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RIO MADEIRA GROUPED REDD+ PROJECT



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RIOMADEIRA
REDD+ CARBON PROJECT

Document Prepared by Future Forest

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1 PROJECT DETAILS

1.1 Summary Description of the Implementation Status of the Project

In Brazil, 58.39% of its entire 851,034,553.8 ha territory (IBGE, 2021¹) is covered by forests, representing almost 497 million hectares of forest area (FAO, 2020²) and putting it in second place for nations with most forest area worldwide. Brazil has also been at times the country with the highest levels of deforestation in the world, having lost almost 15 million hectares of its forest area from 2010 to 2020 (FAO, 2020³). The expansion of the agriculture frontier due to cattle ranching, soy farming, timber collection, infrastructure and colonization by subsistence agriculturalists has contributed to this historically high deforestation rate, which is concentrated in the northern portion of the country, where the Amazon Rainforest lies.

The Rio Madeira Grouped REDD+ Project is located in the municipalities of Porto Velho, Rondônia state and Lábrea, south of Amazonas state, in the Northern region of Brazil. The region is surrounded by many rivers and its borders having direct contact with Rio Madeira. The Trans-Amazonian Highway BR-230, which is the third longest Brazilian highway, along its route, cattle raising can be found, which is one of the many drivers to deforestation in the region (WWF-Brasil, 2017⁴). Imazon data from September 2021 places Rondônia as the 3rd State in the deforestation ranking, with 17,800 hectares within one year. The same study points Porto Velho as the 2nd municipality with the most deforestation rate in September 2021⁵.

The main objective of the Rio Madeira Grouped REDD+ Project is to avoid unplanned deforestation (AUD) of a region within the municipalities of Porto Velho and Lábrea. The first three Project activity instances has 52,274.05 ha project area, which belongs to three private owners: two in Porto Velho municipality, owned by Grupo ROVEMA and Grupo Leite, and one owner in Lábrea municipality, owned by Grupo Tupá consisting of 100% Amazon rainforest.

The surveillance contractor service was the first action taken by landowner from Instance 1 (Grupo ROVEMA) to support forest conservation and avoid invasions. Since the service

¹ IBGE – Instituto Brasileiro de Geografia e Estatística. Brasil. 2021. Available at: <<https://www.ibge.gov.br/cidades-e-estados>>.

² FAO and UNEP. 2020. The State of the World's Forests 2020. Forests, biodiversity and people. Rome. Available at: <<https://doi.org/10.4060/ca8642en>>.

³ FAO. 2020. Global Forest Resources Assessment 2020: Main report. Rome. Available at: <<https://doi.org/10.4060/ca9825en>>.

⁴ WWF-Brasil. Perfil socioeconômico e ambiental do sul do estado do Amazonas: Subsídios para Análise da Paisagem. 2017. Available at: <https://d3nehc6yl9qzo4.cloudfront.net/downloads/perfil_sul_amazonas.pdf>.

⁵ Available at: <https://imazon.org.br/wp-content/uploads/2021/10/SAD_Setembro21.pdf> Last visit on December 22nd, 2022

was initiated when the Contract was signed, this date is considered the first action in terms of initiating the present REDD project and thus been designated this date as its project start date. The project start date is 23-October-2019, where instance 1 hired surveillance company to monitor its properties. The following activities are also part of the project activity:

Table 1. Forest conservation implemented activities

Instance	Brief description of activities and its start
1-ROVEMA	- Surveillance activities started in October-2019 and still in place - Placards were installed in June-2022 at the project area and at its borders to inform about the project and restrictions within the forest area
2-Leite	- Remote sense monitoring started in January-2020 and still in place - Surveillance activities started in May-2021 and still in place - Placards were installed in June-2022 at the project area and at its borders to inform about the project and restrictions within the forest area
3-Tupá	- Surveillance activities started on January-2020 and still in place - Brazilian nuts harvesting agreement was held on January-2022 - Placards were installed in June-2022 at the project area and at its borders to inform about the project and restrictions within the forest area - Landmark was installed and property limits were maintained to emphasize the limit between properties in 2022

Moreover, since the beginning of the project, all instances have performed borders maintenance to avoid eventual fire spreading. In addition, the landowners have registered in September-2022 the social initial plan with surrounding communities in order to promote positive impact with the conservation project. Although such plan defines intentions and its detail is under construction, it aims promoting education, environmental awareness and incomes generating through non timber forest products, such as the Brazil nuts collection already in place, contributing to sustainable development.

Besides the ecological and carbon benefits of the project, a proportion of the carbon credits generated will be dedicated to improving social and environmental conditions for the local community around the project area, specifically contributing to environmental education and other social activities. The contribution to sustainability is being monitored applying the SOCIALCARBON® Standard, which is based in six key indicators: Biodiversity; Natural; Financial; Human; Social and Carbon Resources.

Social activities were also conducted during the monitoring period, as better detailed in section 2.2. Although the relationship between landowners and communities exists prior to the project activity, the REDD project information was shared to several communities during the monitoring period.

The Rio Madeira Grouped REDD+ Project is expected to avoid a predicted 34,681.91 ha of deforestation, equating to an average annual of 535,121 tCO₂e in emissions reductions and 16,053,622 tCO₂e over the 30-year project lifetime (23-October-2019 to 22-October-2049).

Regarding the present monitoring period (01-January-2022 to 31-December-2022), it was generated 495,805 tCO₂e eligible for issuance.

1.2 Sectoral Scope and Project Type

Sectoral Scope: 14 – Agriculture, Forestry, Land Use (AFOLU)

Reducing Emissions from Deforestation and Degradation (REDD) through Avoided Unplanned Deforestation.

This is a grouped project.

1.3 Project Proponent

Organization name	Future Carbon International LLC
Contact person	Aline Ramos de Souza Carolina Chiarello Carolina Honora Gabriel Fernandes de Toledo Piza Igor Ribeiro Jade Cavallieri Jessica Lima Guin Joelson Sampaio Marcelo Hector Sabbagh Haddad Mayara do Nascimento Paulo Zidane Rafaello Dantas Samanta Freitas Yasmin Vila Nova Mascarenhas
Title	Aline Ramos de Souza - Socioenvironmental Analyst Carolina Chiarello - Geoprocessing Analyst Carolina Honora - Compliance Manager Gabriel Fernandes de Toledo Piza – Technical Coordinator Igor Ribeiro - Geoprocessing Coordinator

	Jade Cavallieri - Geoprocessing Analyst Jessica Lima Guin - Socioenvironmental Coordinator Joelson Sampaio - Command and Control Leader - CI3C Marcelo Hector Sabbagh Haddad – Head of Forest Mayara do Nascimento – Technical Analyst Paulo Zidane - CI3C Analyst Rafaelo Dantas – CI3C Analyst Samanta Freitas - Compliance Assistant Yasmin Vila Nova Mascarenhas - Socioenvironmental Analyst
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Table 2. Project Management Team

Department	Title	Functions
Forest – Technical Team	Gabriel Fernandes de Toledo Piza – Technical Coordinator Marcelo Hector Sabbagh Haddad – Head of Forest Mayara do Nascimento – Technical Analyst	Forest's technical department coordinates the day-to-day activities required to develop and sustain a high-quality carbon project. Develops the PDD, executes and monitors the evolution of the project, providing technical knowledge and support when necessary. It is also the focal point for the relationship with landowners.
Forest – Social and Environmental Team	Aline Ramos de Souza - Socioenvironmental Analyst Jessica Lima Guin - Socioenvironmental Coordinator Yasmin Vila Nova Mascarenhas - Socioenvironmental Analyst	The socio-environmental department is part of Future Forest's technical team and is responsible for the project's socio-environmental activities, such as stakeholders consultation, development of activities along with community members (co-benefits), management of safeguards and monitoring and improvement of biodiversity. It is also the focal point for the relationship with communities. They are responsible for planning social and environmental activities, monitoring execution, monitoring indicators, and evaluating the effectiveness of actions.
Forest – GEO Team	Carolina Chiarello - Geoprocessing Analyst	Coordinates and executes GIS mapping activities, develops and selects the baseline model, generates and analyzes monitoring information on land use and deforestation rates.

Department	Title	Functions
	Igor Ribeiro - Geoprocessing Coordinator Jade Cavallieri - Geoprocessing Analyst	
Operations – Command & Control (CI3C)	Joelson Sampaio - Command and Control Leader - CI3C Rafaelo Dantas - CI3C Analyst Paulo Zidane - CI3C Analyst	Department focused on risk management and ensuring the permanence of carbon projects. It conducts field analysis, risk mapping, and develops action plans for area management and protection, including satellite monitoring, firefighting plans, safety training, and area maintenance.
Compliance	Carolina Honora - Compliance Manager Samanta Freitas - Compliance Assistant	Responsible for conducting Due Diligence processes before signing the contract, and mapping and managing compliance risks throughout the development of the project.

1.4 Other Entities Involved in the Project

Organization name	Grupo ROVEMA
Role in the project	Project Activity Instance 1 owner
Contact person	Lediana Ghedin
Title	Lediana Ghedin - CEO
Address	Av. Calama, 1383 – São João Bosco – Porto Velho/RO Postal Code: 76803-705
Telephone	+55 69 3216-9600
Email	lediana@ceo.grupoROVEMA.com.br

Organization name	Grupo Leite
Role in the project	Project Activity Instance 2 owner
Contact person	José Marcos Leite Junior

Title	José Marcos Leite Junior - CEO
Address	BR-364 km 904 Porto Velho/RO - Postal Code: 78900-000
Telephone	+55 68 9218-9393
Email	joseleitejunior@gmail.com

Organization name	Grupo Tupá
Role in the project	Project Activity Instance 3 owner
Contact person	Tulio Villela Lemos Batista da Costa
Title	Tulio Villela Lemos Batista da Costa - CEO
Address	BR 364 km 135 Lábrea/AM - Postal Code: 69830-000
Telephone	+ 55 68 8111-1000
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1.5 Project Start Date

According to the rules established by the VCS Standard document, “The project start date of an AFOLU project is the date on which activities that led to the generation of GHG emission reductions or removals are implemented (eg, preparing land for seeding, planting, changing agricultural or forestry practices, rewetting, restoring hydrological functions, or implementing management or protection plans)”.

Therefore, the project start date is 23-October-2019, and it was defined taking into consideration the date on which the Grupo ROVEMA started a patrolling routine in the property named Rio Madeira. Such service includes security agents in order to avoid land encroachers and wood grabbers, as an action to help forest conservation due to the numerous invasions that are common in other farms in the region. Evidence was presented for the audit period, where Grupo ROVEMA signed a contract with a monitoring team (“S.S.M – Serviços de Segurança Eireli”) to increase surveillance activities and thus guarantee the conservation of the forest areas.

The other two Project Activity Instances are nearby and suffer from the same invasion risks. Thus, the Grupo Leite (instance 2), on 08-January-2020, hired an assessor (“Verine Projetos e Assessoria Ltda – ME”) which is specialized in forest coverage satellite images monitoring service. Thus, with such intel service, it was possible to prevent encroachers.

Grupo Tupá (instance 3) signed a contract with a security service provider (“Elzo Santos de Oliveira”), on 02-January-2020. Such professional is an expert on identifying tracks and settlements in the forest and established a routine of patrolling Grupo Tupá borders in order to prevent invasions and consequent forest coverage loss. Thus, briefly, below is the project start date of the 3 instances:

Table 3. Project Start Date

Instance	Project Start Date
Grupo ROVEMA	23-October-2019
Grupo Leite	08-January-2020
Grupo Tupá	02-January-2020

These actions were the first step to the conservation of the project area due to the increase of invasions within the properties.

1.6 Project Crediting Period

The project has a crediting period of 30 years, starting from 23-October-2019 until 22-October-2049.

This version of VCS 2nd Monitoring Report covers the first baseline period of the Rio Madeira Grouped REDD+ Project, from 23-October-2019 to 22-October-2025.

According to VCS requirements⁶, the baseline must be reassessed every 6 years for ongoing unplanned deforestation once deforestation projections are difficult to predict over the long term.

1.7 Project Location

The Rio Madeira Grouped REDD+ Project is situated in the municipalities of Porto Velho in State of Rondônia and Lábrea, in State of Amazonas, both in the north of Brazil, a region known as Southern Amazon. Belonging to the South-Amazonian Mesoregion and Microregion of Madeira, Porto Velho and Lábrea’s population, according to the Brazilian Institute of Geography and Statistics (IBGE) in 2021, had about 596,000 inhabitants. Their territorial areas sum up to around 102,352 km², which makes them among the largest municipalities in Brazil in the territorial area.⁷

⁶ Available at <<https://verra.org/wp-content/uploads/2022/12/vcs-standard-v4.4-final.pdf>> Last visit on 29/December/2022

⁷ Brazilian Institute of Geography and Statistics (IBGE) < <https://www.ibge.gov.br/cidades-e-estados/ro/porto-velho.html>>

The area of the first project activity instance comprehensively belongs to Grupo ROVEMA, the second project activity instance belongs to Grupo Leite and the third belongs to Grupo Tupá⁸ (Figure below). In accordance with VCS requirements, stipulated in Approved VCS Methodology VM0015, version 1.1, they are areas which include only “forest”⁹ for a minimum of ten years prior to the project start date’. To define the project area, areas within the three properties that were defined as forest for ten years prior to the project start date were identified and utilized to compose the project area. Table and figure below show the location of the project area:

Figure 1. Project Activity Instances location

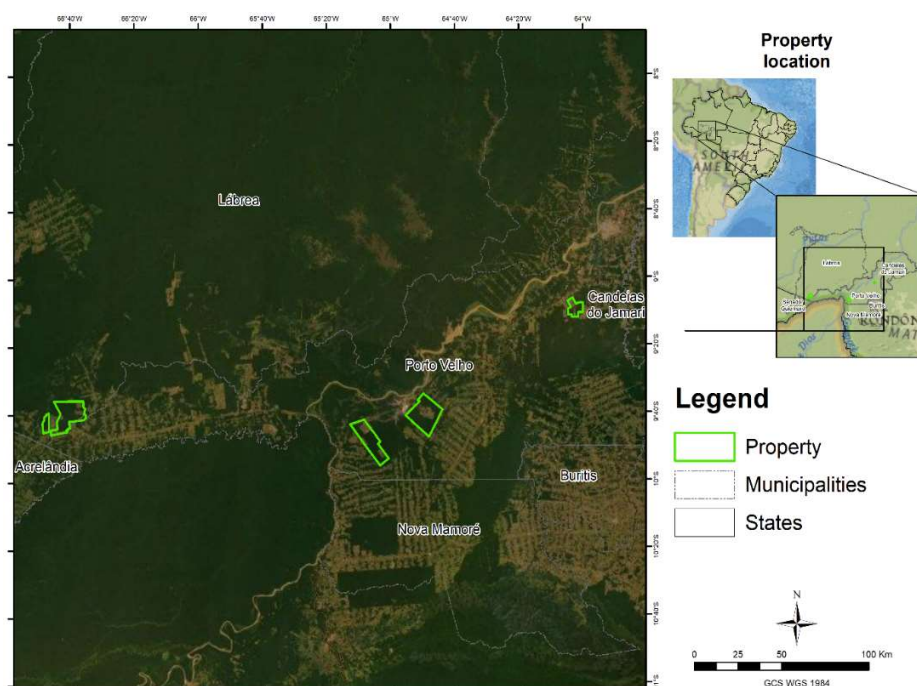


Table 4. Centroid location coordinates by property

Ownership	Properties	Centroid Location Coordinates
Grupo ROVEMA	Fazenda Rio Madeira	9° 40'41.22"S ; 64° 49'40.57"W
	Fazenda Serra Verde	9° 07'33.76"S ; 64° 03'21.22"W
Grupo Leite	Fazenda Santa Carmem	9° 46'01.89"S ; 65° 07'25.50"W
	Fazenda Santa Carmem I	9° 52'20.83"S ; 65° 04'24.96"W
	Fazenda Santa Carmem II	9° 46'39.08"S ; 65° 09'42.32"W
Grupo Tupá	Fazenda Beleza	9° 41'38.45"S ; 66° 43'15.96"W

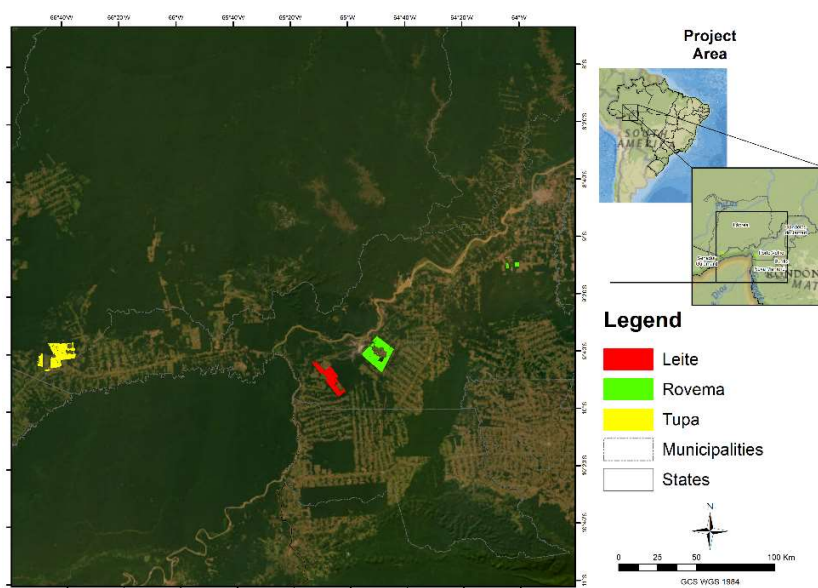
⁸ More information about the split properties, see section “1.7 - Ownership”

⁹ The applied definition of forest is from the FAO: “Land with tree crown cover (or equivalent stocking level) of more than 10 percent and area of more than 0.5 hectares (ha). The trees should be able to reach a minimum height of 5 meters (m) at maturity *in situ*.” Available at: <http://www.fao.org/docrep/006/ad665e/ad665e06.htm>

	Fazenda Fronteira	9° 43'04.65"S ; 66° 41'39.67"W
	Fazenda Iracema I	9° 39'33.69"S ; 66° 38'49.99"W
	Fazenda Iracema II	9° 37'16.84"S ; 66° 39'45.12"W
	Fazenda Seringal Novo A	9° 37'25.59"S ; 66° 43'54.66"W
	Fazenda Seringal Novo B	9° 42'43.80"S ; 66° 48'33.02"W

The location of instances is available below:

Figure 2. Initial instances that compose the project



1.8 Title and Reference of Methodology

This Grouped project utilizes the approved VCS Methodology VM0015: Methodology for Avoided Unplanned Deforestation, version 1.1, published on 03-December-2012.¹⁰

Furthermore, the following tools were used:

- VT0001 – Tool for demonstration and assessment of Additionality in VCS Agriculture, Forestry and Other Land Use (AFOLU) Project Activities, v3.0, published on 01-February-2012.¹¹
- AFOLU Non-Permanence Risk Tool v4.2, published on 12-October-2023.¹²

¹⁰ Available at <https://verra.org/methodology/vm0015-methodology-for-avoided-unplanned-deforestation-v1-1>

¹¹ Available at <https://verra.org/methodology/vt0001-tool-for-the-demonstration-and-assessment-of-additionality-in-vcs-agriculture-forestry-and-other-land-use-afolu-project-activities-v3-0/>

¹² Available at <<https://verra.org/wp-content/uploads/2023/10/AFOLU-Non-Permanence-Risk-Tool-v4.2-FINAL.pdf>>

- VCS Standard v4.4 issued on 19 September 2019¹³

The utilized SOCIALCARBON indicators are Indicators for REDD + SFMP Projects, Version 1.2, from 05-July-2013.¹⁴

1.9 Participation under other GHG Programs

This project is not seeking registration under any other GHG Programs.

1.10 Other Forms of Credit

It is important to note that this grouped project is not located within a jurisdiction covered by a jurisdictional REDD+ program. There are several ways to operationalize REDD+ as a financing instrument. In Brazil, the National REDD+ Commission is responsible for coordinating the elaboration of the requirements for access to REDD+ payments by results. As per the Federal Decree¹⁵ that created such Commission, there are still regulation to be performed.

The State of Tocantins is the Brazilian State with more advanced public policies regarding Jurisdictional REDD initiative¹⁶ ¹⁷. However, as informed by the State of Tocantins official website¹⁸, one of the upcoming steps is signing of the investment contract to make the Tocantins Jurisdictional REDD+ Program viable. Thus, the more advanced Brazilian State on such subject does not have an implemented Jurisdiction REDD Program. It can be concluded the other Brazilian States (such as Amazonas and Rondônia where the Rio Madeira Grouped REDD+ Project is located) have no public policies that recognize REDD+ at the project level and currently do not have the technical and regulatory framework necessary for the implementation of a Jurisdictional regime with carbon credits.

The jurisdictional REDD+ mechanism in Rondônia is in an active development phase, with a growing governance structure and a series of initiatives aimed at forest conservation

¹³ Available at <<https://verra.org/wp-content/uploads/2022/12/VCS-Standard-v4.4-FINAL.pdf>>

¹⁴ Available at https://static1.squarespace.com/static/6161c89d030b89374bec0b70/t/618a268beb78197f4e78ba15/1636443793807/Template_Submission_of_new_indicators_REDD%2BSFMP_v1.2_EN11.pdf Last visit on 15-August-2023

¹⁵ Available at <https://www.planalto.gov.br/ccivil_03/_ato2023-2026/2023/decreto/D11548.htm> Last visit on 06-May-2023

¹⁶ Available at <<https://www.to.gov.br/noticias/tocantins-e-o-primeiro-estado-do-brasil-a-negociar-creditos-de-carbono-no-mercado-internacional/6gg4pips3omj>> Last visit on 16-September-2023

¹⁷ Available at <<https://www.to.gov.br/semarh/noticias/redd-jurisdicional-do-tocantins-se-torna-referencia-para-outros-estados/33am9kxv946h>> Last visit on 11-September-2023

¹⁸ Available at <<https://www.to.gov.br/secom/noticias/tocantins-apresenta-redd-jurisdicional-do-estado-aos-representantes-da-uniao-de-parlamentares-sul-americanos-e-do-mercosul/6wu114rkqizz>> Last visit on 16-September-2023

and sustainable development, such as the State Forum on Climate Change, which took place in 2023. However, no change in legislation took place in 2022.¹⁹

As per section 3.23 of the VCS Standard, this project falls within items 3.23.8 and 3.23.9 where a project GHG emissions reductions are in a supply chain, and the retailers of the impacted good or service are not involved in the project.

Instances 1 and 3 conduct a Sustainable Forest Management Plan in the Project Area, and all three instances conduct cattle ranching in the property. PP understands that Scope 3 emissions refers to all activities within the property that may be affected directly or indirectly by the GHG emission reductions project.

Thus, a public statement was made available at the Future Carbon's website²⁰. In addition, landowners have notified the partners in order to avoid potential risk of Scope 3 emissions double claiming.

1.11 Sustainable Development

The primary objective of the Rio Madeira Grouped REDD+ Project is to avoid the unplanned deforestation (AUD) of the project area, consisting of 100% Amazon rainforest at the project start date.

The project contributes to several nationally stated sustainable development priorities, such as the following objectives and targets from the Brazilian Government related to the UN Sustainable Development Goals (SDG)²¹:

- SDG 8: Decent work and economic growth; Indicator 8.4.1: Material footprint, material footprint per capita, and material footprint per GDP.

Contributions during the monitoring period: the landowners have positive network in the region that can leverage non-timber product initiatives, providing alternative income and helping to decrease the number of young people and adults without income. Instance 3 has partnership with Brazil NTFP harvesters, while other instances demonstrated they can promote similar partnership within their farms. In addition, surveillance services with own employees and Contractor companies are in place during the monitoring period to avoid deforestation. Moreover, instance 2 hired mapping service. Both services generate jobs and foster economic growth.

- SDG 12: Responsible consumption and production; Indicator 12.2.1: Material footprint, material footprint per capita, and material footprint per GDP.

¹⁹ Available at: <<https://fas-amazonia.org/forum-estadual-de-mudancas-climaticas-define-membros-do-conselho-gestor-e-temas-para-o-desenvolvimento-de-baixas-emissoes-de-carbono-em-rondonia/>>

²⁰ Available at: <<https://futurecarbon.com.br/projeto-rio-madeira/>>

²¹ UN's Sustainable Development Goals and targets available at: <<https://sdgs.un.org/goals>> Last visited on 04/01/2021.

Contributions during the monitoring period: harvesting Brazil nuts within instance 3 generate incomes for small producers while the forest is conserved. It worth emphasizing the instance 3 landowner does not receive any income or commission from NTFP harvesters. In addition, instances 1 and 3 carry out sustainable forest management plan following licensing process and rational extraction.

- SDG 13: Climate action; Indicator 13.2.2: Total greenhouse gas emissions per year.

Contributions during the monitoring period: during the monitored period (1-January-2022 to 31-December-2022), the AUD REDD project avoided the emissions of around 561,430 tCO₂e, when summing three initial instances.

- SDG 15: Life on land; Indicator 15.2.1: Progress towards sustainable forest management.

Contributions during the monitoring period: the AUD project avoided the deforestation of more than two thousand hectares of Amazon Forest during 2022 full year, which corresponds to the monitoring period covered by the present monitoring report.

The Rio Madeira Grouped REDD+ Project is based on the conservation and restoration of forests in the Amazon biome, ensuring forest services, preservation of natural resources and biodiversity.

The aforementioned SDGs and Indicators support Brazilian priorities once reduces deforestation and promotes sustainable development in the Amazon biome. This is a key component to Brazil's Nationally Determined Contribution (NDC) under the Paris Agreement. According to the Brazilian Government Ministry for the Environment (in Portuguese, Ministério do Meio Ambiente), the implementation of REDD+ activities is an important component to meet the Country's contribution under the United Nations Framework Convention on Climate Change while preserving natural forest resources²².

The following components of the Brazilian commitments under the Convention are reinforced by the development of the Rio Madeira Grouped REDD+ Project:

- Strengthening and enforcing the implementation of the Forest Code, at federal, state and municipal levels;
- Strengthening policies and measures with a view to achieve, in the Brazilian Amazon, zero illegal deforestation by 2030 and compensate for greenhouse gas emissions from legal suppression of vegetation by 2030;
- Enhancing sustainable native forest management systems, through georeferencing and tracking systems applicable to native forest management, with a view to curb illegal and unsustainable practices.

²² Brazil's Nationally Determined Contribution towards achieving the objective of the United Nations Framework Convention on Climate Change can be accessed in full at: <http://www4.unfccc.int/submissions/INDC/Published%20Documents/Brazil/1/BRAZIL%20iNDC%20english%20FINAL.pdf>. Last visited on December 10th, 2019.

Table 5. Project Activities of the Rio Madeira Grouped REDD+ Project

Project Activity	Objectives	Beneficiary Groups	Implementation Schedule	SocialCarbon Indicators
Establishment and signing of the extractivist partnership agreement between nut harvesters and instance 3 (Tupá Group).	Allows the harvesters to exploit the nuts without the need to pay any fees to the owners.	Nut harvesters	Implemented in 2022	1. Alternative income sources 2. Expansion of community activities 3. Associations and Cooperatives 4. Social and environmental investments 5. Non-timber forest products (NTFPs)
Implement and intensify patrimonial surveillance, local patrolling and remote satellite monitoring in the project area.	Guarantee forest integrity and prevent illegal invasion and illegal practices.	N/A	Since Project Start Date	1. Conflict management 2. Land tenure 3. Quality control
Structure and implement the Forest Fire Prevention and Combat Plan (PPCIF).	Detect, prevent, and suppress fires, as well as mitigate their effects. Train a qualified fire brigade. Promote forest integrity. Maintain carbon stocks.	N/A	From 2025 onwards	1. Buffer reduction 2. Quality control
Implement and strengthen a communication channel with farmer neighbors and communities.	Establish a contact network to warn about deforestation, invasions, and fires, allowing joint action to reduce these actions and optimize resources.	Landowners and farm neighbors	From 2024 onwards	1. Conflict management 2. Land tenure

Establish partnerships to provide technical training.	Develop local businesses, promote income-generating activities and food security and ensure financial and productive independence for local stakeholders.	Nut harvesters, employees and local communities	From 2023 onwards	1. Community education and training 2. Alternative income sources 3. Social and environmental investments 4. Non-timber forest products (NTFPs)
Implement social and recreational spaces and improve infrastructure of public schools.	Promote satisfactory well-being and economic development.	Local schools and farm workers	From 2023 onwards	1. Expansion of community activities 2. Carbon credit benefits 3. Social and environmental investments
Promote educational opportunities activities for young people.	Ensure access to inclusive, quality, and equitable education, and promote learning opportunities.	Young people in the communities	From 2023 onwards	1. Expansion of community activities 2. Community education and training 3. Carbon credit benefits 4. Social and environmental investments
Offer training courses and workshops for women.	Promote new skills, leisure activities and additional income for women	Women living on the project farms and in the surrounding community	From 2024 onwards	1. Women inclusion 2. Community education and training 3. Alternative income sources 3. Carbon credit benefits

				4. Social and environmental investments
Set up communication channels and committees with the participation of local community representatives.	Stakeholders engagement through access to information and participation in project activities.	Local communities and farm workers	Since Project Start Date, but the procedure and standardization of these communication flows will be completed in 2024.	1. Stakeholder consultation 2. Conflict management 3. Land tenure 4. Associations and Cooperatives
Conduct fauna diagnosis.	Increase knowledge and monitoring of the biodiversity of local species	Local fauna	From 2023 onwards	1. Biodiversity monitoring 2. Impact on remaining flora
Continuous species monitoring, especially with some degree of vulnerability (IUCN).	Increase knowledge and monitoring of the biodiversity of local species	Local fauna	From 2023 onwards	1. Biodiversity monitoring 2. Impact on remaining flora
Develop participatory environmental education activities.	Strengthen good biodiversity conservation practices to combat illegal hunting, burning and deforestation in the project region	Local communities and employees	From 2024 onwards	1. Expansion of community activities 2. Community education and training 3. Social and environmental investments

In summary, the project plans to expand the extraction of NTFPs and other alternative income for the community, encouraging handicrafts and local traditions. In addition, the project activities will enable the creation of jobs to monitor the area, prioritizing the hiring of local residents for monitoring of the area, with professional training. Income from the sale of credits will make it possible to invest in the educational and professional training of children and adults in the Community.

In addition, beyond the project's ecological and carbon benefits, the implementation of REDD and SOCIALCARBON mechanisms promotes benefit sharing: a proportion of the carbon credits generated will be dedicated to improving the social and environmental conditions in the project region, specifically contributing to improving deforestation control, and developing environmental education and other social activities.

SOCIALCARBON methodology will serve as a plan and guideline for carrying out activities and achieving goals, in addition to assessing progress in each monitoring period. In this way, the owners are committed and add value to the carbon project with each action taken, encouraging long-term sustainable development.

SOCIALCARBON is based on the monitoring of indicators of six aspects of the project's sustainability: carbon, social, biodiversity, financial, natural and human. The result is a hexagon that shows the evolution of the project's contributions over time.

