishment of forests in areas where there has been no forest cover for an extended period, according to historical land-use criteria. This activity promotes the removal of greenhouse gases (GHG) through carbon sequestration in biomass and soil, while also contributing to ecosystem restoration and the enhancement of environmental services.

II. **Reforestation:** Entails the recovery of forest cover in areas previously occupied by native vegetation that was converted for other uses, such as agriculture or pasture. To ensure eligibility, the methodology establishes a minimum period between vegetation conversion and the start of the project. Reforestation contributes to GHG removal and the restoration of ecological functionality.

III. **Revegetation:** Encompasses the recovery of degraded areas through the introduction of perennial vegetation, without necessarily reestablishing a

complete forest ecosystem. Revegetation may include tree species, palms, shrubs, or native or economically viable grasses, aiming at soil stabilization, the restoration of ecosystem services, and carbon sequestration.

3. BASELINE

3.1. Selection of Project Activity Implementation Areas

The project activity implementation area, referred to as the Project Area (PA), must be geographically identified (**Figure 1**), along with the main geographic polygons of the rural property: Hydrography, Property Boundary (PB), Permanent Preservation Area (PPA), Multiple-Use Area (MUA), and Legal Reserve Area (LRA).

Figure 1. Map identifying the main geographic polygons of the project: Hydrography, Property Boundary (PB), Project Area (PA), Permanent Preservation Area (PPA), Multiple-Use Area (MUA), and Legal Reserve Area (LRA).

3.2. Selection of Carbon Pools Used in Carbon Stock Accounting

The project must specify which carbon pools were considered in the accounting of carbon stocks. **Table 1** presents the types of carbon pools accepted by this methodology.

Table 1. Types of carbon pools accepted by the methodology.

POOL	ACRONYM	MANDATORY
Above-Ground Biomass	AGB	Yes
Below-Ground Biomass	BGB	Yes
Litter	Litter	Optional
Dead wood and soil organic carbon	DDW	Optional

The emission sources and greenhouse gases (GHG) considered in the accounting of the project's activities are described in **Table 2**.

Table 2. Emission sources and GHGs considered in the accounting of the project's activities.

STAGE	SOURCE	GAS	USED	JUSTIFICATION
Pre-Project (BAU)	Emissions from nitrogen fertilizer use	CO_2	No	Conservatively excluded due to MRV tool limitations.
		CH_4	No	
		N_2O	No	
	Fossil fuel combustion	CO_2	No	
		CH_4	No	
		N_2O	No	
Project Implementation	Biomass burning	CO_2	Yes	If the project includes burning woody biomass as part of land clearing for planting, the resulting emissions must be accounted for.
		CH_4	No	Conservatively excluded due to MRV tool limitations.
		N_2O	No	Conservatively excluded due to MRV tool limitations.

STAGE	SOURCE	GAS	USED	JUSTIFICATION
Project Implementation	Emissions from nitrogen fertilizer use	CO_2	No	Conservatively excluded due to MRV tool limitations.
		CH_4	No	Conservatively excluded due to MRV tool limitations.
		N_2O	Yes	May represent a significant emission source and should therefore be accounted for.
	Fossil fuel combustion	CO_2	Yes	If the project involves harvesting products from revegetation, emissions from vehicle and machinery use in this activity must be accounted for.
		CH_4	No	Conservatively excluded due to MRV tool limitations.
		N_2O	No	Conservatively excluded due to MRV tool limitations.

3.3. Selection of the Baseline and Demonstration of Additionality

The baseline selection and demonstration of additionality must consider the challenges faced by rural landowners, who often opt for more profitable activities, such as livestock and crop farming, at the expense of tree planting. Consequently, it is necessary for the project to compensate for opportunity costs and become economically attractive. To this end, it is recommended to integrate plantings with economic purposes, such as agroforestry systems or commercial monocultures, which diversify income sources and ensure financial viability, while also promoting environmental and social benefits for the region.

In Brazil, ARR projects have the prerogative to generate carbon credits in Permanent Preservation Areas (PPAs) and Legal Reserves (LRs) based on Article 46 of Law No. 15,042, dated December 11, 2024, which establishes the Brazilian

Greenhouse Gas Emissions Trading System (SBCE), provided that they meet the additionality criteria and are not obligations. This premise reinforces the validity of projects that prioritize the restoration, maintenance, and conservation of these areas, contributing to the generation of carbon credits.

At the same time, the approach that prioritizes the planting of native trees and the promotion of biodiversity is recognized as valid, resulting in a diverse and resilient forest mosaic. This strategy contributes to the conservation of ecosystems and meets the growing demand for environmentally integrated projects. In summary, the baseline should reflect the actual land use and the opportunity costs faced by landowners, ensuring the additionality of the projects. Thus, whether through diversified plantings or economically viable monocultures, Afforestation and Reforestation projects can provide effective GHG removal, local economic development, and the conservation of natural resources.