2 SAFEGUARDS

2.1 No Net Harm

The Rio Madeira Grouped REDD+ Project conducted a comprehensive social and environmental assessment. The socio-environmental diagnosis and on-site consultation with local stakeholders were carried out during the project validation process. In addition, literature research was also performed to enhance information collected during the onsite visit that were vague or incomplete.

The social diagnosis included villages and education centers identified as Leakage Management Area.

In addition to the acknowledgment of the socioenvironmental conditions of the communities, the SOCIALCARBON certifications also may be applied to quantify the main potential environmental and socio-economic risks. The applicable SOCIALCARBON indicators for this grouped project are "Indicators for REDD + SFMP Projects"²³, and will be applied as guidance for monitoring of social, economic and environmental impacts of the project.

Table below provides details on the identified potential risks:

²³ Available at https://static1.squarespace.com/static/6161c89d030b89374bec0b70/t/618a268beb78197f4e78ba15/1636443793807/Template_Submission_of_new_indicators_REDD%2BSFMP_v1.2_EN11.pdf Last visit on August 24th, 2022

**Table 6. Main social, economic and environmental impacts of Rio Madeira
Grouped REDD+ Project**

Activity	Aspect	Impact	Effect		Comments/ Observation
			Beneficial	Adverse	
REDD: Carbon credit project	Environmental – Conservation of Amazon Rainforest	Greenhouse Gas Emissions Reductions	X		Monitored by the Carbon resource: - Project performance Monitored by the Natural resource: - Quality control
REDD: Carbon credit project	Environmental – Conservation of Amazon Rainforest	Monitoring and supervision to avoid deforestation of forest within the project area	X		Monitored by the Biodiversity resource: - Impact on remaining flora Monitored by the Natural resource: - Quality control
REDD: Carbon credit project	Social – Conservation of Amazon Rainforest	Conflict management with communities in the project area, due to banning of timber product extraction		X	Monitored by the Carbon resource: - Stakeholder consultation Monitored by the Human resource: - Conflict management

REDD: Carbon credit project	Social/ Economic - empowerment	Increased independence of the communities in the project area.	X		Monitored by the Social resource: - Associations and cooperatives - Expansion of community activities - Women inclusion Monitored by the Human resource: - Community education and training Monitored by the Financial resource: - Alternative income sources Monitored by the Natural resource: - Social and environmental investments Monitored by the Biodiversity resource: - Non timber forest products (NTFPs)
REDD: Carbon credit project	Social/economic - Application of the Social Carbon methodology	Encouragement and investment in social, economic, and environmental aspects in the project region.	X		Monitored by the Social resource: - Expansion of community activities Monitored by the Human resource: - Community education and training Monitored by the Financial resource: - Carbon credit benefits Monitored by the Natural resource: - Social and environmental investments Monitored by the Carbon resource: - Project performance

The identified impacts will be monitored through the indicators described on the last column of the table above. Regarding the adverse effect identified, the strategy of actions

will be based in generating incomes to local communities with non-timber forest products, as described in table below.

In addition to the risks described above, it has been identified other risks that could affect the project activity, which are also described by the SOCIALCARBON indicators. These risks are described on Table below:

Table 7. Significant risks to the project

Activity	Aspect	Risk	Mitigation action	Indicators that will monitor the identified potential risks
REDD Carbon Project	Environmental - Uncertainties relating to standing forests in the future.	Non-permanence of carbon: The time which carbon will remain stocked in live biomass, without being emitted into the atmosphere. Due to the uncertainties related to what will happen to the forest in the future, there is a risk of non-permanence of forest carbon.	Encourage sources of income with non-timber forest products, since it is an activity that also generates income while the forest is conserved. This initiative is in place at instance 3 through the harvesting of non-timber products and could be expanded to other instances.	Monitored by the Carbon resource: ▪ Buffer reduction
REDD Carbon Project	Environmental - Conflict management with communities	Conflicts with communities in the project area, due to banning of timber product extraction.	Encourage sources of income with non-timber forest products, since it is an activity that also generates income while the forest is conserved. This initiative is in place at instance 3 through the harvesting of non-timber products and could be expanded to other instances.	Monitored by the Carbon resource: ▪ Stakeholder consultation Monitored by the Human resource: ▪ Conflict management

REDD Carbon Project	Environmental/ Social - Land demarcation process	Risk of land invasion by deforestation agents.	Surveillance activities are taking place in the project area, as well as monitoring with satellite images. In addition, there will be activities involving sustainable income generation including the local population	Monitored by the Natural resource: - Land Tenure Monitored by the Human resource: - Conflict management
REDD	Environmental- Sustainable Forest Management Plan	Risk of non-performance of the sustainable forest management plan.	After the end of the management cycle, the revenue from credits will be the only source of income. Therefore, the credits may be an incentive to maintain the conserved areas, as it guarantee the existence of income until the next management cycle.	Monitored by the Financial resource: - Alternative income sources Monitored by the Biodiversity resource: - Non timber forest products (NTFPs)

These risks will be monitored as part of the report described in the 'Monitoring Plan' section of this document, in accordance with the VCS VM 0015 version 1.1 methodology, as well as in the monitoring of non-permanence risk, which will be evaluated at each monitoring event. Additionally, the risk will be assessed using the SOCIALCARBON Indicator, as described in the last column of the table above, along with any other applicable socio-environmental standards to be adopted by the project.

2.2 Local Stakeholder Consultation

In accordance with the VCS Standard 4.4, the project proponent conducted a thorough assessment of local stakeholders potentially impacted by the project. This section of the VCS Monitoring Report includes the initial information regarding these stakeholders, outlining the consultation process, meeting outcomes, feedback received, and the ongoing communication strategies established during the monitored period in 2022. The consultation process was divided into two primary events:

Preliminary Socio-Environmental Data Collection:

The Preliminary Socio-Environmental Data Collection was carried out by the Project Management Team (PMT) which had previously invited and scheduled the meetings to ensure broad participation conducted between 30-August-2022 and 02-September-2022, across five distinct locations:

- **Grupo Rovema Shared Service Centre:** - 30-Aug-2022.
- **Escola Municipal Flor do Cupuaçu:** 31-Aug-2022²⁴.
- **USF Santa Rita:** 31-Aug-2022.
- **Comunidade União Bandeirantes:** 31-Aug-2022.
- **Escola Municipal Marechal Rondon:** 1-Sep-2022.
- **Cooperativa RECA:** 2-Sep-2022.

The meetings were organized with support from landowners, community leaders, and representatives from the Santa Rita Resettlement School. The goal of these meetings was to gather detailed socio-environmental and economic data from the project region and its communities, while also assessing the involvement of key local institutions.

The assessment included public schools, health institutions, local communities, and a cooperative identified as stakeholders. During these on-site meetings, the Project Management Team provided a detailed summary of the project in Portuguese and used participatory methods, such as group discussions, to engage stakeholders effectively. It was emphasized that the project is a fully private initiative with a 30-year²⁵ duration, involving three landowners, Future Carbon as the project proponent, and active participation from the local community.

²⁴ Before the on-site meeting, a conversation was held with the Director on 30-Aug-2022.

²⁵ It is important to highlight that, at the time of the preliminary socio-environmental data collection, the contract crediting period had not yet been updated to the minimum requirement of 40 years as per VCS Standard version 4.7.

Figure 3. Preliminary assessment of local Stakeholders



From left to right: 1. Flor do Cupuaçu Municipal School; 2. Santa Rita Health Center; 3. União Bandeirantes Community; and 4. Marechal Rondon Municipal School

Figure 4. Rio Madeira Folder

Projeto Agrupado REDD+ Rio Madeira



FUTURE CARBON GROUP

Descrição do Projeto

O Projeto Agrupado REDD+ Rio Madeira está localizado no município de Lábrea (Amazonas) e Porto Velho (Rondônia), em uma das regiões com as maiores taxas de desmatamento da Floresta Amazônica.

Os principais agentes de desmatamento e degradação na região são: pecuária, soja e extração de madeira, além de invasões clandestinas.

O projeto tem como objetivo principal a redução do desmatamento na região através da conservação da floresta, além da ampliação das ações sociais às comunidades locais.

Principais benefícios:

- Evita o desmatamento de florestas nativas;
- Preserva a biodiversidade amazônica;
- Participação de comunidade nas atividades do projeto;
- Geração de renda através da conservação florestal.

Crédito de Carbono

A partir da conservação florestal, é possível evitar a emissão de Gases De Efeito Estufa (GEE) para a atmosfera, atenuando os impactos das Mudanças Climáticas. Dessa forma, é possível gerar créditos de carbono: uma "moeda" verde que representa uma tonelada de GEE que deixou de ser emitida para a atmosfera, que pode ser comercializada no mercado, gerando ganhos econômicos pela preservação do meio ambiente.



1 tonelada evitada de CO₂ = 1 crédito de carbono



ESTE PROJETO VAI REDUZIR APROXIMADAMENTE 5 MILHÕES DE TCO₂ AO LONGO DE 30 ANOS (2019-2048)

O projeto vai evitar desmatar área equivalente a mais de 17 mil campos de futebol em 30 anos

Localização
Lábrea/AM e Porto Velho - RO

Bioma
Amazônia

Área do projeto
55.048 hectares

Tipo do projeto
REDD – Conservação florestal ao evitar o desmatamento não-planejado

Padrões de certificação
VCS + SOCIALCARBON®

Registro
VERRA Registry

Projeto Agrupado REDD+ Rio Madeira



FUTURE CARBON GROUP

BENEFÍCIOS SOCIOAMBIENTAIS

Além dos benefícios ao meio ambiente, uma parte das vendas dos créditos de carbono será direcionada a ações socioambientais da região, em especial às comunidades do entorno das propriedades, contribuindo para atividades de educação ambiental e melhoria das condições da população tradicional.

O projeto Rio Madeira prevê a geração dos seguintes benefícios para a comunidade:

- Melhoria da fiscalização ao desmatamento e ocupações irregulares;
- Oportunidades de renda alternativas para a população local;
- Criação de cadeias de produção sustentável às comunidades (p.ex. castanha, óleo copaíba, entre outros);
- Promoção da educação ambiental à comunidade;
- Manutenção do canal de comunicação com todos os interessados, o qual estará disponível em caso de críticas ou sugestões.

O SOCIALCARBON Standard é o padrão de certificação de benefícios socioambientais utilizado neste projeto. Com ele, será possível acompanhar a melhoria social, ambiental e econômica gerada através das atividades do projeto.

É uma ferramenta eficaz para alcançar os Objetivos de Desenvolvimento Sustentável (ODS) da ONU.

Os ODS são o modelo para alcançar um futuro melhor e mais sustentável para todos. Eles abordam os desafios globais que enfrentamos, incluindo desigualdade, mudança climática, degradação ambiental, paz e justiça.

Este projeto apoia os seguintes ODS:



Caso tenha dúvidas e/ou sugestões sobre o projeto, ficaremos felizes em receber seu comentário através deste canal de comunicação que ficará permanentemente ativo:

Future Carbon Group Email para contato: tecnic@futurecarbon.com.br	Grupo Roveima Email para contato: eduarda@ovo.groceveima.com.br	Grupo Lethe Email para contato: joaoleitejunior@gmail.com	Grupo Tupã Email para contato: ciatupa@oi.com.br
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Figure above details the folder distributed during the preliminary assessment visits held from 31 August 2022 to 02 September 2022, providing information about the project, including co-benefits and communication channels.

As the first VCUs project issuance by the project proponent, related to the verification of the first monitoring period under the VCS Program with additional SocialCarbon certification occurred in May-2024²⁶, the revenues were obtained after 2022. Nevertheless, benefits were generated during the second monitoring period, such as the partnership agreement formalized on January-2022, between Brazil nut harvesters and Instance 3 landowners, resulting in positive impacts for the surrounding communities.

Comments, requests, and inputs received during the meetings were documented in a report, with meeting summaries, participant feedback, and photographs included. The report highlighted community needs, positive comments, and demands expressed during the assessment. Across the five locations, a total of **21 participants** were consulted, excluding Project Management Team members and Landowners. This assessment was crucial in understanding the local context, community potentials, and needs surrounding the project area.

²⁶ Issuance Records Data. Available at:

<<https://registry.verra.org/app/search/VCS?programType=ISSUANCE&exactResId=2878>>. Accessed on: 30 Aug. 2024.

Table 8. Participants engaged during on-site meetings for the 2nd MR

Stakeholder	30/08/22	31/08/22	01/09/22	02/09/22	Total
COMUNIDADE DISTRITO DE ABUNÃ			1		1
COMUNIDADE DISTRITO UNIÃO BANDEIRANTES		1			1
EMEF FLOR DO CUPUAÇU	1	1			2
EMEF MARECHAL RONDON			2		2
REASSENTAMENTO SANTA RITA		1			1
RECA				2	2
SEDAM-RO	2				2
SEMA-RO	6				6
USF SANTA RITA		4			4
Total	9	7	3	2	21

Key considerations raised by stakeholders during this process included:

Table 9. Stakeholders assessed in the Preliminary Socioenvironmental Data Collection

Stakeholder	Location	Municipality	Date	Comment and Feedback Received
Escola Municipal Flor do Cupuaçu	Comunidade Santa Rita	Porto Velho (RO)	30-31/Aug/2022	Positive feedback from the school director and security personnel. Identified needs: high school implementation, road improvements, and sports court renovation.
USF Santa Rita	Reassentamento Santa Rita	Porto Velho (RO)	31/Aug/2022	Positive comments from the community leader; identified community health needs, road access improvement, and the construction of an exercise park for diabetic and hypertensive patients.

Comunidade União Bandeirantes	Distrito União Bandeirantes	Porto Velho (RO)	31/Aug/2022	Positive feedback from community leader; Identified needs: schools, health centers, and roads. Construction of daycare, paving roads, building more schools and USF.
Escola Municipal Marechal Rondon	Distrito de Abunã	Porto Velho (RO)	01/Sept/2022	Positive feedback; identified needs: school resources, infrastructure improvements, sediment removal of Igarapé dos Veados, creation of product production structures, increased school meal budget, sports court renovation, and reactivation of the women's association.
Cooperativa RECA	Distrito de Nova Califórnia	Lábrea (AM)	02/Sept/2022	The project's importance was recognized; identified need: technology updates, industrial process automation, and development of commercial protein isolates from cupuaçu or Brazil nut

Among the **21 participants** in the Preliminary Socioenvironmental Data Collection, no negative comments were received, as recorded in the Preliminary Socio-Environmental Data Collection Report. This positive feedback indicates a strong alignment between stakeholder needs and the objectives of the project, highlighting the importance of ongoing engagement and collaboration with the community.

1st Remote Stakeholder Consultation:

In addition to the preliminary socio-environmental data collection, the 1st Remote Stakeholder Consultation was conducted on 05-September-2022 to engage potential institutional stakeholders. The Project Management Team sent an invitation letter in August 2022 to 43 local, state, and federal governmental institutions active in the project region, requesting their participation.

The remote consultation was held via video conference, hosted by the Project Management Team in São Paulo at 4 pm (Brasília time). During the session, a comprehensive PowerPoint presentation clarified key project concepts, including global warming, carbon projects, and key project details such as location, activities, objectives, challenges, and socio-environmental benefits, and updates on the project implementation progress and second monitoring results, including deforestation monitoring, and Social Carbon Standard, were also shared, followed by a Q&A session.

Figure 5. First remote stakeholder consultation invitation

Future Carbon Group
Avenida Brigadeiro Faria Lima, 4300, conjunto 601
São Paulo, SP, Brasil



CONVITE ÀS PARTES INTERESSADAS

Assunto: Apresentação da Future Carbon Group sobre projeto de créditos de carbono por meio de conservação florestal: Rio Madeira Grouped REDD+ Project

Prezado (a),

Vimos informar sobre o desenvolvimento de um projeto de reduções de emissões de gases de efeito estufa por preservação da floresta amazônica. O projeto intitulado Rio Madeira Grouped REDD+ Project, localizado em Lábrea (AM) e em Porto Velho (RO), tem como principal objetivo evitar o desmatamento não planejado (AUD) da área do projeto de 55.048 hectares. O projeto está em consonância com as diretrizes e critérios de desenvolvimento sustentável do país.

Com esta iniciativa, a Future Carbon Group visa mitigar de forma voluntária os impactos ambientais provocados pelos gases liberados através do desmatamento da floresta amazônica, além de gerar benefícios socioambientais para área do projeto através da metodologia do Carbono Social, impactando positivamente o ecossistema local.

O Projeto encontra-se na fase de validação, para posteriormente ser apresentado ao Verified Carbon Standard (VCS), atendendo aos procedimentos estabelecidos pelo Standard para a geração de créditos de carbono através da redução de emissões voluntárias.

Assim, para o cumprimento de uma das diretrizes, a Future Carbon Group entra em contato com as partes interessadas para divulgação deste projeto e convidá-las a participar de uma vídeo conferência no dia **5 de setembro de 2022, às 16:00 horas (horário de Brasília)**. A conferência será realizada através da Plataforma Google Meet, que poderá ser acessada neste dia e horário através o seguinte endereço: <https://meet.google.com/kgk-ourc-cqu>

A partir da data aqui proposta, estará aberto o período para solicitações de informações e envio de comentários sobre o relatório técnico do projeto. O prazo para comentários é de 30 dias a partir da realização da Apresentação do Projeto (5 de setembro de 2022). Para mais informações e solicitações, favor entrar em contato através de forest@futurecarbon.com.br

Local Stakeholder Consultation - Rio Madeira Grouped REDD Project

Segunda-feira, 5 de setembro - 4:00 até 5:00pm

Informações de participação do Google Meet

Link da videochamada: <https://meet.google.com/kgk-ourc-cqu>

Ou disque: (BR) +55 19 4560-9544 PIN: 125 555 735#

Outros números de telefone: <https://tel.meet/kgk-ourc-cqu?pin=9250723142488>

Atenciosamente,

Future Carbon Group – Future Forest

Figure 6. PPT template used in the 1st Remote Consultation



As required by VCS Standard 4.4, item 3.18.18, the project proponent must share details about the project design and implementation, including monitoring results, and inform stakeholders about the potential risks, costs, and benefits associated with the project. The table below summarize the information that was share in the remote consultation.

Table 10. Risks, Costs and Benefits Communicated during the 1st Remote Consultation

Risks
Emission Leakage: Risk of emissions shifting to other regions, compromising the project's efficacy. Compliance with Legislation: The need to adhere to strict environmental laws, particularly in light of potential legislative changes. Community Engagement: Lack of engagement could lead to project resistance. Dependence on Incentives: The project's effectiveness could be affected by relying on emerging government incentives. Monitoring and Evaluation: Challenges in monitoring emission reductions and social co-benefits could affect the project's credibility.
Costs

- 1. Initial Investments:** Significant investment is required for infrastructure.
- 2. Compliance Costs:** Additional costs for maintaining environmental compliance and certification.
- 3. Operational Costs:** Ongoing costs for project operation, monitoring, and maintenance.
- 4. Economic Opportunity Loss:** Land use restrictions for conservation could result in economic losses for landowners.

Benefits

- 1. GHG Emission Reduction:** An estimated reduction of 14 million tons of CO₂e over 30 years.
- 2. Biodiversity Conservation:** Protection of native forests helps preserve the region's biodiversity.
- 3. Sustainable Community Development:** Part of carbon credit revenue will be reinvested in local education, health, and sustainable development.
- 4. Local Economy Strengthening:** Promotes sustainable land use, benefiting local cooperatives and increasing residents' income.
- 5. Credibility and Recognition:** Certification by international standards (VCS + SOCIALCARBON) enhances project attractiveness to investors.
- 6. Social Co-benefits:** The project includes social co-benefits such as women's inclusion and promotion of education and sports.

It was also mentioned that the Rio Madeira Grouped REDD+ Project follows the VCS Program validation and verification processes, including site visits by the validation/verification body to ensure compliance with VCS & SOCIALCARBON standards and verify the reported results.

During the 1st Remote Stakeholder Consultation on 05-September-2022, the email addresses of the project was provided to interested parties to facilitate ongoing communication and resolve complaints. Moreover, landowners contacts were also shared during the local consultation. It is worth mentioning the local meetings were organized by landowners, which were present during such meetings.

The outcomes of this consultation, including comments and questions received, were documented and addressed during the meetings. Also, at the end of the presentation, participants were able to send feedback, which was recorded on Google Meet, a video conferencing and online meeting platform. Out of the 13 participants, four sent comments, where three of them were positive feedback, and one was a request, as shown in the table below and registered in the attendance report.

Table 11. Comments registered during the 1st Remote Stakeholder Consultation

Ref.	Institution name	Feedback / comments (free translation)
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01	SEDEC-RO (State Secretariat for Economic Development of Rondônia)	<i>"I would like to receive the presentation in my email."</i>
02	SEDAM-RO (State Secretariat for Environmental Development)	<i>"Congratulations on the initiative."</i>
03	ROVEMA GROUP – Shared Services Center Employee (Instance 01)	<i>"I found the content clear, objective, and very useful. Congratulations!"</i>
04	SEMA-AM (State Secretariat for the Environment for Amazonas)	<i>"The project is commendable and very constructive."</i>

Out of the 43 institutional and community stakeholders invited to the 1st remote consultation, **13 participants** engaged through remote meetings, representing four public entities (local and federal government agencies), an educational institution, one NGO, a cooperative, a community, and the first landowner instance. This excludes members of the Project Management Team and Landowners, as indicated in the table below.

Table 12. Participants engaged in remote Stakeholder consultation during 2nd MR

Stakeholder	05-09-22
FIMCA Porto Velho	2
FUNAI-RO	2
IDESAM	1
COOPERATIVA RECA	1
SEDAM-RO	1
SEDEC-RO	1
SEMA-AM	4
COMUNIDADE UNIÃO BANDEIRANTES	1
Total	13

2nd on-site Stakeholder consultation:

Following the onsite and remote consultations conducted in 2022, an additional consultation took place from 6-June-2023 to 9-June-2023. The primary objective of this consultation was to effectively communicate the results of the second monitoring report and to identify local needs and demands through the participatory development of the Theory of Change (ToC) and the Socioenvironmental Impact Plan.

During this opportunity, the project management team provided, orally, an overview of the potential risks, costs, and benefits that the project may bring to stakeholders. This information is summarized in Table 13, which outlines specific impacts and how they relate to the interests of local stakeholders.

The discussions included around various risks, such as environmental degradation, potential displacement, and disruptions to local livelihoods. Conversely, the anticipated economic benefits were also highlighted, including job creation, infrastructure improvements, and opportunities for economic development.

The consultation meetings also served as a mechanism for stakeholders to provide feedback, raise concerns, and ask questions. Furthermore, the project's commitment to compliance with national labor laws and international conventions regarding workers' rights was emphasized. This commitment encompasses provisions for fair wages, safe working conditions, the freedom of association, and strict prohibitions against child and forced labor.

Table 13. Risks, Costs and Benefits Communicated during the 2nd On-site Meetings

Risks
1. Deforestation and habitat loss: Although the project aims to prevent illegal deforestation, there is always a risk of environmental degradation if measures are not strictly enforced. 2. Conflict over resources: There could be potential conflicts over land and resource use, especially if there are misunderstandings or disagreements between the project proponents and local communities. 3. Economic dependence: Local communities might become economically dependent on the project, making them vulnerable if the project faces financial difficulties or is discontinued. 4. Leakage: There is a risk that deforestation activities could be displaced to other areas not covered by the Rio Madeira REDD+ Project, negating the project's positive environmental impact. 5. Changes in social dynamics: The introduction of new economic activities may alter traditional social structures, potentially creating new power dynamics within communities.
Costs
1. Initial investments: Significant investment is required to implement and maintain the project activities at the initial stage. 2. Operational costs: Ongoing costs for project operation, monitoring, and maintenance. 3. Verification and certification: Costs related to the verification of carbon credits, certification of Rio Madeira REDD+ Project, and meeting international standards can be considerable. 4. Monitoring and evaluation: Challenges in monitoring emission reductions and social co-benefits could affect the project's credibility.
Benefits

1. **Participation in decision-making:** By involving local communities in the project's planning and implementation through community consultations, the project empowers them to take ownership of their development and ensures that their needs and concerns are addressed.
2. **Job creation and skill development:** The project aims to create employment, particularly in sustainable land management, conservation, and agroforestry, and to enhance skills.
3. **Sustainable practices:** The formalization of agreements with Brazil nut collectors and other sustainable practices can provide a steady income for local communities.
4. **Preservation of ecosystems:** The project seeks to conserve the local environment, protect biodiversity, and ensure long-term sustainability of natural resources.
5. **Reduction of illegal activities:** Through patrolling and monitoring, the project seeks to reduce illegal deforestation, logging, and other environmentally harmful activities.

Relevant Laws and Regulations covering Workers' Rights

1. **Decree-Law nº 5,452/1943 (CLT):** Consolidates labor laws in Brazil, ensuring dignified working conditions for community employees.
2. **Federal Law No. 5.889/1973:** Establishes equal rights for rural workers, ensuring compensation and overtime pay.
3. **ILO Conventions:** The project adheres to international labor standards, particularly those related to the rights of indigenous peoples and non-discrimination.
4. **Regulatory Norms (NRs):** For example, NR-31 regulates workplace safety and health in agriculture, ensuring safe practices in the project's agricultural and extractive activities.

Abunã and Vila da Penha districts were the most engaged communities, with 62 and 57 participants, respectively. This reveals the effectiveness of the communication, and participatory processes used to engage local stakeholders and communities. Besides a strong interest or concern within these communities regarding the project's outcomes. The concentrated participation on this communities is likely due to this being the main event or the most accessible day for these communities.

The consultation process was successful in reaching a wide range of stakeholders, ensuring that the results of the second monitoring report were communicated effectively. The participatory development process allowed for a comprehensive identification of local needs, particularly in the most engaged communities.

Additionally, the process of VCS validation and verification was addressed, including the possibility of a future site audit visit by a validation/verification body. A total of **149 participants** were engaged during these on-site meetings, excluding members of the Project Management Team and Landowners, as indicated in the Table 14 below.

Table 14. Participants engaged during the 2nd On-site Consultation Meetings

Stakeholder	06/06/23	07/06/23	09/06/23	Total
COMUNIDADE DISTRITO DE ABUNÃ		62		62
ASDAMOR	1			1
ASSOC. DE PESCADORES DE ABUNÃ		1		1
EMEF FLOR DO CUPUAÇU	1			1
EMEF MARECHAL RONDON		2		2
EMEF OLYMPIA SALVATORE RIBEIRO	4			4
EMEF SANTA JULIA		1		1
REASSENTAMENTO SANTA RITA	2			2
RECA			16	16
USF SANTA RITA		1		1
VILA DA PENHA		57		57
VILA JIRAU	1			1
Total	9	124	16	149

2nd Remote Stakeholder Consultation:

Further opportunities for communication regarding project results were provided in 2024 to ensure that all relevant information up to the monitoring period ending in December 2022 was effectively communicated. This included a remote consultation for the 3rd MR on 23-February-2024, held via video conference by Future Carbon team based in São Paulo. A presentation was presented, summarizing project progress, sharing project performance since its start as seen in the Figure 7 below.

Figure 7. Remote presentation prior to 3rd MR site visit



Out of the 51 stakeholders invited to the 2nd Remote Consultation conducted on 23-February-2024, the engagement results indicate a focused but limited participation, with a total of seven participants, excluding members of the Project Management Team and Landowners.

Table 15. Participants engaged in the 2nd Remote Stakeholder Consultation

Stakeholder	23-02-24
CPPT CUNIÃ	2
EMBRAPA Rondônia	1
FUNDAÇÃO UNIVERSIDADE FEDERAL DE RONDÔNIA	1
IDAM	1
WWF	2
Total	7

The involvement of key organizations such as CPPT CUNIÃ and WWF, each with 2 participants, suggests a targeted outreach to influential stakeholders in the environmental sector. Additionally, the participation of EMBRAPA Rondônia, FUNDAÇÃO UNIVERSIDADE FEDERAL DE RONDÔNIA, and IDAM highlights the consultation's emphasis on engaging institutions with expertise in agriculture, environmental research, and regional development.

The input received during the 2nd remote consultation included the project implementation and stakeholder communication outcomes. Feedback was documented in the attendance list, but nothing new was brought for consideration and did not cause changes to the monitoring report. The attendance list from the 2nd remote stakeholder consultation, along with a video recording of the meeting has been kept in digital format and was made available to the validation and verification body.

Mechanism for Ongoing Communication with Local Stakeholders :

The Mechanism for ongoing communication with Local Stakeholders for feedback and grievance redress was initially established through:

- **Email communication:** Email addresses were provided for continued communication were: tecnica@futurecarbon.com.br, forest@futurecarbon.com.br.
- **WhatsApp contacts:** Phone numbers of farm owners and managers were shared with community leaders to disseminate project information. WhatsApp is one of the most popular tools in rural and remote areas in Brazil. According to the 2022 TIC Domicílios survey²⁷, 98% of internet users in the country use WhatsApp, which

²⁷ CETIC.BR – CENTRO REGIONAL DE ESTUDOS PARA O DESENVOLVIMENTO DA SOCIEDADE DA INFORMAÇÃO. Pesquisa sobre o uso das tecnologias de informação e comunicação nos domicílios brasileiros: TIC Domicílios 2022. São Paulo: 2023. Available at: https://cetic.br/media/docs/publicacoes/2/20230825143720/tic_domicilios_2022_livro_eletronico.pdf. Accessed on 24 aug. 2024.

is widely accepted as a communication channel, even in areas where access to other digital platforms is limited. This familiarity makes it easier to send information in a direct and accessible manner, using simple language adapted to the local context, which enhances the reach and understanding of the messages.

Specifically, in the dissemination of project information, the use of these platforms allows for effective community communication, ensuring that the information reaches all community members, in addition to facilitating communication between both parties throughout the development of the project.

- **Access to project documents:** As part of the ongoing communication process with stakeholders, both on-site and remote consultations throughout the project's implementation are used to present project monitoring results, gather feedback, suggestions, and record complaints.

During the second monitoring period, there were several opportunities to disseminate the results of this period, along with information from previous monitoring reports, and to collect stakeholder input through consultations held in August and September 2022, as well as in June 2023. Additionally, a public comment period was opened from 7-December-2023, to 6-January-2024, during which a summary of the Project Design Document for CCB validation was available in Portuguese for public comments for 30 days.

These regular consultations demonstrate the project's commitment to maintaining an open and transparent dialogue with stakeholders, integrating their contributions throughout the project cycle. Other than the comments recorded in Table 11, no records of entries, suggestions, complaints, or grievances were received through the email addresses and WhatsApp contacts provided as communication mechanisms.

2.3 AFOLU-Specific Safeguards

Local Stakeholder Identification and Background

Following the VCS Standard v4.4, requirement 3.18 for AFOLU Projects, and the guidelines presented in the Social and Biodiversity Impact Assessment (SBIA) Manual for REDD+ Projects, the project proponent is required to conduct a thorough assessment of local stakeholders potentially impacted by the project. The stakeholder identification process in the Rio Madeira Grouped REDD+ Project was carried out following the procedures described below.

- **Processes Used:**
 - I. **Geospatial Data Analysis:** Geospatial mapping was performed by the Future Carbon geoprocessing team to identify potential stakeholders and assess land overlaps with settlements, indigenous lands, indigenous villages, quilombola lands, villages, districts, Protected Areas, and other demarcated territories within the project area and its surroundings. Official geospatial data from agencies such as INCRA, IBGE,

FUNAI, ICMBio, and IBAMA were utilized. This analysis confirmed that no indigenous or quilombola territories are present within the project area or the reference region.

- II. **Secondary Data Collection:** Secondary data was collected through online research using governmental, academic, and specialized sources to identify relevant stakeholders in the project's reference region. The primary sources included databases and online portals such as "Mapa das Organizações da Sociedade Civil (OSC)²⁸", and various scientific and newspaper articles. This process identified 43 institutional stakeholders, listed below:

Table 16. Stakeholders identified by secondary data

	INSTITUTIONAL STAKEHOLDER	ACRONYM
1	Ação Ecológica Guaporé	ECOPORÉ
2	Agência de Desenvolvimento Sustentável do Amazonas	ADS
3	Associação de Defesa Etnoambiental Kanindé	KANINDÊ
4	Associação dos Agricultores Agroecológicos de Porto Velho	ASA
5	Assoc. dos Pequenos Agrossilvicultores e Cooperativa Agropecuária e Florestal do Projeto RECA	RECA
6	Associação Rondoniense de Municípios	AROM
7	Centro de Estudos da Cultura e do Meio Ambiente da Amazônia	RIOTERRA
8	Centro Nacional de Pesquisa e Conservação da Biodiversidade Amazônica	CEPAM
9	Embrapa Agrossilvipastoril	CPAMT
10	Empresa Brasileira de Pesquisa Agropecuária	EMBRAPA/RO
11	Empresa Estadual de Assistência Técnica e Extensão Rural do Estado de Rondônia	EMATER/RO
12	Federação da Agricultura e Pecuária do Estado de Rondônia	FAPERON
13	Floresta Nacional do Iquiri	FLONA do Iquiri
14	Fundação Nacional do Índio - Coordenação Regional de Guajará-Mirim	FUNAI/RO
15	Fundação Rondônia de Amparo ao Desen. das Ações Científicas e Tecnológicas e à Pesquisa	FAPERO
16	Fundação Vitória Amazônica	FVA
17	Instituto Chico Mendes de Conservação da Biodiversidade – Coord. Reg. de Porto Velho	ICMBio/GR1
18	Instituto de Conservação e Desenvolvimento Sustentável do Amazonas	IDESAM
19	Instituto de Desenvolvimento Agropecuário e Florestal Sustentável do Amazonas	IDAM
20	Instituto de Pesquisa Ambiental da Amazônia	IPAM
21	Instituto de Proteção Ambiental do Amazonas	IPAAM
22	Instituto Federal de Rondônia	IFRO
23	Instituto Nacional da Colonização e Reforma Agrária – Superintendência Reg. de Rondônia	INCRA/RO

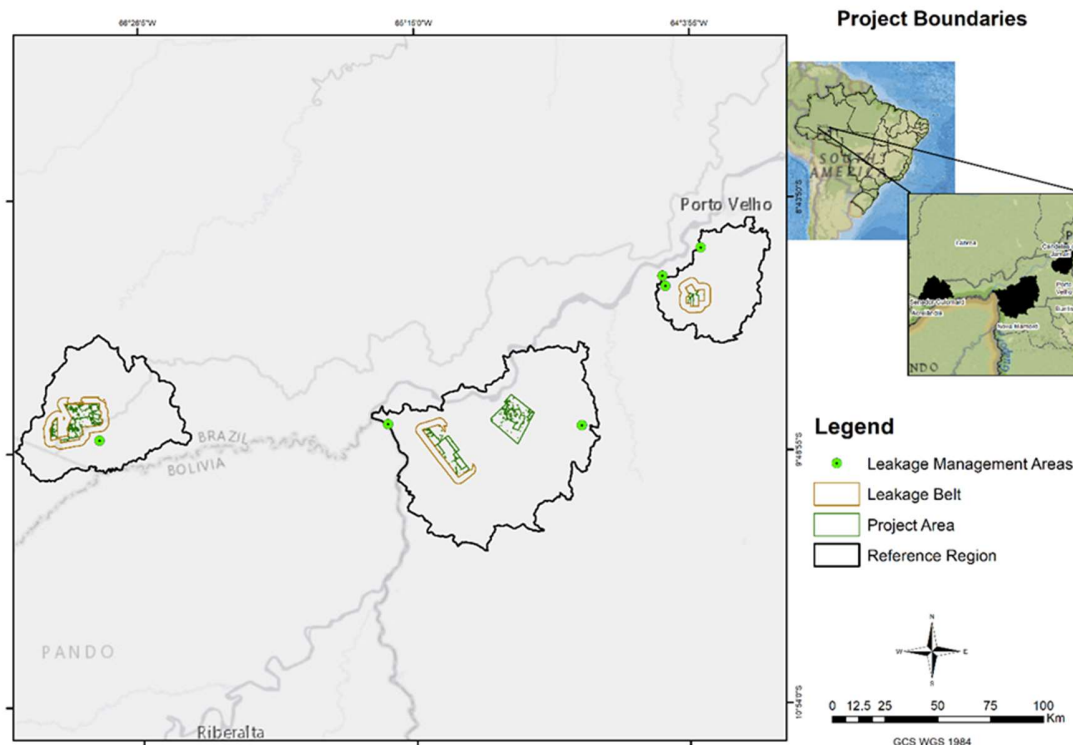
²⁸ Mapa das Organizações da Sociedade Civil. Available at: <<https://mapaosoc.ipea.gov.br>>.

24	Instituto Socioambiental	ISA
25	Operação Amazônia Nativa	OPAN
26	Prefeitura Municipal de Buritis - RO	PMB
27	Prefeitura Municipal de Lábrea - AM	PML
28	Prefeitura Municipal de Nova Mamoré - RO	PMNM
29	Prefeitura Municipal de Porto Velho - RO	PMPV
30	Secretaria de Estado do Desenvolvimento Ambiental de Rondônia	SEDAM/RO
31	Secretaria de Estado do Desenvolvimento Econômico do Estado de Rondônia	SEDEC/RO
32	Secretaria de Estado do Meio Ambiente do Amazonas	SEMA/AM
33	Secretaria Municipal de Administração de Porto Velho	SEMA
34	Secretaria Municipal de Agricultura e Meio Ambiente de Candeias do Jamari - RO	SEMAM
35	Secretaria Municipal de Meio Ambiente de Alto Paraíso - RO	SMMAAP
36	Secretaria Municipal de Meio Ambiente de Lábrea - AM	SMMAL
37	Secretaria Municipal de Meio Ambiente e Desenvolvimento Sustentável de Porto Velho	SEMA/RO
38	Serviço Nacional de Aprendizagem Rural	SENAR/RO
39	Sindicato dos Produtores Rurais de Porto Velho	SPRPV
40	Sindicato dos Trabalhadores Rurais Agricultores e Agricultoras Familiares de Lábrea - AM	STRAAFL
41	Universidade do Estado do Amazonas - Centro de Estudos Superiores de Lábrea	UEA
42	Universidade Federal de Rondônia	UNIR
43	World Wide Fund for Nature	WWF/BRASIL

III. **Interviews with Landowners:** Interviews with landowners of the project area were conducted to gather detailed information about their relationships with potential stakeholders. This step was crucial for validating the existence of stakeholders identified through previous methods, characterize relevant stakeholders (communities, groups, individuals, or organizations), and for facilitating access to communities. Interviews revealed the following stakeholders:

- Near **instance 1** (right polygon on the map): The EMEF Flor do Cupuaçu and USF Santa Rita, both located in the Santa Rita Resettlement. Additionally, SEDAM and SEMA are represented at the same point on the map.
- Near **instance 2** (center polygons): Comunidade Distrito União Bandeirantes and Comunidade do Distrito de Abunã.
- Near **instance 3** (left polygon): Associação dos Pequenos Agrossilvicultores do Projeto Reca e Cooperativa Agropecuária e Florestal do Projeto RECA, known as RECA.

Figure 8. Stakeholders Identified by the Landowners Interviews



- IV. **Preliminary Socioenvironmental Data Collection:** An initial process of gathering relevant social, environmental, and economic data about the conditions of the project region and surrounding communities, as well as local institutional agents active in the region was conducted between 30-August-2022 and 02-September-2022. This data was essential for assessing risks, impacts, and benefits to project stakeholders. Key criteria for stakeholder identification included:
- Proximity to the project area.
 - Relationship with landowners.
 - Potential for developing leakage prevention activities.
 - Level of engagement and willingness to participate in project activities.
 - Social relevance, particularly among neighboring communities, producers' associations, and schools.
 - Technical relevance, focusing on entities involved in forest conservation and sustainable development.
- V. **1st Remote Stakeholder Consultation:** The first remote consultation was conducted on 05-September-2022 in which invitations were sent 25 days prior to the

scheduled meeting to all 43 identified stakeholders. The purpose was to ensure that stakeholders were informed about the Rio Madeira REDD+ Project and its objectives prior to the verification process.

The information presented compose the stakeholder identification process for the 2nd monitoring report, focusing on stakeholder engagement to inform local communities about project implementation and to explore potential partnerships and engagement levels. Based on the identification processes followed, **190** stakeholders participated in the engagement process, as shown in the Table 17 below.

Table 17. Total Stakeholders engaged

Year	Personal Meeting	Remote Meeting	Total
2022	21	13	34
2023	149		149
2024		7	7
Total	170	20	190

Legal or Customary Tenure/Access Rights

The Rio Madeira Grouped REDD+ Project demonstrates its commitment to recognizing, respecting, and promoting the protection of the rights of Indigenous Peoples (IPs), Local Communities (LCs), including both statutory and customary rights holders by adhering United Nations Declaration on the Rights of Indigenous Peoples and the International Labour Organization (ILO) Convention 169 on Indigenous and Tribal Peoples²⁹. This commitment includes ensuring their consultation and participation in decisions that may affect them, as well as adhering to key national human rights laws such as the Statute of the Indian.

It is important to note that, since the project is being developed on private land, its activities will not directly affect the land use and ownership rights of communities, nor impacted their access to natural resources, as there are no communities residing within or utilizing the project area, and there are no conflicting land tenure claims.

The landowners acknowledge the presence of communities surrounding the project area and actively make efforts to maintain a positive relationship. There are no land ownership disputes, or unresolved conflicts related to the project area.

No instances of involuntary removal or relocation have occurred as a result of project activities. The project remains dedicated to upholding the rights and well-being of local

²⁹ Available at: <<https://www.ilo.org/media/324306/download>>. Accessed on: 28 Aug. 2024.

communities, recognizing the importance of their cultural practices and activities in supporting their overall livelihoods.

Table 18. Legal Framework that Protects the Rights of IPs and LCs

Regulation	Description	Project Compliance
Law No. 6.001/1973³⁶.	Commonly known as the Statute of the Indian (Estatuto do Índio), establishes the legal framework for the protection of the rights of indigenous peoples in Brazil. It recognizes the social organization, customs, languages, and traditions of indigenous communities, while also implementing measures to protect their cultural heritage and ensure their physical and moral integrity.	The project complies with the Statute of the Indian by recognizing and respecting the rights of indigenous peoples. This includes respecting their territorial rights, supporting the preservation and promotion of indigenous cultural practices, languages, and traditions. The project's activities, which includes measures to protect forest areas and engage local communities, helps safeguard the integrity of indigenous identities and prevents cultural assimilation.
Constitution of the Federal Republic of Brazil - 1988³⁷	The Federal Constitution recognizes and protects the rights of indigenous peoples and quilombola communities, guaranteeing them territorial, cultural, social, and economic rights. It establishes that indigenous peoples are recognized for their social organization, customs, languages, beliefs, and traditions, as well as rights over the lands they traditionally occupy.	The project recognizes and respects the customary land tenure rights of IPs and LCs by ensuring they have secure access to and control over their lands. The activities described do not involve displacing or dispossessing these communities, aligning with the constitutional protections. This includes refraining from any activities that could lead to the displacement or dispossession of these communities from their lands.
Decree No. 6.040/2007³⁸	Establishes the National Policy for the Sustainable Development of Traditional Peoples and Communities, recognizing and guaranteeing their territorial, cultural, and environmental rights.	The project doesn't encroach upon or negatively impact indigenous lands, territories, and natural resources. The project respects the rights of traditional peoples and communities by ensuring that its activities do not encroach upon indigenous lands or negatively impact their natural resources. The project

³⁶ Available at: <Base Legislação da Presidência da República - Lei nº 6.001 de 19 de dezembro de 1973 (presidencia.gov.br)>. Accessed on: 28 Aug. 2024.

³⁷ Available at: <https://www.planalto.gov.br/ccivil_03/constituicao/constituicao.htm>. Accessed on: 28 Aug. 2024.

³⁸ Available at: <https://www.planalto.gov.br/ccivil_03/%5C_Ato2007-2010/2007/Decreto/D6040.htm>. Accessed on: 28 Aug. 2024.

		aligns with the decree by adhering to the legal demarcation and protection of indigenous territories under Brazilian law.
Law No. 9.985/2000³⁹	Establishes the National System of Nature Conservation Units (SNUC) and sets guidelines for the creation, implementation, and management of conservation units. It recognizes and protects the rights of traditional communities, including quilombolas, riverside dwellers, artisanal fishermen, among others, ensuring their right to participate in decisions affecting their territories and ways of life.	The project contributes to the conservation and sustainable management of natural resources, which aligns with the guidelines for managing conservation units. The involvement of local communities in the project's socioeconomic activities further supports the preservation of traditional ecological knowledge.

In addition to these international conventions ratified by Brazil and national legislation listed at the

Table 18 above, there are other regulations that also contribute to the protection of the rights of indigenous peoples and traditional communities. However, Table above details the main ones. By adhering to this regulatory framework and practices, the Rio Madeira Grouped REDD+ Project can demonstrate its commitment to upholding the rights of indigenous people (IPs), local communities (LCs), and customary rights holders, and contribute to the achievement of sustainable development goals in line with international human rights standards and the interests of IPs and LCs.

It is important to emphasize that the project is being developed entirely on privately-owned properties. Thus, if there are any plans to extend project activities beyond the project area boundaries, including traditional communities, indigenous territories, or government-owned lands, prior consent will be sought. Therefore, the obtaining Free, Prior, and Informed Consent (FPIC) is not deemed necessary, as the project does not impact property rights, legal or customary tenure/access rights.

Measures Taken:

- **Due Diligence on Property Rights:** In a proactive effort to anticipate and mitigate potential risks to property rights, Future Carbon's Compliance team conducted thorough due diligence and integrity analyses during project implementation. This was done to ensure the integrity of the property and landowners, effectively mitigating any possibility of property rights violations.

³⁹ Available at: <https://www.planalto.gov.br/ccivil_03/LEIS/L9985.htm?msclid=d836f862bb2e11ecb0a39fd92b1c866>. Accessed on: 28 Aug. 2024.

- **Geospatial and Socioenvironmental Assessments:** During the implementation phase, comprehensive socioenvironmental impact assessments were conducted as part of the due diligence process using geospatial mapping. These assessments help identify potential risks or adverse impacts on cultural heritage sites or practices, including overlaps with Indigenous Lands, Quilombola Territories, Conservation Units, and Rural Settlements. These assessments also verify respect for the territorial and cultural rights of indigenous peoples, ensuring that no project activities negatively impact their lands or natural resources.
- **Adherence to Cancun Safeguards:** The project aligns with the Cancun Safeguards, established to ensure that REDD+ initiatives effectively address sensitive issues. Compliance with these safeguards ensures that the project respects the territorial, cultural, and environmental rights of traditional and indigenous communities, promotes social participation, conserves natural ecosystems, ensures the permanence of REDD+ results, and mitigates the risk of deforestation displacement to other regions. In cases of conflicts over property rights or resource use, the project abstains from activities that could exacerbate the conflict or influence the outcome of any disputes.
- **Integration of Traditional Practices:** By integrating traditional land management practices and promoting the sustainable use of natural resources in project activities, the project advances conservation objectives while preserving cultural heritage. For instance, the formalization of an agreement between Brazil nut harvesters and the landowner (Instance 3) ensures that the harvesters can collect nuts without paying fees. This aligns with legal and regulatory frameworks supporting sustainable management of non-timber forest products (NTFPs) and the rights of local communities, reaffirming the project's commitment to respecting and preserving traditional practices.
- **Community Participation:** The project also involves consultations and engagement with the community, ensuring that traditional communities, including quilombolas and others have the right to participate in decisions affecting their territories and ways of life, in line with local needs and legal requirements related to project activities, in compliance with SNUC guidelines.

The project activities, such as surveillance, monitoring, and the involvement of local communities in sustainable practices, support the goals of these regulations by ensuring the protection of both the environment and the rights of indigenous and traditional communities.

Social, Economic, and Cultural Diversity

The local stakeholder groups involved in the Rio Madeira Grouped REDD+ Project represent a diverse social, economic, and cultural, reflecting the varying needs, priorities, and interactions across communities and institutions. The stakeholder groups span multiple segments of society, including local communities, educational institutions, health services, cooperatives, and governmental bodies.

- **Social and Economic Diversity:** The stakeholder groups span multiple segments of society, including local communities, educational institutions, health services, cooperatives, and governmental bodies. For example:
 - Local communities such as the Santa Rita Resettlement, União Bandeirantes, and Abunã districts are primarily focused on basic infrastructure improvements like schools, health centers, and road access.
 - Educational institutions like Escola Municipal Flor do Cupuaçu and Escola Municipal Marechal Rondon emphasize needs such as high school implementation, increased funding, and infrastructure development.
 - The RECA cooperative, located in the Nova Califórnia district, prioritizes technological updates and industrial process automation to enhance local agricultural and forest-based production.
- **Cultural Diversity:** The region is characterized by distinct cultural groups, including traditional communities with deep ties to land and agriculture, alongside more modern stakeholders such as government entities and cooperatives. The interactions between these groups are shaped by both their cultural backgrounds and economic dependencies, ranging from extractivist activities to education and community health.
- **Interactions and Differences:** The diverse stakeholders interact within a multi-layered framework of collaboration, where each group brings unique perspectives and contributions to the project. For instance:
 - Landowners and community leaders act as intermediaries, facilitating discussions between project proponents and local populations.
 - Government entities such as SEDAM-RO and SEMA-AM focus on regulatory oversight and ensuring environmental compliance, while also addressing local socio-environmental needs.
 - Cooperative groups like RECA highlight the commercial potential of sustainable development, aiming to integrate technology and market-driven strategies with community-based conservation efforts.

Despite their differences, these groups are interconnected by shared goals such as community development, environmental conservation, and the long-term success of the project. Participatory methods, including group discussions, written and oral presentations, and feedback sessions, were employed during consultations to bridge gaps between the varying economic and cultural contexts. This inclusive approach fosters a more responsive and representative project implementation.

Changes in Stakeholder Makeup

No significant changes were identified among the stakeholders involved in the project. Any future changes will be documented in this section.

Expected Changes in Well-Being Under the Baseline Scenario

Under the baseline scenario, no adverse changes in the well-being of communities, their territories, or their overall way of life are anticipated. The risks and impacts of the project are analyzed in the No Net Harm section. The project aims to reinvest its revenue into socio-environmental programs that engage the local community and mitigate environmental harm, particularly illegal deforestation.

In this context, key ecosystem services, such as sustainable resource management and income generation, are expected to be maintained or enhanced. Notably, the formalization of the extractive partnership agreement between the Brazil nut and açaí collectors and the landowner, signed in January 2022, marks a significant step toward this goal. This agreement, established between the nut harvesters and the Tupá Group, is a critical development that ensures long-term positive impacts for surrounding communities by promoting sustainable livelihoods and reinforcing collective stewardship of natural resources.

Location of Communities and Areas Benefited

The location of communities and areas expected to benefit by the project are presented in Figure 8.

Territories and Resources Accessed by Local Stakeholders

The territories and resources accessed by local stakeholders include areas they own or have customary rights to, which are situated within the Leakage Management Area and the Reference Region. The project recognizes and respects these access rights, ensuring that the areas used by local communities remain integrated into the broader project landscape. This approach not only acknowledges the vital connection between these communities and their traditional territories but also aligns with the project's commitment to safeguarding their rights while promoting sustainable land use practices.

Risks to Local Stakeholders and the Environment

The project proponent acknowledges that certain risks are inherent to the project activities, while others may stem from stakeholders' concerns. To address these, the project identifies potential risks to local stakeholders and the environment, implementing mitigation measures accordingly. The indicators for monitoring these risks are aligned with the SOCIALCARBON standard, ensuring a comprehensive approach. Actions taken during the monitoring period are detailed in section 6.1, outlining how these risks are managed to minimize negative impacts while promoting stakeholder engagement and environmental protection.

In summary, out of the 10 indicators proposed to monitor the identified risks, five⁴⁰ showed progress when compared to the first monitoring report: Non-Timber Forest Products (NTFPs); Stakeholder Consultation; Alternative Income Sources; Conflict Management and Social and Environmental Investments presented higher values.

Other four indicators maintained their score in both monitoring periods: Impact on remaining flora, Quality Control, Carbon Credit Benefits (score 1), and Land Tenure – the

⁴⁰ The following indicators progressed during the second monitoring period: Non-Timber Forest Products (NTFPs); Stakeholder Consultation; Alternative Income Sources; Conflict Management and Social and Environmental Investments

latter maintained the highest score (6). On the other hand, the indicator Project Performance showed a reduction on its score (from 6 to 5).

The following Table summarizes the above-mentioned evolution.

Table 19. Risks to Local Stakeholders and the Environment

Aspect	Impact	Effect		Comments/ Observation									
		Beneficial	Adverse										
Sustainable Forest Management Plan	Logging		X	For the properties that have SFMP in place, the permit process is complied, with appropriate licenses and exploration plans approved and in force, In addition, as stages in the Sustainable Forest Management Plan, some quality control measures can be mentioned, such as: ▪ Planning tree falling, including targeting, so that it does not hit other trees; ▪ Planned layout of primary and secondary roads; ▪ Procedures for loading and transporting logs. Monitored by following indicators: a) Impact on remaining flora. Biodiversity Resource (Section 6.1.5) b) Quality Control. Natural Resource (Section 6.1.4) <table><tr><th>Indicator</th><th>Score SC MR1</th><th>Score SC MR2</th></tr><tr><td>Impact on remaining flora</td><td>1</td><td>1</td></tr><tr><td>Quality Control</td><td>1</td><td>1</td></tr></table>	Indicator	Score SC MR1	Score SC MR2	Impact on remaining flora	1	1	Quality Control	1	1
Indicator	Score SC MR1	Score SC MR2											
Impact on remaining flora	1	1											
Quality Control	1	1											
Sustainable Forest Management Plan	Reduced access to land due to expansion of exploration		X	As there are no communities living within the project area, there is no risk of displacement of residents or limitation of land access, not requiring the									

				implementation of specific mitigation measures for this risk. Monitored by the Natural Resource (6.1.4) indicators: <table> <tr> <th>Indicator</th> <th>Score SC MR1</th> <th>Score SC MR2</th> </tr> <tr> <td>Quality Control</td> <td>1</td> <td>1</td> </tr> <tr> <td>Land Tenure</td> <td>6</td> <td>6</td> </tr> </table>	Indicator	Score SC MR1	Score SC MR2	Quality Control	1	1	Land Tenure	6	6
Indicator	Score SC MR1	Score SC MR2											
Quality Control	1	1											
Land Tenure	6	6											
Resources	Withdrawal of natural, economic and cultural resources (water, food, alternative income, cultural events, etc.) from families		X	On January 2, 2022, Instance 03 signed a partnership agreement with ten (10) Brazil nut (<i>Bertholletia excelsa</i>) extractivists. The partnership allows the extractivists to collect the nuts within the project area during the harvest period. The advantage of the partnership is that they do not have to pay any fees to collect nuts from the farms in Instance 03, which is not a common practice. Typically, extractivists must pay, on average, 30% of their production as a fee to the forest owner in order to collect the nuts. In return, during the harvest period, they are guardians of the forest and notify the farm manager if they identify any irregularities. This partnership strengthens the generation of income from alternative sources aligned with forest preservation, in addition to preserving the cultural practice of collecting Brazil nuts, which is still very manual and family-based. This partnership was not replicated in other two instances because no nut extractivists were identified working in the region. However, if they are eventually identified, the project will replicate the same partnership model. Monitored by the indicators: a) Non-timber forest products (NTFPs). Biodiversity Resource (Section 6.1.5)									

				b) Stakeholder consultation. Carbon Resource (Section 6.1.6) c) Alternative income sources. Financial Resource (Section 6.1.3) <table><tr><th>Indicator</th><th>Score SC MR1</th><th>Score SC MR2</th></tr><tr><td>Non-timber forest products (NTFPs)</td><td>1</td><td>3</td></tr><tr><td>Stakeholder consultation</td><td>1</td><td>3</td></tr><tr><td>Alternative income sources</td><td>1</td><td>2</td></tr></table>	Indicator	Score SC MR1	Score SC MR2	Non-timber forest products (NTFPs)	1	3	Stakeholder consultation	1	3	Alternative income sources	1	2
Indicator	Score SC MR1	Score SC MR2														
Non-timber forest products (NTFPs)	1	3														
Stakeholder consultation	1	3														
Alternative income sources	1	2														
Land access	Reduced access to traditional areas		X	The project does not overlap with traditional areas and has no communities living within it; therefore, no mitigation measure is necessary. Monitored by the Natural Resource (Section 6.1.4) indicators: <table><tr><th>Indicator</th><th>Score SC MR1</th><th>Score SC MR2</th></tr><tr><td>Quality Control</td><td>1</td><td>1</td></tr><tr><td>Land Tenure</td><td>6</td><td>6</td></tr></table>	Indicator	Score SC MR1	Score SC MR2	Quality Control	1	1	Land Tenure	6	6			
Indicator	Score SC MR1	Score SC MR2														
Quality Control	1	1														
Land Tenure	6	6														
Land use	Displacement of families due to project activity		X	The project does not overlap with areas of traditional use and there are no communities living within it. Therefore, there is no risk of project activities causing the displacement of families, and no mitigation measures are necessary for this specific risk. Monitored by the following indicators: a) Conflict management. Human Resource (Section 6.1.2) b) Land Tenure. Natural Resource (Section 6.1.4) <table><tr><th>Indicator</th><th>Score SC MR1</th><th>Score SC MR2</th></tr><tr><td>Conflict management</td><td>1</td><td>4</td></tr><tr><td>Land Tenure</td><td>6</td><td>6</td></tr></table>	Indicator	Score SC MR1	Score SC MR2	Conflict management	1	4	Land Tenure	6	6			
Indicator	Score SC MR1	Score SC MR2														
Conflict management	1	4														
Land Tenure	6	6														
Food Security	Withdrawal of land used		X	Since the project is developed on private properties, there are no productive areas of small producers within the project area,												

	for food production or income generation			therefore, the project activities will not interfere with the productive and subsistence activities of any producers. Additionally, the partnership between Instance 03 and the Brazil nut extractivists also strengthens the income generation of these partners. In the absence of this partnership, the extractivists would collect nuts from other farms, but would have to pay an average fee of 30% of their production, which is the common practice in the region, which would affect their income generation. Monitored by the following indicators: a) Non-timber forest products (NTFPs). Biodiversity Resource (Section 6.1.5) b) Land Tenure. Natural Resource (Section 6.1.4) <table> <tr> <th>Indicator</th> <th>Score SC MR1</th> <th>Score SC MR2</th> </tr> <tr> <td>Non-timber forest products (NTFPs)</td> <td>1</td> <td>3</td> </tr> <tr> <td>Land Tenure</td> <td>6</td> <td>6</td> </tr> </table>	Indicator	Score SC MR1	Score SC MR2	Non-timber forest products (NTFPs)	1	3	Land Tenure	6	6
Indicator	Score SC MR1	Score SC MR2											
Non-timber forest products (NTFPs)	1	3											
Land Tenure	6	6											
Climate change adaptation	Adaptations and impacts related to the climate crisis	X		The main objective of the project is forest conservation, avoiding unplanned deforestation. The maintenance of the standing forest is essential to mitigate the effects of the climate crisis and the maintenance of natural resources for the population. The project also contributes to achieving climate justice, since the groups that suffer most from climate change are the vulnerable and traditional communities. In 2022, the project's first social development action was the formalization of the partnership with Brazil nut extractivists with Instance 03. Monitored by the following indicators: a) Carbon Credit Benefits. Financial Resource (Section 6.1.3)									

				b) Social and environmental investments. Natural Resource (Section 6.1.4) c) Project performance. Carbon Resource (Section 6.1.6) <table> <tr> <th>Indicator</th> <th>Score SC MR1</th> <th>Score SC MR2</th> </tr> <tr> <td>Carbon Credit Benefits</td> <td>1</td> <td>1</td> </tr> <tr> <td>Social and environmental investments</td> <td>1</td> <td>2</td> </tr> <tr> <td>Project performance</td> <td>6</td> <td>5</td> </tr> </table>	Indicator	Score SC MR1	Score SC MR2	Carbon Credit Benefits	1	1	Social and environmental investments	1	2	Project performance	6	5
Indicator	Score SC MR1	Score SC MR2														
Carbon Credit Benefits	1	1														
Social and environmental investments	1	2														
Project performance	6	5														
Environment pollution	Pollutant emissions to air; discharges to water; release of hazardous materials; use of chemical pesticides and/or fertilizers.		X	Since the Rio Madeira project is a project to conserve standing forests and reduce deforestation, the generation of polluting and contaminating waste from activities inherent to the carbon project is low. The pollutant emissions to air that occur are from the vehicles used by patrol teams, however, these emissions are considered insignificant, as detailed in Table 41. Regarding hazardous material, the main one that is used by patrol vehicles and tractors used to clear farm borders is oil. However, all instances carry out maintenance on vehicles outside the properties, so there is no risk of leakage within the project area. The locations where maintenance takes place are duly authorized for this service, and evidence has been presented to the VVB. The use of chemical pesticides and fertilizers is also not foreseen in the project activities. The project activities do not generate waste discharges into any type of water body.												

In this monitoring report period, the main advance in the social aspect was the implementation of the partnership with the Brazil nut extractivists, as mentioned in the table above (Table 19. Risks to Local Stakeholders). However, technical training activities are planned to take place with this target audience during the period of the third monitoring report.

During the period of the second monitoring report, social activities were still in the planning phase, since the credits had not yet been issued and sold, so there was no revenue for the implementation of activities. Revenues from VCUs became available from May 2024. Socio-environmental activities will be planned considering the needs and priorities of the communities that will benefit from the project. Before implementing any activity, communities will be consulted again to confirm interest to carry it out.

Since communities generally have many needs, the project will seek to prioritize activities that are aligned with the project's objectives: reducing deforestation, protecting biodiversity, diversifying income with alternative and sustainable sources and environmental education.

Worker's Rights and Working Conditions

The Rio Madeira Grouped REDD+ Project adheres to all relevant national and international laws and regulations concerning workers' rights, labor conditions, and human rights. This includes compliance with Decrees, Service Orders, and Normative Instructions from the Ministry of Social Security and the Ministry of Labor. Additionally, the project respects international agreements, such as the Universal Declaration of Human Rights, the United Nations Declaration on the Rights of Indigenous Peoples, and ILO Convention 169 on Indigenous and Tribal Peoples, conventions ratified by Brazil.