To demonstrate additionality, the project developer must use the **"Project Additionality Demonstration Tool"**, provided within the Certification Program.

3.4. Baseline for Emissions Removed by Natural Restoration

To account for the natural restoration of vegetation on the property or the maintenance of its degraded state, the calculation of Greenhouse Gas (GHG) emissions removed in the project's baseline must consider the scenario in which the project is not implemented, reflecting the natural or stagnant dynamics of carbon stock over time.

The baseline should be constructed based on the initial carbon stock (CS_0) present in the target area and projections regarding its possible long-term evolution (or lack thereof), considering environmental, historical, and socioeconomic factors that influence land use.

The project developer must provide technical evidence supporting the adopted model, utilizing historical satellite imagery series and local data to demonstrate whether the area has the potential for natural regeneration or if it will remain in a degraded state without direct intervention. This reference scenario is essential for accurately quantifying the project's climate benefits, ensuring the credibility and precision of the carbon credits generated through the effective removal of GHGs. Equation (1) presents how the baseline should be established.

$$CS(t)_{BSL-NAT} = \left(CS_0 + fCS(t)_{NAT}\right) \pm IC \quad (1)$$

where:

$CS(t)_{BSL\text{-}NAT}$ = baseline of carbon removed at time "t" (in tCO_2e) through natural vegetation restoration (NAT) within the project area boundaries;

CS_0 = carbon stock at the start of the project (in tCO_2e);

$fCS(t)_{NAT}$ = function representing the natural variation of carbon stock over time, whether through natural restoration or maintenance of the degraded state (in tCO_2e); and

IC = Confidence Interval (in tCO_2e).

3.5. Leakage

The calculation of leakage is considered optional in this methodology, as there are no proven means for its verification, nor effective management mechanisms for the areas surrounding the project. Nevertheless, nothing prevents the proponent from presenting their own approach, including a specific methodology and criteria for quantifying leakage, if deemed relevant to demonstrate the potential indirect impacts resulting from the implementation of the project activities. If applicable, leakage is given by equation (2):

$$LK(t) = LK(t)_{PROJ} \quad (2)$$

where:

$LK(t)$ = GHG emissions due to leakage at time "t" (in tCO_2e); and

$LK(t)_{PROJ}$ = project leakage, when presented, at time "t" (in tCO_2e).

3.6. Quantification of the Current Carbon Stock in the Project Area

The quantification of the current carbon stock in the project area (CS_{ACTUAL}) must be presented with a known confidence interval (*IC*), ensuring the accuracy and methodological robustness of the calculation. This methodology recommends using the document **"Methodological Basis and Methods for Estimating Carbon Stocks in AFOLU Projects"** as a technical reference, providing standardized guidelines for estimating carbon stocks in AFOLU sector projects. However, each developer is free to present their own quantification method, as long as it is technically and scientifically valid, clearly explaining the

approach used and the correction factors applied to the site, ensuring transparency and consistency in the results.

3.7. Calculation of Net GHG Reductions/Avoidances and Removals by the Project

Net GHG Removals by the project are obtained by the difference between baseline emissions and the project's actual emissions, subtracting any fugitive emissions and leakages. Equation (3) describes the calculation method, covering emissions and removals associated with the planting activity:

$$C(t)_{TOT} = \left(CS(t)_{ACTUAL} - CS(t)_{BSL-NAT} - Ef(t) - LK(t)\right) \pm IC \quad (3)$$

where:

$C(t)_{TOT}$	=	total net emissions of the carbon removal project in agricultural plantations at time "t" (in tCO_2e);
$C(t)_{TOT\text{-}NAT}$	=	total net emissions from the natural restoration activity of the rural property (NAT) at time "t" (in tCO_2e);
$CS(t)_{ACTUAL}$	=	current net carbon stock in the project area (PA) at time "t" (in tCO_2e);
$Ef(t)$	=	increase in GHG emissions ("fugitive emissions") at time "t" (in tCO_2e) within the project area due to the planting activity (e.g., fertilization);
$LK(t)$	=	GHG emissions due to leakage at time "t" (in tCO_2e); and
IC	=	Confidence Interval (in tCO_2e).

3.8. Risk of Non-Permanence and Buffer Reserve Calculation

The risk of non-permanence (*Rnp*), also known as the risk of reversal, refers to the possibility of partial or total loss of the carbon stocks achieved by the project over time. This methodology allows the developer to present their own approach and calculation method for estimating the risk of non-permanence, as long as the methodology used is clear, transparent, and properly justified.

The project should adopt safeguards to minimize the risks of

non-permanence (*Rnp*), adjusting its approach according to the activity being carried out. For Restoration of Degraded Areas (RAD) projects, a portion of the generated credits should be allocated to a buffer reserve (α), calculated based on a non-permanence risk analysis. For Avoided Planned Deforestation (APD) activities, the tonne-per-year approach is applied, eliminating the need for the calculation of the α factor, as carbon credits are issued fractionally throughout the project's duration.