Annually, Future Carbon's Compliance Department conducted a due diligence analysis to identify any risks of forced labor within the project area. This analysis did not reveal any risks related to non-compliance with labor legislation, and these conditions will continue to be monitored throughout the project's implementation. This process ensures there are no human rights violations, including sexual harassment, forced labor, child labor, or human trafficking. These conditions are continuously monitored during the project through site visits, interviews with stakeholders and landowners, and documentation reviews.

Future Carbon's Code of Conduct explicitly prohibits discrimination and sexual harassment during project design and implementation while promoting social inclusion. Any concerns related to ethics or violations of the Code of Conduct can be reported through the Ethics Channel available on the website <https://contatoseguro.com.br/futureclimate>, which provides a secure platform for grievances and reporting potential human rights violations.

All workers have been thoroughly informed about their rights under Brazilian Labor Laws. Prior to beginning their work, workers are briefed on their rights and the applicable laws in a culturally appropriate manner. Relevant laws and regulations related to workers' rights in Brazil, such as the Constitution of the Federal Republic of Brazil (1988) and the Consolidation of Labor Laws (CLT), are strictly followed to ensure compliance.

Table 20. Relevant Laws and Regulations Related to Worker's Rights

Regulatory Framework	Description
Constitution of the Federal Republic of Brazil (1988) ⁴¹	Establishes Chapter II – Social Rights, Articles 7-11, which addressed: i) minimum wage, (ii) normal working hours; (iii) guidance on vacation and weekly leave; (iv) guidance on maternity and paternity leave; (iv) recognition of collective bargaining; (vi) prohibition of discrimination.
Federal Decree-Law N° 5.452 (1943) – Consolidation of Working Laws (CLT) ⁴²	Approves the Consolidation of Labor Laws. Gave more clarification on the following subjects: (i) hourly, daily, weekly, and monthly working hours; (ii) employment of minors and women; (iii) establishment of a minimum wage; (iv) worker safety and safe working environments; (v) definition of penalties for employer's non-compliance; (vi) establishment of a judicial work-related process for addressing all worker related issues.
Federal Law N° 5.889 (1973) ⁴³	Establishes Regular Norms for Rural Workers. Prior to 1973, rural workers did not have the same rights as urban workers. Federal Law N° 5.889 established the equality between urban and rural workers, along with compensation overtime.
Federal Law N° 6.514 (1977) ⁴⁴	Provides for infractions and administrative sanctions to the environment, established the federal administrative process for the investigation of these infractions and make other provisions. Amendments to Chapter V of Title II of Consolidation of Labor Laws (CLT) on the matter of occupational safety, medicine, and other measures.
Federal Law N° 8.080 (1990) ⁴⁵	Provides for the conditions for the promotion, protection, and recovery of health, besides the organization and operation of the corresponding services and other provisions. It includes workers and their health care on Public Health System (SUS).
Federal Law n° 13.467 (2017) ⁴⁶	Amends articles of Federal Decree-Law N° 5.452 (1943) - Consolidation of Working Laws (CLT) concerning working hours, holidays, compensatory time, overtime pay and wages.

For the identification and assessment of occupational risks that could arise due to project implementation, Project Proponent follows the mandatory applicable occupational health and safety laws and regulations established by the federal and state governments.

To ensure compliance with occupational health and safety regulations, the project proponent follows all mandatory laws and regulations established by federal and state governments. Risks in the work environment are identified, evaluated, and managed according to Brazilian Regulatory Norms (NRs). These regulations guide the implementation of programs such as the Preliminary Risk Analysis (PRA), the Occupational Health Medical Control Program (PCMSO), the Rural Work Risk Management Program (PGR), and the Technical Report on Environmental and Working Conditions (LTCAT).

The measures necessary to minimize identified risks are detailed in the table below, which outlines the steps taken to ensure the health and safety of all workers involved in the Rio Madeira Grouped REDD+ Project.

⁴¹ Available at: <https://www.planalto.gov.br/ccivil_03/constituicao/constituicao.htm>.

⁴² Available at: <https://www.planalto.gov.br/ccivil_03/decreto-lei/del5452.htm>

⁴³ Available at: <https://www.planalto.gov.br/ccivil_03/leis/l5889.htm>

⁴⁴ Available at: <https://www.planalto.gov.br/ccivil_03/leis/l6514.htm>

⁴⁵ Available at: <https://www.planalto.gov.br/ccivil_03/leis/l8080.htm>

⁴⁶ Available at: <https://www.planalto.gov.br/ccivil_03/_ato2015-2018/2017/lei/l13467.htm>

Table 21. Occupational Safety Assessment

Activity	Risk(s)	Mitigation Measures
Forest Surveillance Monitoring	Falls, Getting lost in isolated areas, Exposure to Venomous Animals, Conflicts with deforestation agents	Instance 1 hired the company S3A to perform the monitoring service in their farm areas, including the project areas. The contracted company is responsible for providing properly trained and accredited personnel to perform the activities. Instance 2 also hired a company (Impactual) to perform the monitoring service in the property. The company started the service in 2021, and it was suspended in 2022, since the own farm employees assumed the surveillance activities. Instance 3 has a contract with a daily payment model, on which the professional travels around the farm around four times a month. This professional is also known as "Mateiro" (free translation: Forester), which is self-taught in traditional knowledge about the forest and its animals. "Mateiros" are recognized for their in-depth and empirical knowledge of the different ecosystems of the Amazon region⁴⁷, which has made them holders of practical knowledge, and they are highly sought after, including to accompany scientific research. The Mateiro risk analysis was included at the 2024 Safety Program and training since 2023.
Biodiversity Monitoring	Exposure to Venomous Animals	Biodiversity monitoring will be carried out by a company to be hired. The hired company will be responsible for providing PPE and training for its employees. Future Carbon will conduct due diligence to verify that the company meets the required criteria before hiring. This activity has not yet been carried out.

⁴⁷ NAKAZONO, E. M. O Mateiro e a Pesquisa Científica. In: Almeida, Alfredo W. B. de et al. (orgs). Caderno de Debates Nova Cartografia Social: conhecimentos tradicionais na Pan-Amazônia. Manaus: Projeto Nova Cartografia Social da Amazônia. Manaus: UEA Edições, 2010. p. 64-71.. Available at <
https://www.academia.edu/download/37200047/Caderno_Debates_mateiro_jul10.pdf>

Fire Fighting	Burns, Dehydration, Asphyxiation, Exposure to extreme heat, Firebreaks	During the project lifetime, employees responsible for the forest patrols will be trained in fire prevention and firefighting in order to structure the fire brigade. Personal protective equipment (PPE) and first aid kits will be provided. Permanent patrols also serve as a measure to prevent fire outbreaks. An operating procedure with guidelines written in clear and appropriate language and distributed to employees to minimize fire outbreaks will be implemented, and all necessary training will be provided. During this monitoring period, no fire brigade training activities were carried out.
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The project is also committed to gender equality, ensuring equal opportunities for employment, participation in consultations, and involvement in project activities. Women's participation is actively promoted during both project design and implementation.

Respect for Local Stakeholder Resources

The project recognizes, respects, and supports local stakeholders' customary tenure/access rights to territories and resources. The project will never encroach on private property or relocate people off their lands without consent. In the event there are any ongoing or unresolved conflicts over property rights, usage or resources, the project shall undertake no activity that could exacerbate the conflict or influence the outcome of an unresolved dispute.

The landowners intend to offer benefits and training for the local community, including health related benefits, in addition to providing education for children and women, as established and monitored by the Social Carbon methodology.

It is important to say that all the legal documents proving the land title and ownership of the property were presented before the Project Start Date.

No community member has been or will be removed from their land, on the contrary, communities will be supported through programs and incentives the project proponent will instigate. In addition, the project did not introduce any invasive species or allow an invasive species to thrive through project implementation.

Communication and Consultation

The project will take all appropriate measures to communicate and consult with local stakeholders in an ongoing process for the life of the project. As described above, the project intends to carry out local stakeholders' consultations (onsite or online), which will be monitored by social-environmental certification by additional standards. Every consultation shall communicate:

- The project implementation, including the project results and the importance of forest conservation activities.

- The risks, costs and benefits the project brings to local stakeholders.
- The benefit sharing mechanism.
- Procedures related to resolving eventual conflicts with stakeholders.
- The process of VCS Program validation and verification and the validation/verification body's site visit.

Grievance redress and conflict management procedures, as well as benefit sharing mechanisms, were discussed with communities through online and on-site stakeholders consultations.

As stated in section 2.2, the on-line consultation was carried out in 05-September-2022, while the on-site consultations were also held, as detailed in the section 2.2.

In addition, a provisional contact has been made available for communication with local stakeholders, via the email tecnica@futurecarbon.com.br and the phone number of landowners and farm managers to receive and store comments or suggestions about this REDD project. All the communities received Future Carbon's contact details and the landowners' contact details during the Local Stakeholder Consultation. It is worth noting that, as mentioned above, the contact between the communities and the landowners already existed before the REDD Project, so the relationship between them is direct.

The Standard Operating Procedure (SOP) "PO.SAM.02 – Management of Manifestations" establishes an integrated mechanism responsible for managing all stakeholder comments, including doubts, complaints, criticisms, suggestions, and other feedback, particularly from local communities. This procedure was established to strengthen the communication process with interested parties throughout the monitoring cycle and includes both the process of reporting results and handling received feedback.

During this monitoring period, all feedback, comments, questions or complaints – whether received through the provided contact, informally, verbally via landowners, or during the stakeholder consultation – have been documented in the section 2.2.

Management Capacity

In more than two years of activity as a project proponent, Future Carbon has increasingly consolidated itself as one of the most relevant and impactful companies specialized in forest conservation projects in the Amazon, ensuring the quality and effectiveness of the REDD+ activities developed, standing out in Brazil and internationally for its work with rural producers, forest owners, communities and investors.

The implementation of the Rio Madeira Grouped REDD+ Project required a wide range of technical skills from different areas of expertise, with a focus on the development and management of forest conservation projects in the Amazon biome, including in-depth knowledge of the methodologies related to Verra's VCS and CCB standards, in line with the development for AFOLU projects, such as application of socio-economic and territorial

diagnostics and stakeholder engagement, biodiversity assessment and monitoring, community impacts management, projections and modelling necessary for forest carbon stocks calculation, and GIS application, among others, to ensure the quality and effectiveness of the REDD+ project activities carried out.

The team counts on a highly qualified multidisciplinary team for the planning, implementation and monitoring of the Rio Madeira Grouped REDD+ Project, such as professional and academic researchers specialized in biodiversity, social and climate aspects, such as forestry and environmental engineers, territorial and social analysts, geoprocessing spatial analysts and other related fields, as mentioned in the associated management team in the Non-Permanence Risk Report.

The team that constitutes the Management Team of the Rio Madeira Grouped REDD+ Project is composed of a wide range of staff and professionals, precisely placed Forest Team, involved working on the REDD+ technical aspect of the project. Some of the technical skills required by role for the successful implementation of the project and specific activities include:

Table 22. Key technical skills required by role

Roles	Required Technical Skills
Head of Forest	Supervision of the development, implementation, and monitoring of the high-level Forest REDD+ project, providing or sourcing technical assistance and support where necessary, to achieve project validation and certification and sale of carbon credits; Expertise in the planning, design, management, development and evaluation of REDD+ projects and carbon certification under Verra's Voluntary Carbon Standard (VCS) and Climate, Communities and Biodiversity Standards (CCBS); Relevant work experience in climate finance, voluntary carbon markets, carbon credit value chain or similar, and financial management of forest conservation projects; Experience in leading the REDD+ forestry technical team in a diverse portfolio of carbon projects in the Brazilian Amazon region; Knowledge of forest and/or landscape conservation issues, and related funding mechanisms and trends.
REDD+ Technical Coordinator	Technical expert on REDD+ and related methodologies, including Verra's Voluntary Carbon Standard (VCS) and Climate, Communities and Biodiversity Standards (CCBS), providing guidance on technical aspects of REDD+ program design, implementation and monitoring, and follow-up to support capacity to develop and implement multiple projects simultaneously; Support the entire formulation of the project document (PD) and preparation of the due diligence response; Follow-up of external validation and verification bodies to project audit process; Lead the project field visit and audits processes

REDD+ Technical Analyst	Experience in writing and developing full Project Document (PD) and Monitoring Report (MR), baselines, carbon accounting, leakage, additionality and risks of non- permanence, and managing the data essential for these calculations in various methodologies, including Avoided Unplanned Deforestation and Degradation, Avoided Planned Deforestation and Degradation, Afforestation, Reforestation and Revegetation based on VCS and CCB standards.
Socioenvironmental Coordinator	Background experience in developing activities with social focus, stakeholder consultation and engagement for carbon projects, and analysis of drivers and causes of deforestation to establish project baseline; Ability to lead carbon projects involving multiple stakeholders across various sectors, geographies, and cultural backgrounds; Develop activities in conjunction with the community and monitoring and evaluation of biodiversity to formulate strategies and frameworks for REDD+ safeguards, including governance structures and monitoring systems; Provide technical guidance and support to define sustainable development impact accounting and assessment methodologies, including the establishment and monitoring of social and biodiversity co-benefit indicators in various AFOLU activities based on sustainable development objectives.
Socioenvironmental Analyst	Knowledge of social sciences and experience in approaching community engagement; communicating with stakeholders about opportunities to contribute to the collection and production of data and information on REDD+ activities; Experience in sustainable practices for local/rural development, conservation and management of biodiversity and ecosystem services, continuous monitoring of biodiversity indicators by service providers' specialists to ensure local species, their habitat, status, and protection; Experience in the application and development of socio-economic and territorial diagnostics; monitoring of socio-environmental indicators.
GIS Coordination	Coordinate outsourced GIS mapping tasks; develop and select baseline model; generate and analyze satellite land use monitoring information on carbon stocks from deforestation rates and greenhouse gas emissions produced or avoided during the project.
GIS Analyst	Capacity to manage the Geographical Information System and databases and to produce all necessary cartographic analyses; Spatial data analysis for REDD+ projects based on proven methodologies using ArcGIS, QGIS, R and Google Earth Engine. Conducting projections and modelling necessary for the calculation of carbon stocks in forests.

3 IMPLEMENTATION STATUS

3.1 Implementation Status of the Activity

The VCS PD was validated by the Validation and Verification Body (VVB) RINA Services S.p.A. and this present monitoring report is being verified by Ecolance Private Limited.

The project activity includes banning of illegal logging, fire prevention activities, socioeconomic activities and supervision of deforestation by a management team and through satellite images.

Instance 1: ROVEMA

With regard to Instance 1 (Grupo ROVEMA), there is a surveillance contract with private company since 2020 to carry out patrols in the project area. The contract was renovated during 2022, where it was included new assets from instance 1 landowners to be monitored.

In addition, instance 1 carried out SFMP during the monitored period at the 'POA 05' logging zone, located at the Rio Madeira farm. During the monitored period, 34,402.41 m3 were extracted from logging activities. Evidence was shared with VVB team.

Furthermore, during 2022, all the instances have installed placards informing the existence of the REDD project at the property entrances and its borders. The placards also inform area restrictions, such as access, hunt, fire, etc.

Figure 9. Placard informing the AUD project at instance 1 entrance (Serra Verde farm)



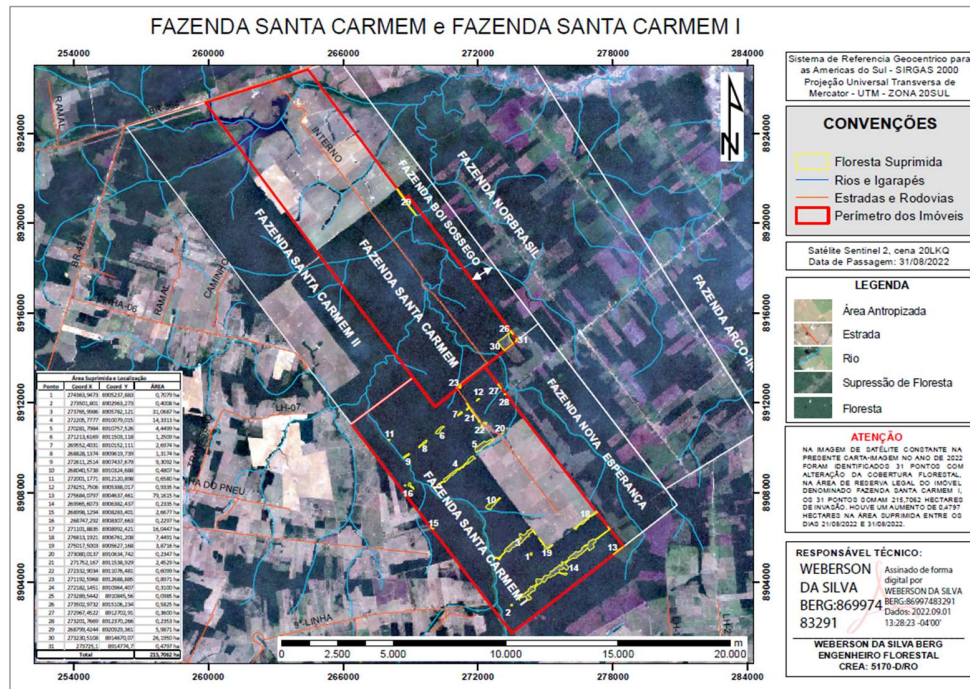
Instance 2: Leite

To improve the surveillance and protect the project area, instance 2 has joined the Rural Patrol Program, which is a governmental program in order to carry out rural policing, aiming to preserve public order in the rural area, and consequently, generate a sense of security. The attribution of rural patrolling involves prevention activities, which are carried out by

patrolling properties which have joined the program. The rural patrol joining process occurred during 2022, while the surveillance itself started in 2023.

Besides patrolling activities with private company and Rural Patrol Program, instance 2 uses satellite images to monitor deforestation within and around the property.

Figure 10. Satellite images monitoring within instance 2



As informed for instance 1, the second instance has also installed a placard informing the REDD project and restrictions within the forest areas.

Figure 11. Placard informing the forest conservation project at instance 2



Instance 3: Tupá

The project activities include banning of illegal logging, fire prevention activities, socioeconomic activities as Brazil nuts collect and supervision of deforestation by a management team and through satellite images. The formalization between the Brazil nuts collectors and the instance 3 landowner was held in January-2022. In addition, a new activity involving açai peats collection has started during 2023, but not formalized yet. During the verification visit, it was possible to meet the açai collectors while harvesting the açai. In order to control the collectors access within the property, it is necessary to pass in front of the farm manager house, named Carlos Alberto Santos, which avoids the movement of unknown persons or authorized people grabbing illegal material. Moreover, instance 3 has installed a geodesic landmark on the property boundaries and made a firebreak around the land as a way of better delimitation and, consequently, protection of project area.

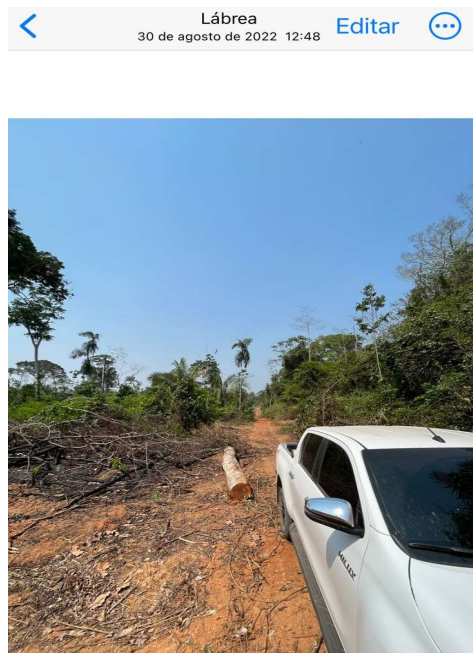
Moreover, instance 3 landowner has installed pillar to easily identify on field the existing geodesic landmark on the property boundaries and thus avoid mistakes while neighbors open their areas. Also, the limit of the property was maintained in order to avoid fire spreading and better delimitate the property boundary, and, consequently, forest conservation.

Figure 12. Brazil nuts collectors in instance 3



Figure 13. Geodesic landmark and new pillar to clearly identify property limits at instance 3



Figure 14. Property border maintenance at instance 3

Instance 3 landowner also makes use of a paid app that captures satellite images of his property named EOS LandViewer⁴⁸.

Surveillance activities are also in place at Instance 3, where the patrolling team visit the project areas in order to identify their integrity, informing the landowner in case any relevant data should be reported.

During the monitored period, Instance 3 has also installed a placard informing the REDD project and restrictions within the forest areas, as illustrated below:

⁴⁸ Available at: < <https://eos.com/pt/products/landviewer/>>.

Figure 15. Placard informing the forest conservation project at instance 3



In addition, instance 3 also carried out SFMP during the monitored at unit Forest Production Unit named 'UPF4'. During the period, 1,789.62 m³ were extracted from logging activities. Evidence was shared with VVB team.

Although part of the abovementioned activities is in place prior to the monitored period, they represent continuous and important initiatives to monitor the area and, consequently, avoid deforestation within the property.

All these actions combined are important for the maintenance of the standing forest. Initiatives also generates jobs and incomes for the local economy through conservation. With the incomes of the carbon credits, it is possible to foster more initiatives that can impact positively surrounding communities.

Non permanence risk is monitored according to AFOLU Non Permanence Risk Tool 4.2, with a score of 12%. This is managed together with the owners in order to reduce risk. In addition, leakage follows the same approach, where deforestation is monitored in the LB and actions in the LMAs (under planning) are designed to reduce deforestation in these areas.

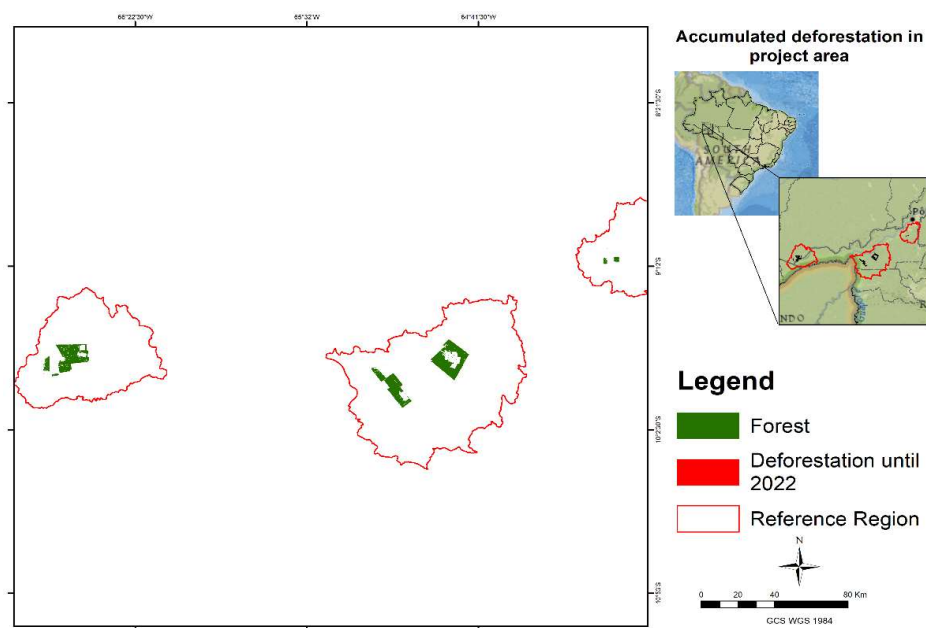
The monitoring data was kept according to the monitoring plan described in the approved VCS PD. This Monitoring Report refers to the second monitoring period of this project and includes data from 01-January-2022 to 31-December-2022.

During the monitoring period, the deforestation within the Project Area was around 3.5% when compared to the projected deforestation (68.67 hectares were deforested, while 1,811.59 hectares were projected). In other words, it can be concluded the Effectiveness Index was around 96%.

In addition, the carbon stock decrease due to unavoided unplanned deforestation within project area during the present monitored period (44,085 tCO₂e), when compared to VCUs already issued (1,256,609 VCUs), represents less than 5%, thus not characterizing a loss event according to VCS Program Definitions 4.5.

The map with the annual areas of deforestation within the project area during the current monitoring period is showed below. Reference region accumulated deforestation map is also available below. The analyses carried out are based on data available on Mapbiomas⁴⁹.

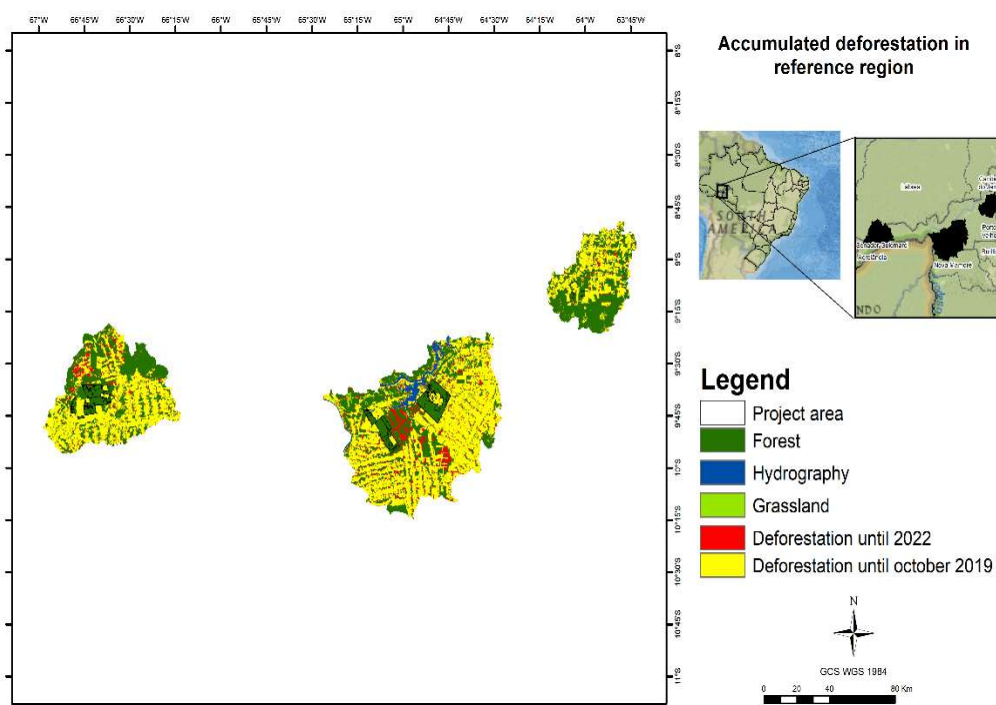
Figure 16. Deforestation in project area during 2022⁵⁰



⁴⁹ Mapbiomas Brasil. Available at: <https://plataforma.brasil.mapbiomas.org/cobertura>. Last visited on July 20, 2023.

⁵⁰ Mapbiomas Brasil. Available at: <https://plataforma.brasil.mapbiomas.org/cobertura>. Last visited on July 20, 2023.

Figure 17. Accumulated deforestation in reference region⁵¹



Although it was identified an overlay between Rio Madeira Grouped REDD+ Project and project ID2508, no agreement was firm. Since the proponents did not agree on how to split the overlapping leakage belt areas, it was considered the adopted methodology VM0015 section 1.1.3 option e), where each project will have to include in its leakage belt the overlapping areas. For more information, please visit VCS PD.

Social Carbon

This is the second Social Carbon Report, regarding Point 1. The environmental and social components of this project are being assessed through socio-economic diagnostics and wildlife inventories, for greater detail and richness of information. After the diagnostic phase, a specific Theory of Change for the project will be developed, which will guide the activities to be implemented in the project. All actions will be validated by the community groups targeted by the actions.

In the social sphere, informative visits about the project and its general objectives have been conducted in order to engage the community and local institutions, as well as to consult them on their interest in participating in the activities to be developed. Also, during 2022, a partnership agreement was signed between Instance 3 (Tupá) and local Brazil nuts collectors, aiming to favor sustainable Brazil nut management within the project area

⁵¹ Mapbiomas Brasil. Available at: <https://plataforma.brasil.mapbiomas.org/cobertura>. Last visited on July 20, 2023.

and greater stability for the involved Brazil nut collectors, as it ensures they will have a fixed location for harvesting during the season. For the owner, this partnership is also advantageous as it increases field presence and strengthens the protection of the project's forest area.

In terms of biodiversity, the first inventory and wildlife diagnosis in the project areas are scheduled for 2023, with the aim of identifying the presence of species from the groups of mammals, birds, and herpetofauna.

Regarding the environment, up to the present moment, practices have been implemented and adopted for greater security of the forest areas, such as:

- Installation of geodetic markers and firebreaks (Instance 3);
- Hiring satellite monitoring services (Instance 2 and 3);
- Adherence to Rural Patrol (Instance 2);
- Area surveillance (all instances); and
- Installation of project signs (all instances).

It is also worth noting that during 2022 the project did not have funds from the sale of credits. However, the project's governance system and the sharing of benefits from activities are being structured together with the interested parties in order to collaboratively build socio-environmental actions aimed at promoting sustainable development and income generation for the communities located in the project's vicinity.

3.2 Deviations

3.2.1 Methodology Deviations

No methodology deviations were applied.

3.2.2 Project Description Deviations

In order to reinforce the project conservativeness approach, the carbon stock increase due to logging was omitted in the present monitoring report. Since such increment was considered in the registered Joint VCS PD, this approach in the current monitoring period is considered a Project Description deviation.

As per the adopted methodology VM0015 v1.1⁵², item 7.1.1, "If the project activity generates an increase in carbon stocks, ignoring the carbon stock change is conservative".

⁵² Available at: <<https://verra.org/documents/vm0015-methodology-for-avoided-unplanned-deforestation-v1-1/>>

According to the VCS Standard v4.7⁵³, item 3.21.1 (Project Description Deviations), which defines “where the deviation does not impact the applicability of the methodology, additionality or the appropriateness of the baseline scenario, and the project remains in conformance with the applied methodology, the deviation shall be described and justified in the monitoring report.”

Once ignoring the carbon stock increase due to logging does not impact in the aforementioned VCS Standard guidelines and reduces the amount of VCU that would be generated during the current monitoring period, this deviation reinforces the conservativeness of Rio Madeira Project. Such deviation is applicable up to the next baseline reassessment.

3.3 Grouped Projects

No new instances were included to the Project in this monitoring period.

3.4 Safeguards

No Safeguards deviations were applied.

4 DATA AND PARAMETERS

4.1 Data and Parameters Available at Validation

Data / Parameter	CF
Data unit	tC/tdm
Description	Default value of carbon fraction in biomass
Source of data	SILVA, Jéssika Luane. Danos florestais e estimativa da redução no estoque de carbono em áreas de manejo florestal sob concessão pública: Floresta Nacional do Jamari. 2014. Dissertação (mestrado) - INPA, Manaus, 2014. Available at: < https://repositorio.inpa.gov.br/handle/1/5065 >. Last visit on 09/December/2022.
Value applied	0.48

⁵³ Available at: <https://verra.org/documents/vcs-standard-v4-7/>. Although the project was validated under VCS version 4.4, it was adopted the most recent version of the VCS Standard version to assure update compliance.

Data / Parameter	CF
Justification of choice of data or description of measurement methods and procedures applied	Adopted data can be considered consistent since such conversion factor was used by Silva (2014), which is the adopted reference for carbon stock for the Rio Madeira REDD+ Project. Moreover, this study was carried out in the State of Rondônia (southern Amazon), where properties are located. In addition, Silva (2014) is more recent when compared to IPCC (2003) or IPCC (2006). Furthermore, the National Forestry Service (SNIF) reinforces the adoption of 0.48 as conservative conversion factor since SNIF informs carbon represents 50% of biomass.
Purpose of Data	This parameter is used to calculate the baseline, project and leakage emissions from deforestation occurred in the baseline and project scenarios. Provides an estimate of the carbon content of the vegetation biomass within the project reference region.
Comments	If new and more accurate carbon fraction data become available, these can be used to estimate the net anthropogenic GHG emission reduction of the subsequent fixed baseline period.

Data / Parameter	Ctot _{fcl}
Data unit	tCO ₂ e/ha
Description	Average carbon stock per hectare in anthropic areas in equilibrium of post-deforestation class fcl in tCO ₂ e/ha
Source of data	The average classification of post-deforestation land-uses within the reference region during the historical reference period was conducted through MapBiomass. Average carbon stocks of pastureland, agriculture and other land uses – National GHG Emissions Communication of Brazil to the UNFCCC (2019) - Available at: https://www.gov.br/mcti/pt-br/acompanhe-o-mcti/sirene/publicacoes/comunicacoes-nacionais-do-brasil-a-unfccc/arquivos/3tcn_volume_3.pdf Secondary Forest average carbon stocks - Pereira, Izaura Cristina Nunes. Estoque de biomassa e carbono florestal em unidades de paisagem na Amazônia: uma análise a partir da abordagem metodológica. Universidade Federal do Pará, Belém, 2013. Available at: https://ppgdstu.propesp.ufpa.br/ARQUIVOS/teses/TESES/2013/IZAURA%20CRISTINA%20NUNES%20PEREIRA.pdf Belowground biomass – Root to shoot ratio available at VM0015.

	A weighted average of the post-deforestation carbon stocks was done, considering the % of area for each land use.					
Value applied	<table><tr><th>Ctot_{refl} +90% (within PA)</th><th>Ctot_{refl} -90% (within LB)</th></tr><tr><td>41.39</td><td>28.38</td></tr></table>		Ctot _{refl} +90% (within PA)	Ctot _{refl} -90% (within LB)	41.39	28.38
Ctot _{refl} +90% (within PA)	Ctot _{refl} -90% (within LB)					
41.39	28.38					
Justification of choice of data or description of measurement methods and procedures applied	Most of post-deforestation land uses within the reference region is composed by pasturelands. In order to estimate the post-deforestation carbon stocks, the average carbon stocks of pasturelands, agriculture and other land uses were taken from the National GHG Emissions Communication of Brazil to the UNFCCC (2019). For secondary forests, a regional study was conducted. Most secondary forests in the Brazilian Amazon are young. In 2017, 65% of secondary forests was ≤10 years old. On average, 35% of annual land abandonment to secondary forests was re-cleared within 5 years, and 57% within 10 years. The half-life of secondary forests is 8 years, on average, which is also the same value found by other study that concludes that more than 50% of the secondary forests in the Amazon biome have less than 8 years old. According to the referenced study, conducted in the State of Pará, that analyzed the carbon stocks of a secondary forest with 14 years old, the average carbon stock in above ground biomass is around 19 tC/ha. Below ground biomass was estimated through the root-to-shoot ratio from the applied methodology. Therefore, the average value for secondary forests is around 22,8 tC/ha. The applied value was obtained with the weighted average of the carbon stock and land use.					
Purpose of Data	This parameter is used to calculate the baseline emissions from deforestation occurred in the baseline scenario. Provides an average of the post-deforestation carbon stock per hectare within the reference region.					
Comments	If new and more accurate biomass stock data become available, these can be used to estimate the net anthropogenic GHG emission reduction of the subsequent fixed baseline period. Please see detailed calculation at VCS 2MR Spreadsheet.					
Data / Parameter	DLF					
Data unit	%					

Description	Displacement Leakage Factor
Source of data	According to VCS requirements, where the applied methodology requires the quantification of activity-shifting leakage, projects may apply the optional default activity-shifting leakage deduction of 15 percent to the gross GHG emission reductions and/or removals.
Value applied	15
Justification of choice of data or description of measurement methods and procedures applied	The DLF was estimated as 15%, based on default value of the VCS requirements, where the applied methodology requires the quantification of activity-shifting leakage
Purpose of Data	This parameter is used to calculate leakage emissions in the baseline scenario due to activity displacement leakage, providing an <i>ex ante</i> estimation of the decrease in carbon stocks and increase in GHG emissions. This value was calculated based on the percent of deforestation expected to be displaced outside the project boundary due to the implementation of the AUD project activity.
Comments	<i>Ex post</i> monitoring of the leakage belt will be done to determine deforestation rate outside the project area and the leakage emissions and carbon stock decrease. This parameter will be updated at each renewal of fixed baseline period.

Data / Parameter	Dm
Data unit	g/cm ³
Description	Mean wood density
Source of data	NOGUEIRA, E. M. Densidade de Madeira e Alometria de Árvores em Florestas do 'Arco do Desmatamento': Implicações para Biomassa e Emissão de Carbono a partir de Mudanças de Uso da Terra na Amazônia Brasileira (Wood Density and Tree Allometry in 'Arc of Deforestation' Forests: Implications for Biomass and Carbon Emissions from Land Use Change in the Brazilian Amazon). 2008. 151 pages. Doctor Thesis - Tropical Rainforest Science Course, INPA, Manaus, 2008. Available at: < https://repositorio.inpa.gov.br/bitstream/1/4959/2/Euler_Nogueira.pdf >

Value applied:	0.589
Justification of choice of data or description of measurement methods and procedures applied	The mean wood density presented in Nogueira (2008) was obtained from the Brazilian Amazon, where the project region is located. The value is for the Open Tropical Rainforest in the state of Rondônia. (Table 3 of the referred study).
Purpose of Data	This parameter is used to calculate baseline, project and leakage emissions through the conversion from m ³ to tons for estimating above-ground biomass from local forest inventories.
Comments	Furthermore, it is also used to calculate project emissions from logging activities occurred in the project scenario due to sustainable forest management. Carbon stock decrease due to planned logging activities were calculated through multiplying the harvested volume by the mean wood density.

Data / Parameter	$\Delta CBSLLK_t$
Data unit	tCO _{2e}
Description	Annual carbon stock changes in leakage management areas in the baseline case at year t
Source of data	- Planned interventions proposed by the project proponent.
Value applied	0
Justification of choice of data or description of measurement methods and procedures applied	Leakage prevention activities generating a decrease in carbon stocks should be estimated <i>ex ante</i> and accounted. The leakage prevention measures proposed by the present project do not include decrease in carbon stocks due to activities implemented in the leakage management area.
Purpose of Data	This parameter was used to calculate leakage emissions in the baseline scenario due to leakage prevention measures implemented in the leakage management area. It provides an <i>ex ante</i> estimation of the decrease in carbon stocks due to the activities implemented.
Comments	<i>Ex post</i> monitoring of the leakage management area will be done to determine the carbon stock decrease and the leakage emissions. This parameter will be updated at each renewal of fixed baseline period.

Data / Parameter	EBBBSLPA _t
Data unit	tCO ₂ e
Description	Sum of (or total) baseline non-CO ₂ emissions from forest fire at year t in the project area
Source of data	Supervisor reports.
Value applied	16,081.61 (Annual average actual non-CO ₂ emissions due to biomass burning within the project area during the crediting period)
Justification of choice of data or description of measurement methods and procedures applied	Slash-and-burn deforestation to clear the area is carried out for subsistence agriculture, which is the main cause of deforestation within the project area. Therefore, baseline deforestation in the project area involves fire and all above ground biomass is burnt. Non-CO₂ emissions from biomass burning are calculated according to requirements of methodology VM0015 v1.1. In order to estimate non-CO₂ emissions from forest fires, the average percentage of the area which contemplates the three municipalities within the RR that was cleared by burning for other land uses involving deforestation, such as cattle raising and farming (F_{burnt}), and the average of biomass that has commercial value, and could be removed prior to clear cutting and burning (P_{burnt,p}) were estimated, either for the baseline and project case. Baseline deforestation in the project area involves fire and all above ground biomass is burnt to clear the area. Therefore, this parameter is estimated as the multiplication of the annual area of deforestation of initial forest classes in the project area in the baseline scenario (ABSLPA_{icl,t}) times the total GHG emission from biomass burning in initial forest classes (EBB_{toticl,t}).
Purpose of data	This parameter is used to calculate non-CO ₂ emissions due to forest fires within the project area in the baseline scenario, providing an ex-ante estimation.
Comments	Ex post monitoring of forest fires and non-CO ₂ emissions (EBBPSPAt) will be done to determine GHG emissions within the project area (when the forest fire was significant).

Data / Parameter	F _{burnt,icl}
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Data unit	%
Description	Proportion of forest area burned during the historical reference period in the forest class.
Source of data	<i>Fburnt</i> data source: 3ª Comunicação nacional do Brasil à convenção-quadro das Nações Unidas sobre Mudança do Clima (3rd national communication to UNFCCC) – volume 3 ⁵⁴
Value applied	45%
Justification of choice of data or description of measurement methods and procedures applied	Official data from Brazilian Government. The data considers the combustion factor for the phytophysognomies “Florestas Ombrófilas Abertas”, which can be considered similar to Open Submontane Tropical Rainforest.
Purpose of data	This parameter is the average percentage of the area within the RR that was cleared by burning for other land uses involving deforestation, such as cattle raising and farming, and is used to calculate baseline and project non-CO ₂ emissions from forest fire at year t in the project area (parameter EBBBSLPAt).
Comments	Monitoring is done only once at project start.

Data / Parameter	Pburnt _{p,icl}
Data unit	%
Description	Average proportion of mass burnt in the carbon pool in the forest class
Source of data	Measured or estimated from literature. <i>Pburnt</i> data source: Anderson LO, Aragão LE, Gloor M, et al. Disentangling the contribution of multiple land covers to fire-mediated carbon emissions in Amazonia during the 2010 drought . Global Biogeochem Cycles. 2015; 29 (10):1739-1753. Doi: 10.1002/2014GB005008. Available at < https://agupubs.onlinelibrary.wiley.com/doi/10.1002/2014GB005008 >. Last visited on August 2022.
Value applied	78
Justification of choice of data or description of	Pburnt was estimated using the average biomass per hectare that has commercial value and could be removed prior to clear cutting

⁵⁴ Available at <http://www.ccst.inpe.br/publicacao/terceira-comunicacao-nacional-do-brasil-a-convencao-quadro-das-nacoes-unidas-sobre-mudanca-do-clima-portugues/> Last visit on 24/October/2022

measurement methods and procedures applied	and burning. Based on literature, an average value of 61.6 m³/ha was obtained, which would correspond to approximately 11% of the total biomass in 1 ha. In this way, the remaining is burned to clear the area, therefore, its new value is 88.6%. However, due to the lack of literature estimates, a study from the Brazilian Amazon in the Cerrado vegetation was used for the comparison. This study reported that the total biomass consumed by fires varies from 72% to 84% (average 78%) in denser Cerrado types, which is a forest vegetation. The most conservative value between these two estimates were used, i.e., Pburnt was estimated as 78%. It is important to note that slash and burn practices are commonly used in the Amazon region to clear the area for other land uses thus, when burning an area, the main objective is to completely remove all the remaining biomass. Therefore, assuming that 78% of the biomass is combusted, there would still be a 22% remaining biomass that shall be left to decompose, which also emits GHG to the atmosphere in this process.
Purpose of data	This parameter is the average of biomass that has commercial value, and could be removed prior to clear cutting and burning, and is used to calculate baseline and project non-CO ₂ emissions from forest fire at year t in the project area (parameter EBBBSLPAt).
Comments	Monitoring is done only once at project start.

Data / Parameter	EI
Data unit	%
Description	Ex ante estimated effectiveness index
Source of data	Conservation implemented and short-term planned activities Observed deforestation data
Value applied	85
Justification of choice of data or description of measurement methods and procedures applied	It was considered ex-ante and ex-post deforestation data within project area for the 1st monitoring period (2019-2021), where a relevant 96% index was achieved. Such performance can be attributed to area control activities, such as surveillance and remote sense activities. Additional approaches are to be implemented by Project Proponent and landowners, since complementary activities are

	recommended by literature to tackle deforestation in medium and long term⁵⁵. The plan is based on five plans that integrate the Project's Theory of Change: • Adaptation and improvement of infrastructure • Continuous Communication and Stakeholder Engagement • Conservation and Monitoring of Biodiversity and Ecosystem Resources • Capacity Building and Support to Promote Sustainable Production Practices • Monitoring and Forest Integrity Considering the abovementioned programs implementation is in progress, a conservative index of 85% was applied.
Purpose of Data	This parameter is used to calculate project emissions in the baseline scenario. Provides an <i>ex ante</i> estimation of the carbon stock changes due to unavoidable unplanned deforestation within the project area, based on the effectiveness of the proposed project activities to reduce the deforestation.
Comments	<i>Ex post</i> monitoring of the project area will be done to determine deforestation rate and the project emissions. This parameter will be updated at each renewal of fixed baseline period.

Data / Parameter	Logging damage factor (LDF)
Data unit	m ³ /m ³ of harvested timber
Description	The logging damage factor (LDF) is a representation of the quantity of emissions that will ultimately arise per unit of extracted timber (m³). These emissions arise from the non-commercial portion of the felled trees (the branched and stump) and trees incidentally killed during felling.

⁵⁵ Many studies indicate how complex is the long-term conservation of the Amazon. Supporting information is available on the following publication from IPAM: "Soluções para o desmatamento na Amazônia", dated March, 2023. This document provides a set of solutions to prevent deforestation that range from command and control measures to increasing agricultural productivity and increasing land tenure to prevent land grabbing, which are all complex initiatives. Document available at: <https://ipam.org.br/wp-content/uploads/2023/03/Amazoniar-Solucoes-para-o-desmatamento-na-Amazonia-VF.pdf>.

Source of data	Feldpausch et al. When big trees fall: Damage and carbon export by reduced impact logging in southern Amazonia. Forest Ecology and Management 219 (2005) 199–215. Available at: < https://www.sciencedirect.com/science/article/abs/pii/S0378112705005232?via%3DiHub >
Value applied:	2.0174
Justification of choice of data or description of measurement methods and procedures applied	This parameter is added to the harvested timber volume intensity in order to calculate carbon stock decrease from planned logging activities at each forest class. The emissions resulting directly from logging are calculated by estimating the emissions resulting from dead wood created in each logging gap measured divided by the volume of wood created, adding skidder trails damage. According to Feldpausch et al. (2005), Table 6 pag 209, the mean Coarse woody debris returned to the soil as necromass following logging and damage in: (1) tree felling gap formation (trees killed by tree-fall), (2) residual canopy from the felled tree, (3) road, (4) deck construction (whole trees plowed to the ground) and (5) skid maneuvering during logging, is about 6.9 Mg C/ha. According to section 4.3 (pg 212) from this same study, this represents 2.4 times the carbon taken off site in logs. However, the MR already takes into account as planned deforestation the roads and decks constructions, which represent around 16% of the total damage. Therefore, the LDF is $2.4 * (1 - 0.16) = 2.0174$.
Purpose of data	This parameter is used to calculate project emissions from logging activities occurred in the project scenario due to sustainable forest management, specifically for the calculation of the carbon stock decrease due to planned logging activities in the project area.
Comments	If no monitoring data is available, SFMP data shall be used. If new and more accurate harvest intensity data become available, these can be used to estimate project emissions.

4.2 Data and Parameters Monitored

Data / Parameter	ab _{icl}
Data unit	Mg/ha

Description	Average biomass stock per hectare in the above-ground biomass pool of initial forest class icl in Mg/ha.																				
Source of data	Average values for the above-ground biomass were taken from literature. The study was used as a source because it was based on data related to the carbon stock in forest management areas in the Jamari National Forest, located in Rondônia, where the project is mainly located. SILVA, Jéssika Luane. Danos florestais e estimativa da redução no estoque de carbono em áreas de manejo florestal sob concessão pública: Floresta Nacional do Jamari. 2014. Dissertação (mestrado) - INPA, Manaus, 2014. Available at: < https://repositorio.inpa.gov.br/handle/1/5065>																				
Description of measurement methods and procedures to be applied	According to the Study, the above-ground biomass of each individual was estimated using the equation proposed by Chave et al. (2005) (equation 2), and used by Mazzei et al. (2005) (equation 2, described below), and used by Mazzei et al. (2010), cited in this study. The equation uses DBH as an independent variable, which is easy to measure in the field and has a low sampling error (HIGUCHI et al., 1998) and takes into account the wood density value, an important variable for improving estimates of carbon stock loss from forest interventions (CHAVE et al., 2005; FEARNSIDE, 1997b; NOGUEIRA et al., 2007).																				
Frequency of monitoring/recording	Whenever current study should be replaced to meet methodology requirements.																				
Value applied	<table><tr><th colspan="5">Above-ground biomass</th></tr><tr><th colspan="5">ab_{icl} (Mg/ha)</th></tr><tr><th>ID_{icl}</th><th>Vegetation</th><th>Reference Region</th><th>Project Area</th><th>Leakage Belt</th></tr><tr><td>1</td><td>Forest</td><td>294.16</td><td>294.16</td><td>294.16</td></tr></table>	Above-ground biomass					ab _{icl} (Mg/ha)					ID _{icl}	Vegetation	Reference Region	Project Area	Leakage Belt	1	Forest	294.16	294.16	294.16
Above-ground biomass																					
ab _{icl} (Mg/ha)																					
ID _{icl}	Vegetation	Reference Region	Project Area	Leakage Belt																	
1	Forest	294.16	294.16	294.16																	
Monitoring equipment	No monitoring equipment is used to determine this parameter.																				
QA/QC procedures to be applied	Data shall be in accordance to VM0015 v1.1 requirements																				

Purpose of data	This parameter is used to calculate baseline emissions, project emissions and leakage emissions in both baseline and project scenarios.
Calculation method	$AGB = \rho * \exp (-1,499 + 2,148 \ln(DAP) + 0,207 (\ln(DBH))^2 - 0,0281 (\ln(DAP))^3) (2)$ Where: AGB is above-ground woody biomass (kg), ρ is wood density (g.cm⁻³) and DBH is diameter at breast height (1.30 m). The wood density value (ρ) was obtained from published studies, such as those by Fearnside (1997b) and Nogueira et al. (2007). In order to compare and evaluate the percentages of forest biomass estimates, we consulted the list of studies carried out in the Brazilian Amazon systematized by Nogueira et al. (2008), specifically the study carried out by Cummings et al. (2002) in the Rondônia region. For the unidentified species, an average wood density value of 0.583 g.cm⁻³, estimated by Nogueira et al. (2007), was used.
Comments	The values will be reassessed every 6 years or when data is more than 10 years old, whichever occurs first.

Data / Parameter	bb _{icl}
Data unit	Mg/ha
Description	Average biomass stock per hectare in the below-ground biomass pool of initial forest class icl in Mg/ha.
Source of data	The value applied to the above-ground biomass was taken from SILVA, Jéssika Luane. Danos florestais e estimativa da redução no estoque de carbono em áreas de manejo florestal sob concessão pública: Floresta Nacional do Jamari. 2014. Dissertação (mestrado) - INPA, Manaus, 2014. (Pg. 70, Table 9)⁵⁶, described above. Average values for the below-ground biomass were taken from the applied methodology VM0015 v1.1
Description of measurement methods and procedures to be applied	The methods and procedures to estimate the above-ground biomass are described at ab_{icl} parameter. Regarding the average values for below-ground biomass, the VM0015 methodology estimates a root-to-shoot ratio of 0.24 for tropical rainforest having above ground biomass values above

⁵⁶ Available at: < <https://repositorio.inpa.gov.br/handle/1/5065> >

	125 tons/ha, and 0.20 for values below 125 tons/ha. (Pg. 140, Table 2). ⁵⁷				
Frequency of monitoring/recording	At each monitoring report.				
Value applied					
	Below-ground biomass				
	<i>bb_{icl}</i> (Mg/ha)				
	ID _{icl}	Vegetation	Reference Region	Project Area	Leakage Belt
	1	Forest	70.60	70.60	70.60
Monitoring equipment	No monitoring equipment is used to determine this parameter.				
QA/QC procedures to be applied	Data shall be in accordance to VM0015 v1.1 requirements				
Purpose of data	This parameter is used to calculate baseline, project and leakage emissions in the baseline and project scenarios.				
Calculation method	To calculate the average biomass stock per hectare in the below-ground biomass, the root-to-shoot ratio of 0.24 for tropical rainforest was applied in relation to the above-ground biomass, since the value is above 125 tons/ha.				
Comments	The values will be reassessed every 6 years or when data is more than 10 years old, whichever occurs first.				

Data / Parameter	ACPA _t
Data unit	m/s
Description	Annual area within the Project Area affected by catastrophic events at year t.
Source of data	- INMET⁵⁸ - INPE⁵⁹ - NHC⁶⁰

⁵⁷ Available at: < <https://verra.org/wp-content/uploads/2023/11/VM0015-Methodology-for-Avoided-Unplanned-Deforestation-v1.1.pdf> >

⁵⁸ INMET. Instituto Nacional de Meteorologia. Available at: < <https://mapas.inmet.gov.br> >.

⁵⁹ INPE. Instituto Nacional de Pesquisas Espaciais. Available at: < <https://previsaonumerica.cptec.inpe.br/> >.

⁶⁰ NHC. National Hurricane Center and Central Pacific Hurricane Center. Available at: < <https://www.nhc.noaa.gov/aboutsshws.php> >. Last visited on July 21, 2023.

Description of measurement methods and procedures to be applied	As this is secondary data, the measurement methods are available on the institutions' websites. ⁶¹⁶²⁶⁵
Frequency of monitoring/recording	At each time a catastrophic event occurs or each monitoring report.
Value applied	The value is calculated <i>ex-post</i> at each time a catastrophic event occurs, when significant. During the present monitoring period, there were no catastrophic events.
Monitoring equipment	No monitoring equipment is used to determine this parameter.
QA/QC procedures to be applied	• INPE (National Institute for Space Research) is a Brazilian federal institute dedicated to space research and exploration, as well as being a Research Unit of the Ministry of Science, Technology and Innovations (MCTI). As an internationally renowned body, it follows strict standards and procedures, and makes its data and results publicly available in a transparent manner. • INMET (National Institute of Meteorology) is the federal agency responsible for weather and climate measurements in Brazil. INMET represents Brazil at the World Meteorological Organization (WMO) and can be considered a reliable institution for a number of reasons, such as being linked to the Ministry of Agriculture, Livestock and Supply (MAPA) and having its work recognized and regulated by the federal government, which reinforces its credibility and importance in the national meteorology system. • Finally, the National Hurricane Center is the division of the United States' NOAA/National Weather Service responsible for tracking and predicting tropical weather systems in some places. In addition to being made up of a team of experts on the subject, the NHC uses cutting-edge technologies to forecast natural phenomena and is recognized throughout the world.

⁶¹ Available at: < <http://lim.cptec.inpe.br/>>

⁶² Available at: <https://www.cemtec.ms.gov.br/wp-content/uploads/2019/02/Nota_Tecnica-Rede_estacoes_INMET.pdf>

⁶⁵ Available at: <<https://www.nhc.noaa.gov/aboutsshws.php>>

	Given the credibility and knowledge of these bodies, it can be said that a QA/QC was applied to the generation of the data used in this parameter.
Purpose of data	This parameter is used to calculate project emissions in the project scenario. Provides an <i>ex post</i> estimation of the area affected by catastrophic events within the project area.
Calculation method	Research was carried out on the websites of the local authorities mentioned above to verify that there had been no catastrophic events during the monitored period. To this end, was considered the types of damage listed on the National Hurricane Center website, where Sustained Winds must be between 209-251 km/h to be characterized as a catastrophic event. For the Lábrea weather station (this was chosen because it is the closest station to the project region and offers complete data for the monitored period), the wind speed did not exceed 7.6 m/s and the wind gust did not exceed 9.9 m/s.
Comments	Decreases in carbon stocks and increases in GHG emissions (e.g. in case of forest fires) due to natural disturbances (such as hurricanes, earthquakes, volcanic eruptions, tsunamis, flooding, drought, fires, tornados or winter storms) or man-made events, including those over which the project proponent has no control (such as acts of terrorism or war), are subject to monitoring and must be accounted under the project scenario, when significant.

Data / Parameter	ABSLLK _t
Data unit	Ha
Description	Annual area of deforestation within the leakage belt at year t.
Source of data	- Monitoring data for the year 2021 from the first Monitoring Report (Landsat image, supervised classification) - MapBiomass Land Use and Land Cover Maps (Collection 8)⁶⁹. - Sentinel 2A images acquired from Google Earth Engine platform.
Description of measurement methods and procedures to be applied	Land use and cover maps from MapBiomass were utilized to generate cumulative deforestation data for both the historical reference period and the monitored years. The cumulative deforestation maps were produced using a post-classification

⁶⁹ MapBiomass Project - Collection 8 of the Annual Land Use Land Cover Maps of Brazil. Available at: <https://brasil.mapbiomas.org/en/colecoes-mapbiomas/>. Last visit at August 21, 2024

	comparison method, which involves analyzing changes in pixel classifications between consecutive years. Quality assurance was implemented through accuracy analysis. For a comprehensive understanding of the methods and processes employed, please refer to section 4.4, titled "MapBiomass methodology for analyzing land use land cover change".										
Frequency of monitoring/recording	Annually										
Value applied	<table> <tr> <th>Instance</th><th>ABSLKt (ha)</th></tr> <tr> <td>Instance 1 (Rovema)</td><td>175.18</td></tr> <tr> <td>Instance 2 (Leite)</td><td>1,046.78</td></tr> <tr> <td>Instance 3 (Tupá)</td><td>208.54</td></tr> <tr> <td>Total</td><td>1,430.50</td></tr> </table>	Instance	ABSLKt (ha)	Instance 1 (Rovema)	175.18	Instance 2 (Leite)	1,046.78	Instance 3 (Tupá)	208.54	Total	1,430.50
Instance	ABSLKt (ha)										
Instance 1 (Rovema)	175.18										
Instance 2 (Leite)	1,046.78										
Instance 3 (Tupá)	208.54										
Total	1,430.50										
Monitoring equipment	Remote sensing and GIS analysis tools such as QGIS, ArcGIS, and Python. The monitoring process is detailed in section 4.4 (Table 24).										
QA/QC procedures to be applied	The imagery data used on MapBiomass LULC maps is subjected to pre-processing, including geometric correction (to ensure correct pixel location), radiometric correction (to adjust digital numbers and remove atmospheric effects), and cloud filtering (to remove cloud-covered areas). After processing, a confusion matrix accuracy analysis was conducted, as detailed in Section 4.4, to assess classification accuracy.										
Purpose of data	This parameter is utilized to monitor the project since it provides <i>ex post</i> values of the deforested area within the leakage belts.										
Calculation method	The deforestation calculation method is based on post-classification change detection. Pixels classified as forest at the end of the previous monitoring period (2021) and reclassified to another class in the current period (2022) are identified as deforestation in the monitored year. The annual difference constitutes the deforestation data, which is then input into the ER sheet.										
Comments	N/A										
Data / Parameter	ABSLPAt										

Data unit	Ha										
Description	Annual area of deforestation in the project area at year t										
Source of data	- Monitoring data for the year 2021 from the first Monitoring Report (Landsat image, supervised classification) - MapBiomass Land Use and Land Cover Maps (Collection 8)⁷¹. - Sentinel 2A images acquired from Google Earth Engine platform.										
Description of measurement methods and procedures to be applied	Land use and cover maps from MapBiomass were utilized to generate cumulative deforestation data for both the historical reference period and the monitored years. The cumulative maps were produced using a post-classification comparison method, which involves analyzing changes in pixel classifications between consecutive years. Quality assurance was implemented through accuracy analysis. For a comprehensive understanding of the methods and processes employed, please refer to section 4.4, titled "MapBiomass methodology for analyzing land use land cover change".										
Frequency of monitoring/recording	Annually										
Value applied	The table below shows the deforestation within each project area during the monitored period. <table> <tr> <th>Instances</th><th>ABSLPA_t (ha)</th></tr> <tr> <td>Grupo Rovema (Instance 1)</td><td>11.93</td></tr> <tr> <td>Grupo Leite (Instance 2)</td><td>51.79</td></tr> <tr> <td>Grupo Tupá (Instance 3)</td><td>4.95</td></tr> <tr> <td>Total</td><td>68.67</td></tr> </table>	Instances	ABSLPA _t (ha)	Grupo Rovema (Instance 1)	11.93	Grupo Leite (Instance 2)	51.79	Grupo Tupá (Instance 3)	4.95	Total	68.67
Instances	ABSLPA _t (ha)										
Grupo Rovema (Instance 1)	11.93										
Grupo Leite (Instance 2)	51.79										
Grupo Tupá (Instance 3)	4.95										
Total	68.67										
Monitoring equipment	Remote sensing and GIS analysis tools such as QGIS, ArcGIS, and Python. The monitoring process is detailed in section 4.4 (Table 24).										
QA/QC procedures to be applied	The imagery data used on MapBiomass LULC maps is subjected to pre-processing, including geometric correction (to ensure correct										

⁷¹ MapBiomass Project - Collection 8 of the Annual Land Use Land Cover Maps of Brazil. Available at: <<https://brasil.mapbiomas.org/en/colecoes-mapbiomas/>>. Last visit at August 21, 2024

	pixel location), radiometric correction (to adjust digital numbers and remove atmospheric effects), and cloud filtering (to remove cloud-covered areas). After processing, a confusion matrix accuracy analysis was conducted, as detailed in Section 4.4, to assess classification accuracy.
Purpose of data	This parameter is utilized to monitor the project since it provides <i>ex post</i> values of the deforested area within the project area.
Calculation method	The deforestation calculation method is based on post-classification change detection. Pixels classified as forest at the end of the previous monitoring period (2021) and reclassified to another class in the current period (2022) are identified as deforestation in the monitored year. The annual difference constitutes the deforestation data, which is then input into the ER sheet.
Comments	N/A

Data / Parameter	ABSLRR _t
Data unit	Ha
Description	Annual area of deforestation in the reference region at year t
Source of data	- Monitoring data for the year 2021 from the first Monitoring Report (Landsat image, supervised classification) - MapBiomass Land Use and Land Cover Maps (Collection 8)⁷².
Description of measurement methods and procedures to be applied	Land use and cover maps from MapBiomass were utilized to generate cumulative deforestation data for both the historical reference period and the monitored years. The cumulative deforestation maps were produced using a post-classification comparison method, which involves analyzing changes in pixel classifications between consecutive years. For a comprehensive understanding of the methods and processes employed, please refer to section 4.4, titled "MapBiomass methodology for analyzing land use land cover change".
Frequency of monitoring/recording	Annually

⁷² MapBiomass Project - Collection 8 of the Annual Land Use Land Cover Maps of Brazil. Available at: <<https://brasil.mapbiomas.org/en/colecoes-mapbiomas/>>. Last visit at August 21, 2024

Value applied	The table below shows the deforestation within the reference region during the monitored period. <table> <tr> <th>Rio Madeira Grouped REDD+ Project</th><th>ABSLRR_t (ha)</th></tr> <tr> <td>Deforestation</td><td>25,130.88</td></tr> </table>	Rio Madeira Grouped REDD+ Project	ABSLRR _t (ha)	Deforestation	25,130.88
Rio Madeira Grouped REDD+ Project	ABSLRR _t (ha)				
Deforestation	25,130.88				
Monitoring equipment	Remote sensing and GIS analysis tools such as QGIS, ArcGIS, and Python. The monitoring process is detailed in section 4.4 (Table 18).				
QA/QC procedures to be applied	The imagery data used on MapBiomass LULC maps is subjected to pre-processing, including geometric correction (to ensure correct pixel location), radiometric correction (to adjust digital numbers and remove atmospheric effects), and cloud filtering (to remove cloud-covered areas). After processing, a confusion matrix accuracy analysis was conducted, as detailed in Section 4.4, to assess classification accuracy.				
Purpose of data	This parameter is utilized to monitor the project since it provides ex post values of the deforested area within the reference region.				
Calculation method	The deforestation calculation method is based on post-classification change detection. Land use/land cover (LULC) maps are generated for both the previous (2021) and current (2022) monitoring periods. Pixels classified as forest at the end of the previous period and reclassified to another class in the current period are identified as deforestation in the monitored year. The annual difference in LULC map pixel classes constitutes the deforestation data, which is then input into the ER sheet.				
Comments	N/A				

Data / Parameter	APDPA _{ict}
Data unit	Ha
Description	Areas of planned deforestation in forest class <i>icl</i> at year <i>t</i> in the project area
Source of data	- Annual operational plan; - Annual post-harvesting report;

Description of measurement methods and procedures applied	The planned deforestation activities in the project area that result in carbon stock decrease will be subject to monitoring. The forest management team records such information according to procedures established in its sustainable forest management plan.								
Frequency of monitoring/recording	Annually								
Value applied:	The table below shows the annual planned deforestation expected to occur within the project area for each instance during the monitoring period. <table> <tr> <th>Instances</th><th>APDPA_{icl,t} (ha)</th></tr> <tr> <td>Grupo Rovema (Instance 1)</td><td>6.75</td></tr> <tr> <td>Grupo Leite (Instance 2)</td><td>0</td></tr> <tr> <td>Grupo Tupa (Instance 3)</td><td>9.14</td></tr> </table>	Instances	APDPA _{icl,t} (ha)	Grupo Rovema (Instance 1)	6.75	Grupo Leite (Instance 2)	0	Grupo Tupa (Instance 3)	9.14
Instances	APDPA _{icl,t} (ha)								
Grupo Rovema (Instance 1)	6.75								
Grupo Leite (Instance 2)	0								
Grupo Tupa (Instance 3)	9.14								
Monitoring equipment	No monitoring equipment is used to monitor this parameter, since the source is the Annual Operational Plan or Annual Post-Harvesting report.								
QA/QC procedures applied	The pre and post-exploration reports can be considered a reliable source of data, as they comply with the legislation required to implement a Sustainable Forest Management Plan. In addition, these reports are prepared by responsible technicians, as .								
Purpose of data	This parameter is used to calculate project emissions in the project scenario. Provides the <i>ex post</i> value of the decrease in carbon stocks due to planned deforestation in the project area.								
Calculation method	Emissions from deforestation are quantified by multiplying the detected area of forest loss by the average forest carbon stock per unit area. For an <i>ex ante</i> estimation, it was considered that 1.50% of each annual production unit will be deforested for the implementation of SFMP infrastructure.								
Comments	Planned deforestation mainly includes implementation of the forest management infrastructure, such as opening of main and secondary roads, skidding trails, and timber yards in each annual production unit within the project area. Although there was SFMP during the monitored period at instance 1, the overall planned deforestation (roads and decks) occurred in								

the previous monitored period. Please see the provided MR sheet for more information.