To support this, the document "**Non-Permanence Risk Analysis Tool and Buffer Reserve Calculation**" offers various approaches for the adoption of safeguards.

3.9. Calculation of Permanent Carbon Credits Generated

e calculation of the permanent carbon credits (*pC*) generated by the project is carried out based on the buffer reserve approach, where a fraction (α) of the carbon credits becomes permanent with each verification. To determine this factor, use the "**Risk of Non-Permanence and Buffer Reserve Calculation Tool for the Project**". In this case, the permanent carbon credits generated in the verification period "n" are calculated by the difference between the net C_{TOT} of the current verification ($C_{TOT\ n}$) and the highest C_{TOT} ever recorded in the project ($C_{TOT\ max}$)), with the fraction allocated to the buffer reserve subtracted. Thus, the adopted formula is. Equation 4 presents the calculation.

$$pC_n = \left(C_{TOT\ n} - C_{TOT\ max}\right) \times \alpha \quad (4)$$

where:

pC_n = Permanent carbon credits generated in verification period “n” (in tCO_2e);

$C_{TOT\ n}$ = Net total GHG emissions removed by the project in the current verification (n) (in tCO_2e));

$C_{TOT\ max}$ = Highest C_{TOT} value ever recorded in the Project Area up to the current verification (in tCO_2e); and

α = Fraction of credits that become permanent.

Rules to Prevent Negative Credits and Double Counting:

- If a reversal occurs (i.e., if $C_{TOT\ n} < C_{TOT\ max}$), then $pC = 0$;

- The highest C_{TOT} previously recorded in the project ($C_{TOT\ max}$) must be used as a reference to avoid double counting of carbon removals; and
- The buffer reserve is applied to all net removals, ensuring security against future risks.

3.10. Project Scale Definition

The project scale should be defined based on the potential for annual carbon credit generation. To support this analysis, the Certification Program provides the **"Project Scale Analysis Tool"**, which guides the developer in presenting the proposed scale, considering the estimates of reduced/avoided and removed emissions. However, it is the developer's responsibility to justify the defined scale, based on technical parameters and realistic projections, ensuring coherence between the project's capacity and its potential for GHG mitigation.

4. MONITORING PROCEDURE

4.1. Monitoring Plan

The monitoring plan is crucial to ensure the quality, traceability, and environmental integrity of the project's results over time. The monitoring should cover continuous verification of essential aspects, including:

I. The continuous validity of the acceptance criteria defined for the project;

II. The updated quantification of carbon stocks within the project area;

III. The assessment of co-benefits selected through key performance indicators (KPIs));

IV. Monitoring and mitigation of non-permanence risks; and

V. when applicable, monitoring of potential leakage.

Other specific points for ARR projects include:

- **Area and Delimitation:** Continuous verification of the planted area's extent and integrity, ensuring it remains consistent with the defined baseline.
- **Growth and Survival of Seedlings:** Monitoring survival rate, growth (e.g., DBH), and mortality of planted species.

- **Carbon Stock:** Periodic quantification of accumulated biomass to measure carbon sequestration, using approved methodologies for conversion into carbon credits.
- **Ecosystem Health:** Evaluation of pests, diseases, extreme weather events, and other factors that could compromise the forest's integrity.

4.2. Methodology and Quality of Monitoring

As part of the monitoring procedure, the project developer must establish a clear and replicable methodology for data collection, analysis, and reporting, ensuring that the processes are auditable and consistent throughout the verification cycles. The plan must describe the tools, technologies, and frequencies used for monitoring, as well as identify the responsibilities of the parties involved. The developer must also adopt measures to ensure data quality, including internal audits, control procedures, and detailed records of all monitored activities.

4.3. Period Between Verifications

The period between verifications must be defined by the developer in the Monitoring Plan, considering the nature of the project and the frequency required to ensure the quality and traceability of the results. However, this interval should not exceed three years to ensure that the collected data remains updated and consistent with the project's reality. Ideally, verifications should be conducted annually, allowing for continuous monitoring of the project's performance, quick identification of deviations, and implementation of corrective actions when necessary.

4.4. Monitoring Report

At each monitoring period, when requesting a verification, the project developer must submit a comprehensive Monitoring Report. This report should present the quantified results of net emissions, clearly indicating the carbon credits required for the current crediting period. In addition to the written document, the developer must also provide spreadsheets and supporting information available in the "**Acceptance Criteria Analysis Tool for Project Verification**" This documentation ensures that all data and calculations are

transparent, auditable, and consistent with the project's monitoring and verification requirements.

VERSION HISTORY

VERSION	DATE	NOTES
1.0	04/02/2025	Initial version approved by the Board and released for public consultation.