Data / Parameter	APLPA _{icl,t}										
Data unit	Ha										
Description	Areas of logging activities at year t in the project area										
Source of data	- Annual operational plan; - Annual post-harvesting report; - Logging permit										
Description of measurement methods and procedures applied	The logging activities in the project area that resulted in carbon stock increase ⁷³ or decrease shall be subjected to monitoring, when significant.										
Frequency of monitoring/recording	Annually										
Value applied:	The table below shows the logging areas within the project area during the monitoring period. <table> <tr> <th>Instances</th><th>APLPA_{icl,t} (ha)</th></tr> <tr> <td>Grupo Rovema (Instance 1)</td><td>3,476.13</td></tr> <tr> <td>Grupo Leite (Instance 2)</td><td>0</td></tr> <tr> <td>Grupo Tupá (Instance 3)</td><td>484.22</td></tr> <tr> <td>Total</td><td>3,960.35</td></tr> </table>	Instances	APLPA _{icl,t} (ha)	Grupo Rovema (Instance 1)	3,476.13	Grupo Leite (Instance 2)	0	Grupo Tupá (Instance 3)	484.22	Total	3,960.35
Instances	APLPA _{icl,t} (ha)										
Grupo Rovema (Instance 1)	3,476.13										
Grupo Leite (Instance 2)	0										
Grupo Tupá (Instance 3)	484.22										
Total	3,960.35										
Monitoring equipment	Forest Management files, based on the Sustainable Forest Management Plan, AUTEX (logging permit), DOFs (Forest Origin Document)										
QA/QC procedures applied	In addition to the procedures established in the Forest Management Plans in force, such as measuring and choosing the trees to be logged based on a forest inventory and criteria that comply with the law, the plans have the appropriate license to carry them out. The AUTEX is a document issued by the responsible environmental agency, in which the applicant must										

⁷³ Note that the increase was ignored. For more information, see section 3.2.2 of this current MR

	meet various criteria and procedures until the document is in force.
Purpose of data	This parameter is used to calculate project emissions in the project scenario. Provides the <i>ex post</i> value of the increase or decrease in carbon stocks due to planned logging activities in the project area.
Calculation method	Carbon stock decrease from planned logging activities at each forest class are quantified by multiplying the detected area subject to logging by the harvested timber volume intensity, and then by the mean wood density ⁷⁴ .
Comments	The SFMP net area is obtained from the logging permit (AUTEX). Moreover, if the same logging area has been partially exploited in previous years, it was utilized linear proportion rule to define the logged area during the monitored period. Please see MR spreadsheet to check details.

Data / Parameter	AUDPA _{icl,t}
Data unit	Ha
Description	Areas of unplanned deforestation in forest class icl at year t in the project area
Source of data	- MapBiomass Land Use and Land Cover Maps (Collection 8)⁷⁶. - Sentinel 2A images acquired from Google Earth Engine platform.
Description of measurement methods and procedures applied	Land use and cover maps from MapBiomass were utilized to generate cumulative deforestation data for both the historical reference period and the monitored years. The cumulative deforestation maps were produced using a post-classification comparison method, which involves analyzing changes in pixel classifications between consecutive years. Quality assurance was implemented through accuracy analysis. For a comprehensive understanding of the methods and processes employed, please

⁷⁴ The reduction in stock per hectare is evidenced in the post-management report and DOF's (mandatory license for the transport and storage of forest products of native origin).

⁷⁶ MapBiomass Project - Collection 8 of the Annual Land Use Land Cover Maps of Brazil. Available at: <<https://brasil.mapbiomas.org/en/colecoes-mapbiomas/>>. Last visit at August 21, 2024

	refer to section 4.4, titled "MapBiomass methodology for analyzing land use land cover change".										
Frequency of monitoring/recording	Annually										
Value applied:	The table below shows the unplanned deforestation occurred within the project area during the monitoring period. <table> <tr> <th>Instances</th><th>AUDPA_{del,t} (ha)</th></tr> <tr> <td>Grupo Rovema (Instance 1)</td><td>11.93</td></tr> <tr> <td>Grupo Leite (instance 2)</td><td>51.79</td></tr> <tr> <td>Grupo Tupá (Instance 3)</td><td>4.95</td></tr> <tr> <td>Total</td><td>68.67</td></tr> </table>	Instances	AUDPA _{del,t} (ha)	Grupo Rovema (Instance 1)	11.93	Grupo Leite (instance 2)	51.79	Grupo Tupá (Instance 3)	4.95	Total	68.67
Instances	AUDPA _{del,t} (ha)										
Grupo Rovema (Instance 1)	11.93										
Grupo Leite (instance 2)	51.79										
Grupo Tupá (Instance 3)	4.95										
Total	68.67										
Monitoring equipment	Remote sensing and GIS analysis tools such as QGIS, ArcGIS, and Python. The monitoring process is detailed in section 4.4 (Table 24).										
QA/QC procedures applied	The imagery data used on MapBiomass LULC maps is subjected to pre-processing, including geometric correction (to ensure correct pixel location), radiometric correction (to adjust digital numbers and remove atmospheric effects), and cloud filtering (to remove cloud-covered areas). After processing, a confusion matrix accuracy analysis was conducted, as detailed in Section 4.4, to assess classification accuracy.										
Purpose of data	This parameter will be used to calculate project emissions in the project scenario. Provides the ex post value of the decrease in carbon stocks due to unplanned deforestation in the project area.										
Calculation method	The deforestation calculation method is based on post-classification change detection. Pixels classified as forest at the end of the previous monitoring period (2021) and reclassified to another class in the current period (2022) are identified as deforestation in the monitored year. The annual difference constitutes the deforestation data, which is then input into the ER sheet.										
Comments	N/A										
Data / Parameter	$\Delta CADLK_t$										

Data unit	tCO ₂ e				
Description	Total decrease in carbon stocks due to displaced deforestation at year t.				
Source of data	ABSLLK _t parameter results				
Description of measurement methods and procedures to be applied	Besides monitoring the parameter ABSLLK_t, it was also considered the comparison between the total ex-ante and ex-post net actual carbon stock change (parameter ΔCBSLLK_t), as detailed in ER sheet, tab 21d_ex post. In summary, if ex-ante carbon stock change is greater than ex-post carbon stock change, then ΔCBSLLK_t is zero. Otherwise, the difference between ex-post and ex-ante is considered the total ex-post leakage. ΔCADLK_t also considers the carbon stock per hectare (parameters ab_{icl} and ab_{icl}). All the above-mentioned parameters and its dependencies can be observed at ER sheet.				
Frequency of monitoring/recording	Annually				
Value applied	<table> <tr> <th>Project year t</th><th>ΔCADLK_t (tCO₂e)</th></tr> <tr> <td>2022</td><td>270,963.60</td></tr> </table>	Project year t	ΔCADLK _t (tCO ₂ e)	2022	270,963.60
Project year t	ΔCADLK _t (tCO ₂ e)				
2022	270,963.60				
Monitoring equipment	Since ΔCADLK _t data is related to deforestation data within leakage belt and carbon stock per hectare, please see related parameters Tables.				
QA/QC procedures to be applied	Since ΔCADLK _t data is related to deforestation data within leakage belt and carbon stock per hectare, please see related parameters Tables.				
Purpose of data	This parameter is used to calculate leakage emissions in the project scenario. Provides the ex post value of the decrease in carbon stocks due to displaced deforestation in the leakage belt.				
Calculation method	Ex-post deforestation within leakage belt was calculates using GIS method (please see ABSLLK _t parameter table) and then subtracted from ex-ante deforestation at the same limit and period. Since ex-post data was greater, the difference between baseline and actual deforestation at baseline was multiplied by carbon stock per hectare parameters.				
Comments	N/A				

Data / Parameter	ΔCPAdPA_t						
Data unit	tCO2e						
Description	Total decrease in carbon stock due to all planned activities at year t in the project area						
Source of data	- SFMP plans - Post-harvesting SFPM report and DOFs (Forestry Origin Documents)						
Description of measurement methods and procedures to be applied	The planned activities in the project area that result in carbon stock decrease was monitored by SFMP records, which are available at ER sheet (Tables 25a and 25b).						
Frequency of monitoring/recording	Annually						
Value applied		<table> <tr> <th>Project year t</th> <th>ΔCPAdPA_t (tCO2e)</th> </tr> <tr> <td>2022</td> <td>123,408</td> </tr> </table>	Project year t	ΔCPAdPA_t (tCO2e)	2022	123,408	
Project year t	ΔCPAdPA_t (tCO2e)						
2022	123,408						
Monitoring equipment							
QA/QC procedures to be applied	Internal procedures required by the SFMP process: SFMP plans, post-exploitation records and DOFs. Such records comply legal requirements for SFM activities.						
Purpose of data	This parameter provides the ex-post value of the decrease in carbon stocks due to planned logging activities in the project area.						
Calculation method	This parameter is obtained by summing emissions from logging structure (roads and decks), and logging exploitation, as available at ER sheet, Table 25d.						
Comments	N/A						

Data / Parameter	ΔCPSLK_t
Data unit	tCO ₂ e
Description	Total annual carbon stock change in leakage management areas in the project case at year t.

Source of data	MapBiomass Land Use and Land Cover Maps (Collection 8) ⁷⁷ .		
Description of measurement methods and procedures to be applied	Land use and cover maps from MapBiomass were utilized the monitoring period. The cumulative deforestation maps were produced using a post-classification comparison method, which involves analyzing changes in pixel classifications between consecutive years. For a comprehensive understanding of the methods and processes employed, please refer to section 4.4, titled "MapBiomass methodology for analyzing land use land cover change".		
Frequency of monitoring/recording	Annually		
Value applied		Project year t	ΔCPSLK_t (tCO ₂ e)
		2022	4.99
Monitoring equipment	Remote sensing and GIS analysis tools such as QGIS, ArcGIS, and Python. The monitoring process is detailed in section 4.4 (Table 18).		
QA/QC procedures to be applied	The imagery data used on MapBiomass LULC maps is subjected to pre-processing, including geometric correction (to ensure correct pixel location), radiometric correction (to adjust digital numbers and remove atmospheric effects), and cloud filtering (to remove cloud-covered areas).		
Purpose of data	This parameter will be used to calculate leakage emissions in the project scenario. Provides the <i>ex post</i> value of the change in carbon stocks due to leakage prevention measures in the leakage management area.		
Calculation method	The deforestation calculation method is based on post-classification change detection. Land use/land cover (LULC) maps are generated for both the previous (2021) and current (2022) monitoring periods. Pixels classified as forest at the end of the previous period and reclassified to another class in the current period are identified as deforestation in the monitored year. The annual difference in LULC map pixel classes constitutes the deforestation data, which is then input into the ER sheet.		
Comments	The leakage prevention measures proposed by the present project do not include decrease in carbon stocks due to activities implemented in the leakage management area.		

⁷⁷ MapBiomass Project - Collection 8 of the Annual Land Use Land Cover Maps of Brazil. Available at: <https://brasil.mapbiomas.org/en/colecoes-mapbiomas/>. Last visit at August 21, 2024

Data / Parameter	ΔCUDdPA_t		
Data unit	tCO ₂ e		
Description	Total actual carbon stock change due to unavoided unplanned deforestation at year t in the project area		
Source of data	MapBiomass Land Use and Land Cover Maps (Collection 8) ⁷⁸ .		
Description of measurement methods and procedures to be applied	Land use and cover maps from MapBiomass were utilized to generate cumulative deforestation data for both the historical reference period and the monitored years. The cumulative deforestation maps were produced using a post-classification comparison method, which involves analyzing changes in pixel classifications between consecutive years. For a comprehensive understanding of the methods and processes employed, please refer to section 4.4, titled "MapBiomass methodology for analyzing land use land cover change".		
Frequency of monitoring/recording	Annually		
Value applied		Project year t	ΔCUDdPA_t (tCO ₂ e)
		2022	44,085.21
Monitoring equipment	Remote sensing and GIS analysis tools such as QGIS, ArcGIS, and Python. The monitoring process is detailed in section 4.4 (Table 18).		
QA/QC procedures to be applied	The imagery data used on MapBiomass LULC maps is subjected to pre-processing, including geometric correction (to ensure correct pixel location), radiometric correction (to adjust digital numbers and remove atmospheric effects), and cloud filtering (to remove cloud-covered areas). After processing, a confusion matrix accuracy analysis was conducted, as detailed in Section 4.4, to assess classification accuracy.		
Purpose of data	This parameter is utilized to monitor the project since it provides <i>ex post</i> values of the deforested area within the project area.		

⁷⁸ MapBiomass Project - Collection 8 of the Annual Land Use Land Cover Maps of Brazil. Available at: <<https://brasil.mapbiomas.org/en/colecoes-mapbiomas/>>. Last visit at August 21, 2024

Calculation method	The deforestation calculation method is based on post-classification change detection. Land use/land cover (LULC) maps are generated for both the previous (2021) and current (2022) monitoring periods. Pixels classified as forest at the end of the previous period and reclassified to another class in the current period are identified as deforestation in the monitored year. The annual difference in LULC map pixel classes constitutes the deforestation data, which is then input into the ER sheet.
Comments	N/A

Data / Parameter	EADLK _t			
Data unit	tCO ₂ e			
Description	Total ex <i>post</i> increase in GHG emissions due to displaced forest fires at year t.			
Source of data	MapBiomass Land Use and Land Cover Maps (Collection 8) ⁷⁹ . EBB _{tot} and relative parameter at ER sheet Table 23.			
Description of measurement methods and procedures to be applied	It was compared between the total ex-ante and ex-post net actual carbon stock change (parameter ΔCBSLLK _t), as detailed in ER sheet, tab 21d_ex post. In summary, if ex-ante carbon stock change is greater than ex-post carbon stock change, then ΔCBSLLK _t is zero. Otherwise, the difference between ex-post and ex-ante is considered the total ex-post leakage. The GWP and non-CO2 gases parameters that compose EBB _{tot} and impact on the EADLK _t parameter are available at ER sheet, Table 23			
Frequency of monitoring/recording	Annually			
Value applied		Project year t	EADLK _t (tCO ₂ e)	
		2022	6,059.00	
Monitoring equipment	Since parameter depends on ABSLLK _t , it can be considered same equipment, such as remote sensing and GIS analysis tools such as QGIS, ArcGIS, and Python. The monitoring process is detailed in section 4.4 (Table 24).			

⁷⁹ MapBiomass Project - Collection 8 of the Annual Land Use Land Cover Maps of Brazil. Available at: <<https://brasil.mapbiomas.org/en/colecoes-mapbiomas/>>. Last visit at August 21, 2024

QA/QC procedures to be applied	In order to obtain ABSLLK _t , the imagery data used on MapBiomass LULC maps is subjected to pre-processing, including geometric correction (to ensure correct pixel location), radiometric correction (to adjust digital numbers and remove atmospheric effects), and cloud filtering (to remove cloud-covered areas). After processing, a confusion matrix accuracy analysis was conducted, as detailed in Section 4.4, to assess classification accuracy.
Purpose of data	This parameter will be used to calculate leakage emissions in the project scenario. Provides the ex post value of the increase in GHG emissions due to displaced forest fires in the leakage belt.
Calculation method	Estimated by multiplying ABSLLK _t by EBB _{tot} .
Comments	N/A

Data / Parameter	EBBPSPA _t			
Data unit	tCO ₂ e			
Description	Total ex-post non-CO ₂ emissions from forest fire at year t in the project area			
Source of data	MapBiomass Land Use and Land Cover Maps (Collection 8) ⁸⁰ . EBB _{tot} and relative parameter at ER sheet Table 23.			
Description of measurement methods and procedures to be applied	It was considered the ex-post carbon stock change (parameter ABSLPA _t). The GWP and non-CO ₂ gases parameters that compose EBB _{tot} and impact on the EBBPSPA _t parameter are available at ER sheet, Table 23			
Frequency of monitoring/recording	Annually			
Value applied		Project year t	EBBPSPA _t (tCO ₂ e)	
		2022	811.96	
Monitoring equipment	Since parameter depends on ABSLPA _t , it can be considered same equipment, such as remote sensing and GIS analysis tools such			

⁸⁰ MapBiomass Project - Collection 8 of the Annual Land Use Land Cover Maps of Brazil. Available at: <<https://brasil.mapbiomas.org/en/colecoes-mapbiomas/>>. Last visit at August 21, 2024

	as QGIS, ArcGIS, and Python. The monitoring process is detailed in section 4.4 (Table 24).
QA/QC procedures to be applied	In order to obtain $ABSLPA_t$, the imagery data used on MapBiomass LULC maps is subjected to pre-processing, including geometric correction (to ensure correct pixel location), radiometric correction (to adjust digital numbers and remove atmospheric effects), and cloud filtering (to remove cloud-covered areas). After processing, a confusion matrix accuracy analysis was conducted, as detailed in Section 4.4, to assess classification accuracy.
Purpose of data	This parameter is used to calculate non-CO ₂ emissions due to forest fires within the project area in the project scenario, providing an estimate of the ex post value.
Calculation method	Estimated by multiplying $ABSLPA_t$ by EBB_{tot} .
Comments	N/A

Data / Parameter	$EBB_{tot,icl,t}$		
Data unit	tCO ₂ e/ha		
Description	Total GHG emission from biomass burning in forest class icl at year t		
Source of data	Calculated according to methodology VM0015 v1.1 and related parameters available at ER sheet Table 23.		
Description of measurement methods and procedures to be applied	This parameter was calculated according to requirements and default values established by the VM0015 v1.1 methodology. In order to estimate non-CO ₂ emissions from forest fires, the average percentage of the area which contemplates the three municipalities within the RR that was cleared by burning for other land uses involving deforestation, such as cattle raising and farming (F_{burnt}), and the average of biomass that has commercial value, and could be removed prior to clear cutting and burning ($P_{burnt,p}$) were estimated, either for the baseline and project case. These average percentage values are assumed to remain the same in the future, according to the applied methodology		
Frequency of monitoring/recording	Annually		
Value applied	<table> <tr> <td>Initial Forest Class</td><td>$EBB_{tot,icl}$ tCO₂e/ha</td></tr> </table>	Initial Forest Class	$EBB_{tot,icl}$ tCO ₂ e/ha
Initial Forest Class	$EBB_{tot,icl}$ tCO ₂ e/ha		

	IDcl	Name	
	1	Forest	11.82
Monitoring equipment	Data was obtained from different literatures, available at ER sheet Table 23.		
QA/QC procedures to be applied	Literature is considered reliable (IPCC default values, VCS Standard, Fburnt and Pburnt from governmental sources)		
Purpose of data	This parameter is used to calculate the project non-CO ₂ emissions from biomass burning occurred in the project scenario.		
Calculation method	This parameter was calculated according to requirements and default values established by the VM0015 v1.1 methodology. For further information, please see ER sheet Table 23.		
Comments	N/A		

Data / Parameter	EgLK _t		
Data unit	tCO ₂ e		
Description	Emissions from grazing animals in leakage management areas at year t.		
Source of data	Activities report related to leakage prevention measures		
Description of measurement methods and procedures to be applied	GHG emissions from grazing animals in the leakage management area (i.e. enteric fermentation or manure management) is to be subjected to monitoring, when significant.		
Frequency of monitoring/recording	Annually		
Value applied		Project year t	EgLK _t (tCO ₂ e)
		2022	0.00
Monitoring equipment	Field assessment data. Interviews with Leakage Management Areas living people.		
QA/QC procedures to be applied	Interviewed people from LMAs are aware of the project and the importance of providing reliable data.		
Purpose of data	This parameter is used to calculate GHG emissions from activities implemented in the leakage management area in the project scenario, providing an <i>ex post</i> value.		

Calculation method	Described in the methodology VM0015 v1.1, section 8.1.2: <i>Ex ante</i> estimation of CH ₄ and N ₂ O emissions from grazing animals.
Comments	The community living within the leakage management areas did not practice grazing activities during the monitored activities.

Data / Parameter	Hlicl,t															
Data unit	m³/ha															
Description	Harvesting intensity of timber in forest class icl at year t in the project area due to planned logging activities (i.e., sustainable forest management plan).															
Source of data	• Post-harvesting report; • Logging permit (AUTEX); • DOFs (Forestry Origin Documents).															
Description of measurement methods and procedures to be applied	Forest inventory and measurements of wood logs by the forest management team. Harvesting intensity followed procedures described in the Sustainable Forest Management Plan and Annual Operating Plan-AOP (POA, in Portuguese)															
Frequency of monitoring/recording	Annually															
Value applied	<table><tr><th>Instance</th><th>Volume explored during monitored period (m³)</th><th>Harvesting area (ha)</th><th>Harvesting intensity (m³/ha)</th></tr><tr><td>Grupo Rovema (Instance 1)</td><td>34,402.41</td><td>3,476.13</td><td>9.90</td></tr><tr><td>Grupo Tupá (Instance 3)</td><td>1,789.62</td><td>484.22</td><td>3.70</td></tr></table>				Instance	Volume explored during monitored period (m³)	Harvesting area (ha)	Harvesting intensity (m³/ha)	Grupo Rovema (Instance 1)	34,402.41	3,476.13	9.90	Grupo Tupá (Instance 3)	1,789.62	484.22	3.70
Instance	Volume explored during monitored period (m³)	Harvesting area (ha)	Harvesting intensity (m³/ha)													
Grupo Rovema (Instance 1)	34,402.41	3,476.13	9.90													
Grupo Tupá (Instance 3)	1,789.62	484.22	3.70													
Monitoring equipment	Post-deforestation reports, logging permit (AUTEX), DOFs (Forest Origin Documents).															
QA/QC procedures to be applied	• Control procedures applied to forest inventory. • SFMP reports. • Logging permit (AUTEX) issued by Environmental Agency⁸¹.															

⁸¹ The responsible environmental agency in this case is the SEDAM (for instance 1, located in the State of Rondônia) or IPAAM (for instance 3, in the State of Amazonas)

Purpose of data	This parameter is used to calculate project emissions in the project scenario. Provides the ex post value of the harvested intensity due to planned logging activities in the project area.
Calculation method	This parameter was calculated by dividing the total volume exploited (in m ³) by the net logging area (in hectares). Please see MR spreadsheet to (Table 25b) to see detailed calculation.
Comments	N/A

Data / Parameter	RF _t
Data unit	%
Description	Risk factor used to calculate VCS buffer credits
Source of data	• Joint VCSPD spreadsheet; • SFMP plans; • Instances cashflow; • Contract between Project Proponent and landowners; • Legal documents; • GIS analysis; • Literature data.
Description of measurement methods and procedures to be applied	The procedures for calculating the RF _t follow the guidelines of the Non-Permanence Risk Tool, version 4.2. ⁸²
Frequency of monitoring/recording	Each monitoring report
Value applied	12
Monitoring equipment	No monitoring equipment is used to monitor this parameter directly.
QA/QC procedures to be applied	The documents considered for the analysis of this parameter are, for the most part, certified by recognized bodies or, when another source is used (such as GIS or literature), submitted to the institution's accuracy analysis.

⁸² Available at: < <https://verra.org/documents/afolu-non-permanence-risk-tool-v4-2/> >

Purpose of data	This parameter represents the non-permanence risk rating of the project, which was used to determine the number of buffer credits that shall be deposited into the AFOLU pooled buffer account.
Calculation method	This parameter was calculated using the last available version of the AFOLU Non-Permanence Risk Tool. All the risk factors described in the VCS Non-Permanence Risk Report is assessed.
Comments	N/A

4.3 Data Monitored and SOCIALCARBON

Indicator	Women inclusion
Data unit	Not applicable
Description	Evaluates initiatives implemented by the company to promote women inclusion in the community activities.
Source of data	Questionnaires were completed by Grupo Rovema, Grupo Leite, and Grupo Tupá teams, which was prepared by the FUTURE Carbon Group. The questionnaires are aimed to indirectly obtain information regarding the six SOCIALCARBON Standard resources based on the applied SOCIALCARBON indicators.
Description of methods to collect information and procedures to be applied	Application and Analysis Method of SOCIALCARBON Standard Indicators: Stage 1: Future Carbon created a questionnaire to collect data on the six resources of the SOCIALCARBON Standard from the Rovema, Leite, and Tupá Groups. The questionnaire was designed to measure, record, and store relevant data, covering topics such as: women's inclusion, project engagement with external communities, existence of conflicts, public health activities, training and education activities, investments in the areas of: education, income generation, environment, sports, and infrastructure, quality control actions of the management plan, existence of a methodology for identifying and controlling local flora and fauna, evaluation of the project's impact on remaining

	flora, stakeholder consultation, etc. This questionnaire was used to monitor the indicators for the project's second monitoring period. Stage 2: The questionnaires were sent via email and WhatsApp to the relevant parties with instructions on how to complete them and compile the necessary documents for validation. Stage 3: Representatives from the Rovema, Leite, and Tupá Groups filled out the questionnaires through telephone or video interviews. The responses were recorded and stored in Future Carbon's cloud. Stage 4: The Future Carbon team (listed in section 1.3 of this document), consisting of coordinators and technical analysts, evaluated the responses and documents. The new data were verified and compared with previous monitoring results. The data were analyzed based on SOCIALCARBON indicators and compared with historical data to identify trends and variations, which were detailed in the monitoring report. Stage 5: All received documents were securely stored in Future Carbon's internal folders and shared with the VVB (Third-Party Verifier) upon request
Purpose of the data	1 (There are no initiatives related to women inclusion).
Comments	Not applicable.

Indicator	Expansion of community activities
Data unit	Not applicable
Description	Evaluates whether the community activities implemented by the company extend to all affected communities.

Source of data	Questionnaire, interviews with the Grupo Rovema, Grupo Leite, and Grupo Tupá teams by calls, reports, local visit and interviews with communities.
Description of methods to collect information and procedures to be applied	Application and Analysis Method of SOCIALCARBON Standard Indicators: Stage 1: Future Carbon created a questionnaire to collect data on the six resources of the SOCIALCARBON Standard from the Rovema, Leite, and Tupá Groups. The questionnaire was designed to measure, record, and store relevant data, covering topics such as: women's inclusion, project engagement with external communities, existence of conflicts, public health activities, training and education activities, investments in the areas of: education, income generation, environment, sports, and infrastructure, quality control actions of the management plan, existence of a methodology for identifying and controlling local flora and fauna, evaluation of the project's impact on remaining flora, stakeholder consultation, etc. This questionnaire was used to monitor the indicators for the project's second monitoring period. Stage 2: The questionnaires were sent via email and WhatsApp to the relevant parties with instructions on how to complete them and compile the necessary documents for validation. Stage 3: Representatives from the Rovema, Leite, and Tupá Groups filled out the questionnaires through telephone or video interviews. The responses were recorded and stored in Future Carbon's cloud. Stage 4: The Future Carbon team (listed in section 1.3 of this document), consisting of coordinators and technical analysts, evaluated the responses and documents. The new data were verified and compared with previous monitoring results. The data were analyzed based on SOCIALCARBON indicators and compared with historical data to identify trends and variations, which were detailed in the monitoring report.

	Stage 5: All received documents were securely stored in Future Carbon's internal folders and shared with the VVB (Third-Party Verifier) upon request
Purpose of the data	2 (There are social activities that reach at least one community).
Comments	The document that proves the partnership between the Tupá group and the nut collectors in neighboring towns is signed.

Indicator	Associations and Cooperatives
Data unit	Not applicable
Description	Evaluates whether communities residing in/around the project area are involved in associations or cooperatives. Association: Group of two or more people who organize themselves to defend their common interests, without financial ends and existing as a legal entity. Cooperative: Organization consisting of at least twenty private individuals acting cooperatively and mutually assisting each other, with democratic, participatory management, with common economic and social goals, of which the legal and doctrinal aspects are independent of those of other organizations and societies.
Source of data	Questionnaire, interviews with the Grupo Rovema, Grupo Leite, and Grupo Tupá teams by calls, reports, local visit and interviews with communities.
Description of methods to collect information and procedures to be applied	Application and Analysis Method of SOCIALCARBON Standard Indicators: Stage 1: Future Carbon created a questionnaire to collect data on the six resources of the SOCIALCARBON Standard from the Rovema, Leite, and Tupá Groups. The questionnaire was designed to measure, record, and store relevant data, covering topics such as: women's inclusion, project engagement with external communities, existence of conflicts, public health activities, training and education activities, investments

	in the areas of: education, income generation, environment, sports, and infrastructure, quality control actions of the management plan, existence of a methodology for identifying and controlling local flora and fauna, evaluation of the project's impact on remaining flora, stakeholder consultation, etc. This questionnaire was used to monitor the indicators for the project's second monitoring period. Stage 2: The questionnaires were sent via email and WhatsApp to the relevant parties with instructions on how to complete them and compile the necessary documents for validation. Stage 3: Representatives from the Rovema, Leite, and Tupá Groups filled out the questionnaires through telephone or video interviews. The responses were recorded and stored in Future Carbon's cloud. Stage 4: The Future Carbon team (listed in section 1.3 of this document), consisting of coordinators and technical analysts, evaluated the responses and documents. The new data were verified and compared with previous monitoring results. The data were analyzed based on SOCIALCARBON indicators and compared with historical data to identify trends and variations, which were detailed in the monitoring report. Stage 5: All received documents were securely stored in Future Carbon's internal folders and shared with the VVB (Third-Party Verifier) upon request
Purpose of the data	4 (Instance 3 (Grupo Tupá) allowed in the first monitoring period the entry of Brazil nut gatherers to harvest the product from November to April without any formal partnership document. In this monitoring period (2022) there was the formalization of sustainable extraction and entry of the collectors to the farm, ensuring safety for the collectors and for the forest). However, there are no associations or cooperatives, considering the Brazil nut gatherers work autonomously.
Comments	Not applicable

Indicator	Conflict management
Data unit	Not applicable
Description	Evaluates the company's procedures to identify and deal with conflicts in the surrounding communities, as well as the actions that are being taken so that they do not recur.
Source of data	Questionnaire, interviews with the Grupo Rovema, Grupo Leite, and Grupo Tupá teams by calls, reports, local visit and interviews with communities.
Description of methods to collect information and procedures to be applied	Application and Analysis Method of SOCIALCARBON Standard Indicators: Stage 1: Future Carbon created a questionnaire to collect data on the six resources of the SOCIALCARBON Standard from the Rovema, Leite, and Tupá Groups. The questionnaire was designed to measure, record, and store relevant data, covering topics such as: women's inclusion, project engagement with external communities, existence of conflicts, public health activities, training and education activities, investments in the areas of: education, income generation, environment, sports, and infrastructure, quality control actions of the management plan, existence of a methodology for identifying and controlling local flora and fauna, evaluation of the project's impact on remaining flora, stakeholder consultation, etc. This questionnaire was used to monitor the indicators for the project's second monitoring period. Stage 2: The questionnaires were sent via email and WhatsApp to the relevant parties with instructions on how to complete them and compile the necessary documents for validation. Stage 3: Representatives from the Rovema, Leite, and Tupá Groups filled out the questionnaires through telephone or video interviews. The responses were recorded and stored in Future Carbon's cloud.

	Stage 4: The Future Carbon team (listed in section 1.3 of this document), consisting of coordinators and technical analysts, evaluated the responses and documents. The new data were verified and compared with previous monitoring results. The data were analyzed based on SOCIALCARBON indicators and compared with historical data to identify trends and variations, which were detailed in the monitoring report. Stage 5: All received documents were securely stored in Future Carbon's internal folders and shared with the VVB (Third-Party Verifier) upon request
Purpose of the data	4 (In addition to the previous scenario, all conflicts identified are treated and monitored. Surveillance efforts are carried out to ensure that incident will not be repeated. It is worth clarifying no conflicts were identified during the monitored period).
Comments	Not applicable.

Indicator	Public health
Data unit	Not applicable
Description	Evaluates the company's actions to mitigate the impacts of its activities related to the public health of surrounding communities.
Source of data	Questionnaire, interviews with the Grupo Rovema, Grupo Leite, and Grupo Tupá teams by calls, reports, local visit and interviews with communities.
Description of methods to collect information and procedures to be applied	Application and Analysis Method of SOCIALCARBON Standard Indicators: Stage 1: Future Carbon created a questionnaire to collect data on the six resources of the SOCIALCARBON Standard from the Rovema, Leite, and Tupá Groups. The questionnaire was designed to measure, record, and store relevant data, covering topics such as: women's

	inclusion, project engagement with external communities, existence of conflicts, public health activities, training and education activities, investments in the areas of: education, income generation, environment, sports, and infrastructure, quality control actions of the management plan, existence of a methodology for identifying and controlling local flora and fauna, evaluation of the project's impact on remaining flora, stakeholder consultation, etc. This questionnaire was used to monitor the indicators for the project's second monitoring period. Stage 2: The questionnaires were sent via email and WhatsApp to the relevant parties with instructions on how to complete them and compile the necessary documents for validation. Stage 3: Representatives from the Rovema, Leite, and Tupá Groups filled out the questionnaires through telephone or video interviews. The responses were recorded and stored in Future Carbon's cloud. Stage 4: The Future Carbon team (listed in section 1.3 of this document), consisting of coordinators and technical analysts, evaluated the responses and documents. The new data were verified and compared with previous monitoring results. The data were analyzed based on SOCIALCARBON indicators and compared with historical data to identify trends and variations, which were detailed in the monitoring report. Stage 5: All received documents were securely stored in Future Carbon's internal folders and shared with the VVB (Third-Party Verifier) upon request
Purpose of the data	1 (There are no initiatives related to public health).
Comments	The three instances are intended to identify and map possible actions to integrated.
Indicator	Community education and training

Data unit	Not applicable
Description	Evaluates the relevant education and training programs implemented as a project activity, including additional programs to the stakeholders and broader community.
Source of data	Questionnaire, interviews with the Grupo Rovema, Grupo Leite, and Grupo Tupá teams by calls, reports, local visit and interviews with communities.
Description of methods to collect information and procedures to be applied	Application and Analysis Method of SOCIALCARBON Standard Indicators: Stage 1: Future Carbon created a questionnaire to collect data on the six resources of the SOCIALCARBON Standard from the Rovema, Leite, and Tupá Groups. The questionnaire was designed to measure, record, and store relevant data, covering topics such as: women's inclusion, project engagement with external communities, existence of conflicts, public health activities, training and education activities, investments in the areas of: education, income generation, environment, sports, and infrastructure, quality control actions of the management plan, existence of a methodology for identifying and controlling local flora and fauna, evaluation of the project's impact on remaining flora, stakeholder consultation, etc. This questionnaire was used to monitor the indicators for the project's second monitoring period. Stage 2: The questionnaires were sent via email and WhatsApp to the relevant parties with instructions on how to complete them and compile the necessary documents for validation. Stage 3: Representatives from the Rovema, Leite, and Tupá Groups filled out the questionnaires through telephone or video interviews. The responses were recorded and stored in Future Carbon's cloud. Stage 4: The Future Carbon team (listed in section 1.3 of this document), consisting of coordinators and technical analysts, evaluated the responses and documents. The new data were verified and compared with previous

	monitoring results. The data were analyzed based on SOCIALCARBON indicators and compared with historical data to identify trends and variations, which were detailed in the monitoring report. Stage 5: All received documents were securely stored in Future Carbon's internal folders and shared with the VVB (Third-Party Verifier) upon request
Purpose of the data	2 (There are no education and training activities).
Comments	The companies aim to carry out formal training to cooperatives around the project.

Indicator	Alternative income sources
Data unit	Not applicable .
Description	Evaluates whether the project created alternative sources of income generation for the communities living within/surrounding the project area.
Source of data	Questionnaire, interviews with the Grupo Rovema, Grupo Leite, and Grupo Tupá teams by calls, reports, local visit and interviews with communities.
Description of methods to collect information and procedures to be applied	Application and Analysis Method of SOCIALCARBON Standard Indicators: Stage 1: Future Carbon created a questionnaire to collect data on the six resources of the SOCIALCARBON Standard from the Rovema, Leite, and Tupá Groups. The questionnaire was designed to measure, record, and store relevant data, covering topics such as: women's inclusion, project engagement with external communities, existence of conflicts, public health activities, training and education activities, investments in the areas of: education, income generation, environment, sports, and infrastructure, quality control actions of the management plan, existence of a methodology for identifying and controlling local flora and

	fauna, evaluation of the project's impact on remaining flora, stakeholder consultation, etc. This questionnaire was used to monitor the indicators for the project's second monitoring period. Stage 2: The questionnaires were sent via email and WhatsApp to the relevant parties with instructions on how to complete them and compile the necessary documents for validation. Stage 3: Representatives from the Rovema, Leite, and Tupá Groups filled out the questionnaires through telephone or video interviews. The responses were recorded and stored in Future Carbon's cloud. Stage 4: The Future Carbon team (listed in section 1.3 of this document), consisting of coordinators and technical analysts, evaluated the responses and documents. The new data were verified and compared with previous monitoring results. The data were analyzed based on SOCIALCARBON indicators and compared with historical data to identify trends and variations, which were detailed in the monitoring report. Stage 5: All received documents were securely stored in Future Carbon's internal folders and shared with the VVB (Third-Party Verifier) upon request
Purpose of the data	2 (The project generates one alternative income source for the local communities). The Tupá Group has signed an agreement with the Brazil nut extractivists, which aims to formalize the agreement between the Tupá Group and the extractivists to collect the nuts. The nuts are collected without the need for any financial transfer to the owner of the area. With the nuts in hand, they have a raw material, and can market and produce various products from the nuts or simply resell them in natura to interested buyers. The agreement signed with the extractivists does not provide for the Tupá Group to control the financial return from the collection of the nuts, so we have no evidence to share. Grupo Tupá is aware that there is a financial return and income generation through informal conversations with the collectors, where they report that the extraction of nuts

	generates an alternative income during the fruit harvest period.
Comments	Not applicable .

Indicator	Carbon credit benefits
Data unit	Not applicable
Description	Evaluates whether proceeds from the sale of carbon credits was distributed to carbon project improvements or activities that benefit the local community.
Source of data	Questionnaire, interviews with the Grupo Rovema, Grupo Leite, and Grupo Tupá teams by calls, reports, local visit and interviews with communities.
Description of methods to collect information and procedures to be applied	Application and Analysis Method of SOCIALCARBON Standard Indicators: Stage 1: Future Carbon created a questionnaire to collect data on the six resources of the SOCIALCARBON Standard from the Rovema, Leite, and Tupá Groups. The questionnaire was designed to measure, record, and store relevant data, covering topics such as: women's inclusion, project engagement with external communities, existence of conflicts, public health activities, training and education activities, investments in the areas of: education, income generation, environment, sports, and infrastructure, quality control actions of the management plan, existence of a methodology for identifying and controlling local flora and fauna, evaluation of the project's impact on remaining flora, stakeholder consultation, etc. This questionnaire was used to monitor the indicators for the project's second monitoring period. Stage 2: The questionnaires were sent via email and WhatsApp to the relevant parties with instructions on

	how to complete them and compile the necessary documents for validation. Stage 3: Representatives from the Rovema, Leite, and Tupá Groups filled out the questionnaires through telephone or video interviews. The responses were recorded and stored in Future Carbon's cloud. Stage 4: The Future Carbon team (listed in section 1.3 of this document), consisting of coordinators and technical analysts, evaluated the responses and documents. The new data were verified and compared with previous monitoring results. The data were analyzed based on SOCIALCARBON indicators and compared with historical data to identify trends and variations, which were detailed in the monitoring report. Stage 5: All received documents were securely stored in Future Carbon's internal folders and shared with the VVB (Third-Party Verifier) upon request
Purpose of the data	1 (The income generated by carbon credit sales was not distributed to the carbon project or in the community, or there are no organized controls of the allocation of proceeds.)
Comments	Not applicable

Indicator	Securing of funds
Data unit	Not applicable
Description	Evaluates the project proponent's participation in requests for proposals/ programs to secure funds. Also monitors whether project participants were successful, and whether the funds raised are creating activities for communities resident in/around the project area.
Source of data	Questionnaire, interviews with the Grupo Rovema, Grupo Leite, and Grupo Tupá teams by calls, reports, local visit and interviews with communities.

Description of methods to collect information and procedures to be applied

Application and Analysis Method of SOCIALCARBON Standard Indicators:

Stage 1: Future Carbon created a questionnaire to collect data on the six resources of the SOCIALCARBON Standard from the Rovema, Leite, and Tupá Groups. The questionnaire was designed to measure, record, and store relevant data, covering topics such as: women's inclusion, project engagement with external communities, existence of conflicts, public health activities, training and education activities, investments in the areas of: education, income generation, environment, sports, and infrastructure, quality control actions of the management plan, existence of a methodology for identifying and controlling local flora and fauna, evaluation of the project's impact on remaining flora, stakeholder consultation, etc. This questionnaire was used to monitor the indicators for the project's second monitoring period.

Stage 2: The questionnaires were sent via email and WhatsApp to the relevant parties with instructions on how to complete them and compile the necessary documents for validation.

Stage 3: Representatives from the Rovema, Leite, and Tupá Groups filled out the questionnaires through telephone or video interviews. The responses were recorded and stored in Future Carbon's cloud.

Stage 4: The Future Carbon team (listed in section 1.3 of this document), consisting of coordinators and technical analysts, evaluated the responses and documents. The new data were verified and compared with previous monitoring results. The data were analyzed based on SOCIALCARBON indicators and compared with historical data to identify trends and variations, which were detailed in the monitoring report.

Stage 5: All received documents were securely stored in Future Carbon's internal folders and shared with the VVB (Third-Party Verifier) upon request

Purpose of the data	1 (The project proponent does not take any action to secure funds).
Comments	Not applicable

Indicator	Land tenure
Data unit	Not applicable
Description	Evaluates the existence of conflicts due to land tenure, as well as whether actions are being taken to manage the issue.
Source of data	Questionnaire, interviews with the Grupo Rovema, Grupo Leite, and Grupo Tupá teams by calls, reports, local visit and interviews with communities.
Description of methods to collect information and procedures to be applied	Application and Analysis Method of SOCIALCARBON Standard Indicators: Stage 1: Future Carbon created a questionnaire to collect data on the six resources of the SOCIALCARBON Standard from the Rovema, Leite, and Tupá Groups. The questionnaire was designed to measure, record, and store relevant data, covering topics such as: women's inclusion, project engagement with external communities, existence of conflicts, public health activities, training and education activities, investments in the areas of: education, income generation, environment, sports, and infrastructure, quality control actions of the management plan, existence of a methodology for identifying and controlling local flora and fauna, evaluation of the project's impact on remaining flora, stakeholder consultation, etc. This questionnaire was used to monitor the indicators for the project's second monitoring period. Stage 2: The questionnaires were sent via email and WhatsApp to the relevant parties with instructions on

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Purpose of the data	6 (All land tenure proceedings are concluded and the owners already have the terms of concession and the legal land title as well as right to use those localities. Beyond that, the company monitors the management plan area to avoid new land occupation).
Comments	Not applicable

Indicator	Social and environmental investments
Data unit	Not applicable
Description	Evaluates the socio-environmental investments in the different areas: education; alternative income generation; environment; sport and infrastructure.

Source of data	Questionnaire, interviews with the Grupo Rovema, Grupo Leite, and Grupo Tupá teams by calls, reports, local visit and interviews with communities.
Description of methods to collect information and procedures to be applied	Application and Analysis Method of SOCIALCARBON Standard Indicators: Stage 1: Future Carbon created a questionnaire to collect data on the six resources of the SOCIALCARBON Standard from the Rovema, Leite, and Tupá Groups. The questionnaire was designed to measure, record, and store relevant data, covering topics such as: women's inclusion, project engagement with external communities, existence of conflicts, public health activities, training and education activities, investments in the areas of: education, income generation, environment, sports, and infrastructure, quality control actions of the management plan, existence of a methodology for identifying and controlling local flora and fauna, evaluation of the project's impact on remaining flora, stakeholder consultation, etc. This questionnaire was used to monitor the indicators for the project's second monitoring period. Stage 2: The questionnaires were sent via email and WhatsApp to the relevant parties with instructions on how to complete them and compile the necessary documents for validation. Stage 3: Representatives from the Rovema, Leite, and Tupá Groups filled out the questionnaires through telephone or video interviews. The responses were recorded and stored in Future Carbon's cloud. Stage 4: The Future Carbon team (listed in section 1.3 of this document), consisting of coordinators and technical analysts, evaluated the responses and documents. The new data were verified and compared with previous monitoring results. The data were analyzed based on SOCIALCARBON indicators and compared with historical data to identify trends and variations, which were detailed in the monitoring report.

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Purpose of the data	2 (The company has social- environmental actions for at least one of the following topics: - education; - alternative income generation; -environment; - sport; - infrastructure).
Comments	Not applicable

Indicator	Quality control
Data unit	Not applicable
Description	Evaluates the quality control of the management plan operation.
Source of data	Questionnaire, interviews with the Grupo Rovema, Grupo Leite, and Grupo Tupá teams by calls, reports, local visit and interviews with communities.
Description of methods to collect information and procedures to be applied	Application and Analysis Method of SOCIALCARBON Standard Indicators: Stage 1: Future Carbon created a questionnaire to collect data on the six resources of the SOCIALCARBON Standard from the Rovema, Leite, and Tupá Groups. The questionnaire was designed to measure, record, and store relevant data, covering topics such as: women's inclusion, project engagement with external communities, existence of conflicts, public health activities, training and education activities, investments in the areas of: education, income generation, environment, sports, and infrastructure, quality control actions of the management plan, existence of a methodology for identifying and controlling local flora and fauna, evaluation of the project's impact on remaining flora, stakeholder consultation, etc. This

	questionnaire was used to monitor the indicators for the project's second monitoring period. Stage 2: The questionnaires were sent via email and WhatsApp to the relevant parties with instructions on how to complete them and compile the necessary documents for validation. Stage 3: Representatives from the Rovema, Leite, and Tupá Groups filled out the questionnaires through telephone or video interviews. The responses were recorded and stored in Future Carbon's cloud. Stage 4: The Future Carbon team (listed in section 1.3 of this document), consisting of coordinators and technical analysts, evaluated the responses and documents. The new data were verified and compared with previous monitoring results. The data were analyzed based on SOCIALCARBON indicators and compared with historical data to identify trends and variations, which were detailed in the monitoring report. Stage 5: All received documents were securely stored in Future Carbon's internal folders and shared with the VVB (Third-Party Verifier) upon request
Purpose of the data	1 (There are no actions to ensure quality control of the management plan operations.)
Comments	Not applicable .

Indicator	Non-timber forest products (NTFPs)
Data unit	Not applicable
Description	Evaluates the sustainable use of natural resources by communities in/around the project area for income generation. "NTFPs are biological resources or products from flora – which are not wood – obtained from forests for subsistence or for trade. They can come from native, primary or secondary forest, planted forest or agro-forestry systems. NTFPs include a wide range of products

	including medicinal plants, fibres, resins, latex varieties, oils, rubbers, fruits, nuts, seasonings, dyes, rattan, bamboo, etc.” (Brazilian Forest Service, 2013). Sustainable practices are taken to include the following: - Low-impact practices; - Exploitation/ collection practices of each NTFP that are compatible with their productivity levels and without affecting their regeneration and/or conservation of each utilized species.
Source of data	Questionnaire, interviews with the Grupo Rovema, Grupo Leite, and Grupo Tupá teams by calls, reports, local visit and interviews with communities.
Description of methods to collect information and procedures to be applied	Application and Analysis Method of SOCIALCARBON Standard Indicators: Stage 1: Future Carbon created a questionnaire to collect data on the six resources of the SOCIALCARBON Standard from the Rovema, Leite, and Tupá Groups. The questionnaire was designed to measure, record, and store relevant data, covering topics such as: women’s inclusion, project engagement with external communities, existence of conflicts, public health activities, training and education activities, investments in the areas of: education, income generation, environment, sports, and infrastructure, quality control actions of the management plan, existence of a methodology for identifying and controlling local flora and fauna, evaluation of the project’s impact on remaining flora, stakeholder consultation, etc. This questionnaire was used to monitor the indicators for the project's second monitoring period. Stage 2: The questionnaires were sent via email and WhatsApp to the relevant parties with instructions on how to complete them and compile the necessary documents for validation. Stage 3: Representatives from the Rovema, Leite, and Tupá Groups filled out the questionnaires through

	telephone or video interviews. The responses were recorded and stored in Future Carbon's cloud. Stage 4: The Future Carbon team (listed in section 1.3 of this document), consisting of coordinators and technical analysts, evaluated the responses and documents. The new data were verified and compared with previous monitoring results. The data were analyzed based on SOCIALCARBON indicators and compared with historical data to identify trends and variations, which were detailed in the monitoring report. Stage 5: All received documents were securely stored in Future Carbon's internal folders and shared with the VVB (Third-Party Verifier) upon request
Purpose of the data	3 (Non-timber forest products are traded in/around the project area, with sustainable practices in use.).
Comments	Not applicable .

Indicator	Biodiversity monitoring
Data unit	Not applicable
Description	Evaluates whether the company has actions to identify and monitor the local fauna and flora.
Source of data	Questionnaire, interviews with the Grupo Rovema, Grupo Leite, and Grupo Tupá teams by calls, reports, local visit and interviews with communities.
Description of methods to collect information and procedures to be applied	Application and Analysis Method of SOCIALCARBON Standard Indicators: Stage 1: Future Carbon created a questionnaire to collect data on the six resources of the SOCIALCARBON Standard from the Rovema, Leite, and Tupá Groups. The questionnaire was designed to measure, record, and store relevant data, covering topics such as: women's inclusion, project engagement with external communities, existence of conflicts, public health activities, training and education activities, investments

	in the areas of: education, income generation, environment, sports, and infrastructure, quality control actions of the management plan, existence of a methodology for identifying and controlling local flora and fauna, evaluation of the project's impact on remaining flora, stakeholder consultation, etc. This questionnaire was used to monitor the indicators for the project's second monitoring period. Stage 2: The questionnaires were sent via email and WhatsApp to the relevant parties with instructions on how to complete them and compile the necessary documents for validation. Stage 3: Representatives from the Rovema, Leite, and Tupá Groups filled out the questionnaires through telephone or video interviews. The responses were recorded and stored in Future Carbon's cloud. Stage 4: The Future Carbon team (listed in section 1.3 of this document), consisting of coordinators and technical analysts, evaluated the responses and documents. The new data were verified and compared with previous monitoring results. The data were analyzed based on SOCIALCARBON indicators and compared with historical data to identify trends and variations, which were detailed in the monitoring report. Stage 5: All received documents were securely stored in Future Carbon's internal folders and shared with the VVB (Third-Party Verifier) upon request
Purpose of the data	1 (There is no process of identification and monitoring of fauna and flora, nor cataloguing of timber).
Comments	Not applicable .
Indicator	Impact on remaining flora
Data unit	Not applicable

Description	Evaluates the company actions to monitor the impact on the remaining flora.
Source of data	Questionnaire, interviews with the Grupo Rovema, Grupo Leite, and Grupo Tupá teams by calls, reports, local visit and interviews with communities.
Description of methods to collect information and procedures to be applied	Application and Analysis Method of SOCIALCARBON Standard Indicators: Stage 1: Future Carbon created a questionnaire to collect data on the six resources of the SOCIALCARBON Standard from the Rovema, Leite, and Tupá Groups. The questionnaire was designed to measure, record, and store relevant data, covering topics such as: women's inclusion, project engagement with external communities, existence of conflicts, public health activities, training and education activities, investments in the areas of: education, income generation, environment, sports, and infrastructure, quality control actions of the management plan, existence of a methodology for identifying and controlling local flora and fauna, evaluation of the project's impact on remaining flora, stakeholder consultation, etc. This questionnaire was used to monitor the indicators for the project's second monitoring period. Stage 2: The questionnaires were sent via email and WhatsApp to the relevant parties with instructions on how to complete them and compile the necessary documents for validation. Stage 3: Representatives from the Rovema, Leite, and Tupá Groups filled out the questionnaires through telephone or video interviews. The responses were recorded and stored in Future Carbon's cloud. Stage 4: The Future Carbon team (listed in section 1.3 of this document), consisting of coordinators and technical analysts, evaluated the responses and documents. The new data were verified and compared with previous monitoring results. The data were analyzed based on SOCIALCARBON indicators and compared with historical

	data to identify trends and variations, which were detailed in the monitoring report.
	Stage 5: All received documents were securely stored in Future Carbon's internal folders and shared with the VVB (Third-Party Verifier) upon request
Purpose of the data	1 (There are no actions related to monitoring the impacts on the remaining flora).
Comments	Not applicable .

Indicator	Buffer reduction
Data unit	Not applicable
Description	Although there has been no reduction in the buffer, it is important to note that according to the criteria of Tool version 4.2, the minimum score to be achieved is 12, which applies to the Rio Madeira project. This tool assesses the progression of the buffer during the current monitoring period.
Source of data	Project Description and Monitoring Report
Description of methods to collect information and procedures to be applied	Application and Analysis Method of SOCIALCARBON Standard Indicators: Stage 1: Future Carbon created a questionnaire to collect data on the six resources of the SOCIALCARBON Standard from the Rovema, Leite, and Tupá Groups. The questionnaire was designed to measure, record, and store relevant data, covering topics such as: women's inclusion, project engagement with external communities, existence of conflicts, public health activities, training and education activities, investments in the areas of: education, income generation, environment, sports, and infrastructure, quality control actions of the management plan, existence of a methodology for identifying and controlling local flora and fauna, evaluation of the project's impact on

	remaining flora, stakeholder consultation, etc. This questionnaire was used to monitor the indicators for the project's second monitoring period. Stage 2: The questionnaires were sent via email and WhatsApp to the relevant parties with instructions on how to complete them and compile the necessary documents for validation. Stage 3: Representatives from the Rovema, Leite, and Tupá Groups filled out the questionnaires through telephone or video interviews. The responses were recorded and stored in Future Carbon's cloud. Stage 4: The Future Carbon team (listed in section 1.3 of this document), consisting of coordinators and technical analysts, evaluated the responses and documents. The new data were verified and compared with previous monitoring results. The data were analyzed based on SOCIALCARBON indicators and compared with historical data to identify trends and variations, which were detailed in the monitoring report. Stage 5: All received documents were securely stored in Future Carbon's internal folders and shared with the VVB (Third-Party Verifier) upon request
Purpose of the data	3 The buffer reduced by up to 10% compared to the previous monitoring period (or compared to the PD).
Comments	Not applicable .

Indicator	Stakeholder consultation
Data unit	Not applicable
Description	Evaluates the methodology used for the stakeholder consultation regarding the carbon project.
Source of data	Questionnaire, interviews with the Grupo Rovema, Grupo Leite, and Grupo Tupá teams by calls, reports, local visit and interviews with communities.

Description of methods to collect information and procedures to be applied

Application and Analysis Method of SOCIALCARBON Standard Indicators:

Stage 1: Future Carbon created a questionnaire to collect data on the six resources of the SOCIALCARBON Standard from the Rovema, Leite, and Tupá Groups. The questionnaire was designed to measure, record, and store relevant data, covering topics such as: women's inclusion, project engagement with external communities, existence of conflicts, public health activities, training and education activities, investments in the areas of: education, income generation, environment, sports, and infrastructure, quality control actions of the management plan, existence of a methodology for identifying and controlling local flora and fauna, evaluation of the project's impact on remaining flora, stakeholder consultation, etc. This questionnaire was used to monitor the indicators for the project's second monitoring period.

Stage 2: The questionnaires were sent via email and WhatsApp to the relevant parties with instructions on how to complete them and compile the necessary documents for validation.

Stage 3: Representatives from the Rovema, Leite, and Tupá Groups filled out the questionnaires through telephone or video interviews. The responses were recorded and stored in Future Carbon's cloud.

Stage 4: The Future Carbon team (listed in section 1.3 of this document), consisting of coordinators and technical analysts, evaluated the responses and documents. The new data were verified and compared with previous monitoring results. The data were analyzed based on SOCIALCARBON indicators and compared with historical data to identify trends and variations, which were detailed in the monitoring report.

Stage 5: All received documents were securely stored in Future Carbon's internal folders and shared with the VVB (Third-Party Verifier) upon request

Purpose of the data	3 (During the time period analyzed, the company conducted a formal stakeholder consultation regarding the carbon project and all comments were registered).
Comments	Not applicable .

Indicator	Project performance
Data unit	Not applicable
Description	Evaluates project performance in relation to verified emissions reductions. Project performance = Units verified in the Monitoring Report corresponding to the SCR period/Estimate of emissions reductions in the VCS PD.
Source of data	Project Description and Monitoring Report
Description of methods to collect information and procedures to be applied	Application and Analysis Method of SOCIALCARBON Standard Indicators: Stage 1: Future Carbon created a questionnaire to collect data on the six resources of the SOCIALCARBON Standard from the Rovema, Leite, and Tupá Groups. The questionnaire was designed to measure, record, and store relevant data, covering topics such as: women's inclusion, project engagement with external communities, existence of conflicts, public health activities, training and education activities, investments in the areas of: education, income generation, environment, sports, and infrastructure, quality control actions of the management plan, existence of a methodology for identifying and controlling local flora and fauna, evaluation of the project's impact on remaining flora, stakeholder consultation, etc. This questionnaire was used to monitor the indicators for the project's second monitoring period. Stage 2: The questionnaires were sent via email and WhatsApp to the relevant parties with instructions on

	how to complete them and compile the necessary documents for validation. Stage 3: Representatives from the Rovema, Leite, and Tupá Groups filled out the questionnaires through telephone or video interviews. The responses were recorded and stored in Future Carbon's cloud. Stage 4: The Future Carbon team (listed in section 1.3 of this document), consisting of coordinators and technical analysts, evaluated the responses and documents. The new data were verified and compared with previous monitoring results. The data were analyzed based on SOCIALCARBON indicators and compared with historical data to identify trends and variations, which were detailed in the monitoring report. Stage 5: All received documents were securely stored in Future Carbon's internal folders and shared with the VVB (Third-Party Verifier) upon request
Purpose of the data	5 (More than 90% of carbon credits predicted for the period were generated.)
Comments	Not applicable

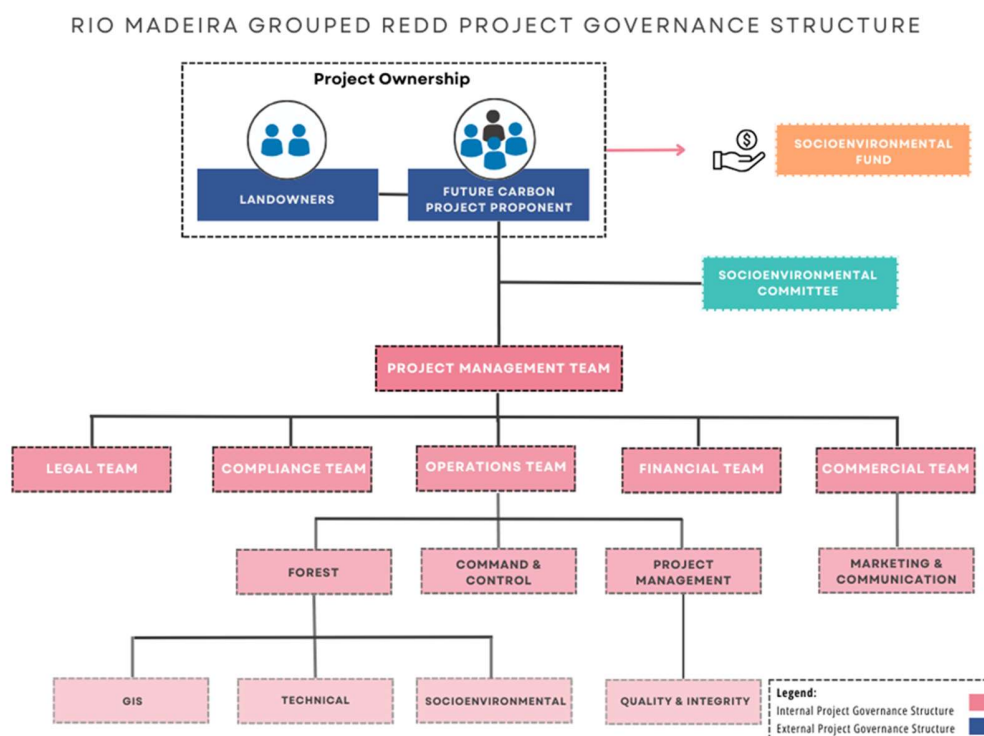
4.4 Monitoring Plan

This monitoring plan has been developed according to the VCS Methodology VM0015 version 1.1.

Organizational Structure, responsibilities and competencies

As part of the Governance Structure of Rio Madeira Grouped REDD+ Project, the project activities were designed based on information collected during interviews with the project landowners, employees within four private properties, and local stakeholders. The project activities will be operated under the guidance of the Future Carbon Group Technical Team, along with local partners responsible for the implementation and monitoring, which involves a broad expertise in environmental and social issues, as well as, in biodiversity, ensuring the efficient and successful implementation of the project. The project governance structure organizational chart below describes the roles and responsibilities team members divided into interconnected areas:

Figure 18. Project Governance Structure



The project governance structure operates in two distinct spheres: internal and external.

Internal Project Governance

The internal governance structure, as illustrated in the Figure 18, is centered around the Project Management Team, which includes several specialized teams (e.g., Legal, Compliance, Operations, Financial, Commercial). These teams are responsible for overseeing the project's design and implementation, ensuring adherence to legal requirements, and maintaining operational efficiency.

The Project Proponent plays a pivotal role in this structure, directly manage funds, and engaging with various internal teams to coordinate activities such as command and control, forest management, project management, quality, and integrity.

External Project Governance

The external project management governance structure is composed by landowners and local stakeholders groups, which include representatives of the different groups communities and other relevant institutional actors.

The external governance structure involves landowners and other key stakeholders. This group is vital in guiding project activities at a ground level, ensuring that the project aligns with local needs and priorities.

The link between Future Carbon and landowners is formalized through a contractual agreement, which outlines responsibilities for planning, execution, and monitoring of the project. Landowners are tasked with critical functions, including forest management and activities to reduce deforestation and degradation, surveillance, and fire prevention, among others. They are also responsible for implementing and maintaining social and environmental activities designed to minimize leakage and enhance the project's social and environmental co-benefits, as assessed by the SOCIALCARBON Standard.

The governance structure ensures that all parties are clear on their roles and responsibilities, thereby facilitating effective project implementation and monitoring.

Project Ownership and Responsibilities

The project ownership is shared between Future Carbon and the Landowners. Future Carbon is primarily responsible for developing project documentation, conducting monitoring activities in line with the Verified Carbon Standard (VCS) and SOCIALCARBON, and overseeing internal audits. They ensure that data collection, processing, analysis, and reporting are conducted as per the monitoring plan.

In addition, it is responsible for keeping all documentation required by the project in order, as well as project maintenance expenses; Execute, monitor and maintain social and environmental activities (or designating and hiring third parties responsible for the activities).

The landowners, on the other hand, are accountable for the physical implementation and maintenance of the project. They manage on-the-ground activities, maintain essential project documentation, and ensure that the project infrastructure is operational, contributing to the overall goals of reducing deforestation and environmental degradation.

Monitoring and Reporting

Monitoring tasks are carried out by both Project Proponent (Future Carbon) and the landowners (Grupo ROVEMA, Grupo Leite, and Grupo Tupá). The project proponent manages the technical aspects of monitoring, including GIS analysis and emissions tracking, carry out the monitoring activities of VCS and SocialCarbon. Landowners focus on the operational side, such as monitoring forest conditions and responding to natural disturbances, whenever necessary.

Monitoring was done by the project proponent and outsourced to a third party having sufficient capacities to perform the monitoring tasks. Specific responsibilities and frequencies for monitoring various project aspects are outlined in the table provided below:

Table 23. Type of monitoring and party responsible for monitoring

Variables to be monitored	Responsible	Frequency
---------------------------	-------------	-----------

Reassessment of the baseline	Future Carbon Group or its subsidiaries and external institutions qualified for the GIS analysis and monitoring	Every 6 years
Monitoring Deforestation and Project Emissions	The landowners are responsible for monitoring the properties, while Future Carbon Group is responsible for monitoring the parameters together with a qualified GIS team.	Prior to each verification
Monitoring of non-CO ₂ emissions from forest fires	The landowners are responsible for monitoring the properties, while Future Carbon Group is responsible for monitoring the parameters together with a qualified GIS team.	Prior to each verification
Monitoring Leakage emissions	The landowners are responsible for monitoring the properties, while Future Carbon Group is responsible for monitoring the parameters together with a qualified GIS team.	Prior to each verification
Monitoring of Natural Disturbance and catastrophic events	Instance landowner	When a natural event occurs
Updating Forest Carbon Stocks Estimates	Future Carbon Group or its subsidiaries and external institutions qualified for the GIS analysis and monitoring	At least, every 10 years, only if necessary.

Regarding the competencies of the teams involved in the activities related to monitoring, the responsibilities and functions performed by Future Carbon's internal team are described in section 1.3 (Table 2), while the qualifications of the local monitoring team and landowners are described in the Non-Permanence Risk Report, under Project Management, which is covered under Internal Risk.

For all aspects of project monitoring, the project proponent will ensure that data collection, processing, analysis, management and archiving are conducted in accordance with the monitoring plan. The authority for the registration, monitoring, measurement and reporting is Future Carbon Group⁸³ or its partners.

Monitoring of actual carbon stock changes and GHG emissions within the project area

- **Monitoring of project implementation**

The project landowners are responsible for the implementation of the project activity. The monitoring of the sustainable management plan is carried out by the municipal and state secretariats.

⁸³ As mentioned in section 1.5, the Project Proponent (Future Carbon International LLC) is a company controlled by Future Carbon Group. Thus, other companies than Future Carbon International LLC also controlled by Future Carbon Group are responsible and technically aware of the project.

Information from the sustainable forest management plan and post-exploratory reports was used to update parameters related to planned deforestation and was verified during the validation and verification of the carbon project.

- **Updating Forest Carbon Stocks Estimates**

If new and more accurate carbon stock data become available, these can be used to estimate the net anthropogenic GHG emission reduction, provided that these data are in accordance to the requirements established by the applied methodology VM0015. New data on carbon stocks will only be used if they are validated by an accredited VVB.

- **Methods for generating, recording, aggregating, collating and reporting data on monitored parameters**

All data sources and processing, classification and change detection procedures is documented and stored in a dedicated long-term electronic archive maintained by the Project Proponent (Future Carbon International LLC or its controlled subsidiaries).

The Project Proponent will also keep a digital copy of all documents generated during the development of the VCS PD (first fixed baseline period) and the subsequent baseline reports and monitoring periods.

Given the extended time frame and the pace of production of updated versions of software and new hardware for storing data, electronic files are updated periodically or converted to a format accessible to future software applications, as needed.

All maps and records generated during project implementation are stored and made available to VCS verifiers at verification for inspection. In addition, any data collected from ground-truth points (including GPS coordinates, identified land-use class, and supporting photographic evidence) are recorded and archived.

Monitored data is to be kept for two years after the end of the crediting period or the last issuance of carbon credits for this project activity, whichever occurs later. For this purpose, the authority for the registration, monitoring, measurement and reporting is Future Carbon International LLC. Monitored parameters are described in Section 4.2 and are monitored with the frequency described further below.

All reliable data collected and documented was used as a technical support tool for decision making in order to improve project outcomes, and to adapt the project according to the current needs and reality. These decisions are made during periodic meetings to review the Action Plan – that was developed as part of the SocialCarbon Methodology. On these occasions, the design of the Monitoring Plan is analyzed according to its efficiency in generating reliable feedback and all the necessary information. If any changes in the Monitoring Plan or management actions are identified, a corrective action is to be designed and implemented.

Quality Assurance/Quality Control

To ensure consistency and quality of results, spatial analysts carrying out the image processing, interpretation, and change detection procedures will strictly adhere to the steps detailed in the Methodology.

All of this reliable data, which is collected and documented, is used as a technical support tool for decision-making in order to improve project outcomes, and to adapt the project according to the current needs and realities. Project activities implemented within the project area must be consistent with the management plan of the PD.

The implementation of the project activity is monitored by continuous monitoring activities using remote sensing techniques. Additionally, field studies will also be used. The land-use monitoring was carried out with remote sensing methods, using images generated by Mapbiomas, INPE (PRODES)⁸⁴ and LANDSAT satellite images (or other available source accepted by the methodology), which was subject to digital processing to perform the interpretation and classification of the land cover classes studied.

The management structure will also rely on the local community to help monitor the area. All the monitored parameters were checked with the frequency detailed in the Section 5.2 above, as requested in the VCS Methodology VM0015, version 1.1.

With the carbon credits income, in order to complement the monitoring of the project area and its surroundings, the project proponent intends to improve the remote sensing methods and data used, which meet the accuracy assessment requirements laid out in the methodology.

The present REDD project will also implement the sustainability report following the SOCIALCARBON methodology, which was developed by *Instituto Ecológica* and focus on implementing environmental and social activities within the project area. This methodology follows the SOCIALCARBON Guidelines available at: <http://www.socialcarbon.org/documents/>.

The SOCIALCARBON data was collected by on-site interviews carried out in the presence of the landowners. In addition, the landowners actively participated in choosing the communities benefiting from the project. To support the research sources, only data from official databases was used. In addition, the use of the VM0015 Methodology and Risk Report Calculation Tool 4.0 helps to maintain the quality of the data and procedures adopted.

All data collection and parameters adopted to monitor the SOCIALCARBON indicators were presented in the SOCIALCARBON Reports, as well as the description of methods to collect information and procedures to be applied for each indicator. This information is stored digitally and all evidence was made available during the verification process.

⁸⁴ Available at: <<http://www.obt.inpe.br/OBT/assuntos/programas/amazonia/prodes>> Last visited on 10/03/2021.

In addition, the SOCIALCARBON Reports is available on the VCS Registry once the project is registered.

Procedures for handling internal auditing and non-conformities

To ensure the quality of project information, a review process was conducted as outlined below:

Response to non-conformities: Issues are initially classified in a spreadsheet by the project leader according to their nature and relevant area, such as social, GIS, among others. The technical team is then assigned to draft responses to each query, compiling all relevant information to formulate the answers. Preliminary responses are reviewed internally by the designated responsible person, who ensures that each response is clear, accurate, and fully addresses the query. It is also verified that the responses align with the project documentation and records. After this internal review, the responses are submitted to the project leader for a final review, ensuring compliance with project requirements and the accuracy of the information provided.

Quality and Integrity management: The development of procedures for quality and integrity management is designed to ensure compliance with project requirements, verify adherence to established standards, minimize and correct process deviations, and ultimately reduce non-conformities. The procedure is supervised by the Quality and Integrity committee, an internal multidisciplinary team established by the project proponent and with responsibilities assigned to Future Carbon. Such process was officially implemented in September-2023 and more details can be detailed in the upcoming monitoring reports.

Monitoring of land-use and land-cover change within the project area Forest cover change due to unplanned deforestation is monitored through periodic assessment of classified satellite imagery covering the project area. Emissions from deforestation are estimated by multiplying the detected area of forest loss by the average forest carbon stock per unit area.

The project boundary, as set out in the PD, serve as the initial “forest cover benchmark map” against which changes in forest cover was assessed over the interval of the monitoring period.

The entire project area has been demonstrated to meet the forest definition at the beginning of the crediting period. For subsequent monitoring periods, change in forest cover was assessed against the preceding classified forest cover map marking the beginning of the monitoring interval. The resulting classified image is compared with the preceding classified image (forest cover benchmark map marking the start of the monitoring interval) to detect forest cover change over the monitoring interval, and

subsequently becomes the updated forest cover benchmark map for the next monitoring interval. Thus, the forest benchmark map is updated at each monitoring event.

The increase or decrease in carbon stocks due to planned activities in the project area will also be monitored through documents and periodic assessment of classified satellite imagery covering the project area. In case of planned deforestation, emissions are estimated by multiplying the area of forest loss by the average forest carbon stock per unit area.

The results of monitoring shall be reported by creating *ex post* tables of activity data per stratum; per initial forest class *icI*; and per post-deforestation zone *z*, for the reference region, project area and leakage belt.

In addition, a map showing Cumulative Areas Credited within the project area shall be updated and presented to VCS verifiers at each verification event. The cumulative area cannot generate additional VCUs in future periods.

Other applied methodologies for monitoring of deforestation are listed below:

Monitoring bases

The land owner is responsible for the implementation of monitoring bases, if necessary, to guarantee the standing forest and carbon stock.

Satellite images and remote sensing monitoring techniques

According to the applied methodology, to achieve a consistent time-series of LU/LC-change data over the crediting period, the detailed methodological procedures used in pre-processing, classification, post classification processing, and accuracy assessment of the remotely sensed of the current MR data is documented below.

To conduct the monitoring, land use maps from MapBiomass were selected. This process is described in detail below. The adoption of MapBiomass data for monitoring is justified by its alignment with best practices outlined in methodology VM0015 v1.1. MapBiomass provides 30-meter resolution maps, produced from Landsat imagery. Furthermore, selecting a one-year monitoring period aligns with the recommended practice of using data as close as possible to the project start date for areas covered by forests.

MAPBIOMAS METHODOLOGY FOR ANALYZING LAND USE LAND COVER CHANGE

To map land use dynamics within the Reference Region, remote sensing satellite analysis was conducted using MapBiomass (collection 8.0) Land Use and Land Cover (LULC) maps, which are available in raster format on the program's website⁸⁵.

⁸⁵ MapBiomass Collections available at: < <https://brasil.mapbiomas.org/en/colecoes-mapbiomas/>>.

MapBiomass is a collaborative initiative under the Greenhouse Gases Emissions Estimation System promoted by the Climate Observatory that brings together NGOs, universities, and technology companies⁸⁶. The annual land cover and land use maps produced by MapBiomass are generated through pixel-by-pixel classification of Landsat images, utilizing advanced machine learning algorithms on the Google Earth Engine platform⁸⁷.

Table 24. Satellite images used on the monitoring period LU/LC change analysis

Vector	Sensor	Resolution		Coverage	Acquisition date	Scene	
		Spatial (m)	Spectral (µm)	(Km ²)	Year	Path	Row
Satellite	Landsat TM	30	0.45-2.35 µm	34,225	2022	232	66
Satellite	Landsat TM	30	0.45-2.35 µm	34,225	2022	232	67
Satellite	Landsat TM	30	0.45-2.35 µm	34,225	2022	233	66
Satellite	Landsat TM	30	0.45-2.35 µm	34,225	2022	232	67
Satellite	Landsat TM	30	0.45-2.35 µm	34,225	2022	1	66
Satellite	Landsat TM	30	0.45-2.35 µm	34,225	2022	1	67

The process begins with generating annual Landsat mosaics, using specific temporal windows to enhance spectral contrast and improve discrimination of land cover and land use (LCLU) classes across various biomes and cross-cutting themes. Next, feature space attributes are derived from the Landsat bands to train a random forest classifier for each year. Training samples are collected annually within each biome and cross-cutting theme based on the availability of information and statistical requirements. The output is a yearly LCLU map for the entire territory, created from that year's training dataset. Exceptions

⁸⁶ For more information on the history of LULC Map production and the process, visit the scientific article: Souza et al. (2020) – "Reconstructing Three Decades of Land Use and Land Cover Changes in Brazilian Biomes with Landsat Archive and Earth Engine" – Remote Sensing, Volume 12, Issue 17, 10.3390/rs12172735 available at: < <https://www.mdpi.com/2072-4292/12/17/2735>>.

⁸⁷ Methodology overview available at: <<https://brasil.mapbiomas.org/en/visao-geral-da-metodologia/>>.

include the classes Aquaculture, Mining, Irrigation, Rice, and Citrus, which are identified using the U-Net convolutional neural network (CNN) classifier.

Spatial-temporal filters are applied to the classified data for noise removal and temporal stabilization. Subsequently, the filtered LCLU maps for each biome and cross-cutting theme are hierarchically merged (integrated) based on a set of prevalence rules. Finally, spatial and temporal filters are reapplied to the integrated maps to produce the final Collection 8 product⁸⁸.

ACCURACY ASSESSMENT ANALYSIS OF MAPBIOMAS' LAND COVER MAPPING

Accuracy analysis is the main way of assessing the quality of mapping performed by Mapbiomas. In addition to telling the overall classification accuracy, the analysis also reveals the accuracy and error rate for each classified class. MapBiomas evaluated global and per-class classification accuracy for each year between 1985 and 2022.

Accuracy estimates were based on the evaluation of a pixel sample, which we call a reference database, consisting of ~ 75,000 samples. Statistical sampling techniques predetermined the number of pixels in the reference database. Each year, technicians trained in visual interpretation and inspection of Landsat images evaluated each pixel from the reference database. Accuracy was assessed using metrics that compare the mapped class with the class evaluated by the technicians in the reference database.

Each year, the accuracy analysis is done by cross-tabulating the sample frequencies of the mapped and real classes, in Figure 1. The frequencies n_{ij} represent the number of pixels in the sample classified as class i , and evaluated as class j . The line marginal totals, $n_{i,*}$, represent the number of samples mapped as class i , while the column marginal totals, $n_{*,j}$, represent the number of samples that were evaluated by the technicians as class j . In figure below is commonly called the error matrix or confusion matrix.

Figure 19. MapBiomas generic sample confusion matrix

Map\Real	Class 1	...	Class H	Total
Class 1	$n_{1,1}$	...	$n_{1,H}$	$n_{1,*}$
...	...	...	...	...
Class H	$n_{H,1}$	...	$n_{H,H}$	$n_{H,*}$
Total	$n_{*,1}$	...	$n_{*,H}$	$n_{*,*}$

⁸⁸ Mapbiomas General "Handbook". Algorithm Theoretical Basis Document (ATBD). Collection 8. Version 1. Available at: < <https://brasil.mapbiomas.org/wp-content/uploads/sites/4/2023/09/ATBD-Collection-8-v1.1.docx.pdf>>.

From the results in Figure 1, the sample proportions in each cell of the table are estimated

by $\hat{p}_{ij} = \frac{n_{ij}}{n_{i*}} \times \frac{N_i}{N}$. The matrix of values $\hat{p}_{ij}$ is used to estimate:

1. **User's Accuracies:** These are the estimates of the fractions of pixels, for each classified class, correctly classified. The user's accuracy is associated with the error of commission, which is the error of assigning a pixel to class i , when it belongs to some other class.
2. **Producer's Accuracies:** Are the sample fraction of pixels of each land cover/use class correctly assigned to their classes by the classifiers. The producer's accuracy is associated with the omission error, which occurs when we fail to map a class j pixel correctly.
3. **Global Accuracy** (overall accuracy): It is the estimate of the overall hit rate. The estimate is given by sum of the main diagonal of the proportion's matrix. The complement of the total accuracy, or the total error is still decomposed into area (or quantity) disagreement and allocation disagreement⁸⁹. Area disagreement measures the fraction of the error attributed to the amount of area allocated incorrectly to the classes by the mapping, while the mismatch allocation to the ratio of class-displacement errors.

The matrix also provides estimates of the different types of errors. For example, we show estimates of true class area composition in each mapping class. Thus, in addition to the hit rate of the class mapped as forest, for example, we also estimate the fraction of these areas that could be pasture or other classes of cover and land use, for each year. We understand that this level of transparency informs users and maximizes the potential of use across multiple types of users⁹⁰.

MONITORING PROCESS

The MapBiomass images of the monitored years and Historical Period of Reference are first reclassified according to the categories defined in Table 1 to correspond with the monitoring classes used in the analysis. These classes are: 1 - Forest, 2 - Water, 3 - Non-forest areas, and 4 - Deforestation, according to table 2. This reclassification aligns with the criteria for defining Land Use/Land Cover (LU/LC) classes as specified in Section "STEP 2: ANALYSIS OF HISTORICAL LAND-USE AND LAND-COVER CHANGE" of the VM0015 v1.1 methodology that defines that the minimum LU/LC classes should be "Forest Land" and "Non-Forest Land." Furthermore, the "Non-Forest Land" category aggregates different non-forest classes, as outlined in IPCC guidelines used for national GHG inventories.

⁸⁹ Pontius Jr, R. G., & Millones, M. (2011). Death to Kappa: birth of quantity disagreement and allocation disagreement for accuracy assessment. *International Journal of Remote Sensing*, 32(15), 4407-4429.

⁹⁰ For detailed descriptions of the accuracy assessment formulas, processes and access to the dashboard available for all collections, visit: <https://brasil.mapbiomas.org/en/analise-de-acuracia/>.

It is worth mentioning that the forest definition adopted by MapBiomass aligns with the definition provided by the FAO. According to the FAO, an area is classified as a forest when it exhibits a tree canopy cover of more than 10%, an area greater than 0.5 hectares, and trees capable of reaching a minimum height of 5 meters when mature in situ. This alignment is detailed in Annex III of the technical documentation of MapBiomass Collection 8⁸⁸, referencing the forest classes indicated in the "Manual for Integrated Field Data Collection" published by the FAO in 2012^{91, 92}.

Table 25. MapBiomass reclassification

ID	MapBiomass Class	Reclass_ID
3	Forest Formation	1
4	Savanna Formation	1
5	Mangrove	3
6	Floodable Fores	3
9	Forest Plantation	4
10	Non Forest Natural Formation	3
11	Wetlands	3
12	Grassland	3
13	Other non Forest Formations	3
14	Farming	4
15	Pasture	4
18	Agriculture	4
19	Temporary Crop	4
20	Sugar cane	4
21	Mosaic of Uses	4
22	Non vegetated Area	4
23	Beach, Dune and Sand Spot	3
24	Urban Area	4
25	Other non Vegetated Areas	4
29	Rocky Outcrop	3
30	Mining	4
31	Aquaculture	2
32	Salt Flat	3
33	River, Lake and Ocean	2

⁹¹ FAO. The National Forest Monitoring and Assessment – Manual for Integrated Field Data Collection. 2012. Available at: < <https://www.fao.org/4/ap152e/ap152e.pdf>>

⁹² To access the correlation between the MapBiomass, IBGE, FAO and the National Greenhouse Gas Emissions Inventory classes of land use and land cover, visit: <https://brasil.mapbiomas.org/wp-content/uploads/sites/4/2023/09/Legenda-Colecao-8-Descricao-Detalhada-PDF-PT>

35	Palm Oil	4
36	Perennial Crop	4
39	Soybean	4
40	Rice	4
41	Other temporary Crops	4
46	Coffee	4
47	Citrus	4
48	Other Perennial Crop	4
49	Wooded Restinga	1
50	Herbaceous Sandbank Vegetation	3
62	Cotton (beta)	4

After reclassification, the accumulated deforestation for each year is calculated, considering the Historical Reference Period and the monitored year (2022). The accumulated deforestation consists of a raster where the classes for water and non-forest are locked for the analyzed years, while deforestation and forest classes can be dynamic and subject to changes.

This analysis involves comparing the 2021 classification with the 2022 data to identify pixels classified as 1 - Forest in 2021 but assigned a different class in 2022. These pixels are then reclassified as 4 - Deforestation for 2022 to accurately capture changes in land cover.

It's important to note that for the 2021 monitoring, conducted in September 2022, a supervised classification methodology was used, with the following four classes: 1 - Forest, 2 - Water, 3 - Non-Forest, and 4 - Deforestation. Therefore, for the 2022 monitoring using MapBiomass data, the 2021 data served as a comparison parameter. Consequently, the deforestation identified in 2022 is the result of subtracting the forest class in 2022 from the forest class in 2021.

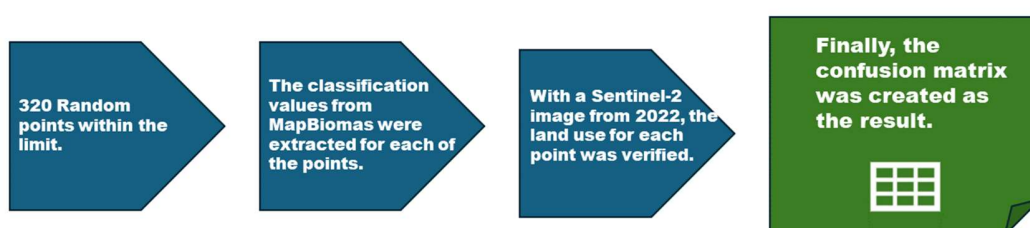
Table 26. Monitoring LULC change matrix

Projection	Classification	Description	Class
Non-Forest	Forest	Deforestation foreseen in the PDD was not carried out	Avoided deforestation
Forest	Forest	The forest was maintained as predicted	Forest
Non-Forest	Non-Forest	Deforestation where it had been predicted	Predicted deforestation
Forest	Non-Forest	Deforestation where it was not foreseen	Unplanned deforestation

ACCURACY ANALYSIS

The accuracy analysis was conducted for the Project Area (PA) and the Leakage Belt (LK). A total of 320 sample points were randomly selected within each boundary, and the accuracy of the classification was verified. Each sample points were checked using high-resolution Sentinel images and visual inspection tools to determine the land use at each selected point, according to the following diagram (Figure 19).

Figure 20. Accuracy analysis process



The result of this process is the confusion matrix, which provides a comparison between the classified data and the actual land use observed at the sample points. The confusion matrix allows for the evaluation of classification accuracy by showing how well the classified data matches the true land use conditions.

Table 27. Monitoring confusion matrix (2022)

		REFERENCE				
CLASSIFIED		Forest	Non forest	Total	User's accuracy	Overall accuracy
	Forest	461	1	462	99.78%	97.97%
	Non forest	12	166	178	93.26%	
	Total	473	167	640		
	Producer's accuracy	97.46%	99.40%			

The sample points, as well as the Sentinel image, were provided as evidence.

The LU/LC-change categories that could occur within the project area and leakage belt during the first baseline period, in both the baseline and project case, are identified in the potential LU/LC-change matrix and the list of LU/LC-change categories during the project crediting period are shown in the Tables below. It is shown that deforestation could occur in the baseline and project scenarios within both the PA and LK areas; the hectares show the quantities of deforestation during the crediting period associated with each identifier.

Table 28. Land-use and land-cover change matrix model

	Idcl	Initial LU/LC class	
		Forest	No forest
Final Class	Forest	I1/F1	0
	No forest	I1/F2	I2/F2

Table 29. Project Area Land Use and Land Cover Change Matrix – Monitoring period

Project Area					
ID _{cl}		Initial class (jan. 22)			Total (ha)
		Name	Forest	Deforestation	
			I1	I4	
LULC final class (dec. 22)	F1	Forest	52,081.79	0.00	52,081.79
	F4	Deforestation	68.67	0.00	68.67
Total (ha)			52,150.46	0.00	52,150.46

Table 30. Leakage Belt Land Use and Land Cover Change Matrix – Monitoring period

Leakage Belt					
ID _{cl}		Initial class (jan. 22)			Total (ha)
		Name	Forest	Deforestation	
			I1	I4	
LULC final class (dec. 22)	F1	Forest	24,880.98	0.00	24,880.98
	F4	Deforestation	1,430.50	0.00	1,430.50
Total (ha)			26,311.48	0.00	26,311.48

Security procedures

The project landowners are responsible for the security procedures and reporting illegal activity to responsible authorities and the Project Proponent.

These actions are planned to avoid unplanned deforestation and carbon stock changes in the area. Related parameters shall be monitored and reassessed at every verification and revalidation point.

SOCIALCARBON Report will also monitor the relationship between the company and the communities, and its evolution on mitigating unplanned deforestation caused by these agents.

- **Monitoring of carbon stock changes and non-CO2 emissions from fires**

If forest fires occur, these non-CO2 emissions is to be subject to monitoring and accounting, when significant.

- **Monitoring of impacts of natural disturbances and other catastrophic events**

The monitoring of natural impacts and other catastrophic events is responsibility of the project landowners. The companies must notify Future Carbon International LLC, Future Carbon Group or its controlled companies so that it can include the related impacts in the carbon project reports, updating the related parameters, including the buffer report. Where an event occurs that is likely to qualify as a loss event, the project proponent shall notify Verra within 30 days of discovering the likely loss event.

Decreases in carbon stocks and increases in GHG emissions (e.g. in case of forest fires) due to natural disturbances (such as hurricanes, earthquakes, flooding, drought, fires or storms) or man-made events, including those over which the project proponent has no control (such as acts of terrorism or war), are subject to monitoring, when significant. If the area (or a sub-set of it) affected by natural disturbances or man-made events generated VCUs in past verifications, the total net change in carbon stocks and GHG emissions in the area(s) that generated VCUs is to be estimated, and an equivalent amount of VCUs should be cancelled from the VCS buffer. No VCUs can be issued for the project until all carbon stock losses and increases in GHG emissions have been offset.

- **Monitoring of Leakage**

Monitoring of the leakage belt and leakage management area was carried out as in the project area and reference region.

The most recent VCS guidelines on this subject matter shall be applied. Furthermore, as the leakage belt was determined using Option 1 (Opportunity cost analysis), the boundary of the leakage belt is to be reassessed at the end of each fixed baseline period using the same methodological approaches used in the previous period. The calculation procedure for estimating leakage emissions in the project scenario was done by monitoring the following sources of leakage:

- **Carbon stock changes and GHG emissions associated with leakage prevention activities.**

The carbon stock decrease or increase in GHG emissions due to leakage prevention measures inside the leakage management area was monitored through interviews and field assessment. In areas undergoing carbon stock enhancement, the project conservatively assumes stable stocks and no biomass monitoring is conducted.

- **Carbon stock decrease and increases in GHG emissions due to activity displacement leakage**

Deforestation in the leakage belt area above the baseline may be considered activity displacement leakage. Activity data for the leakage belt area was determined using the same methods applied to monitoring deforestation activity data in the project area. Leakage was calculated by comparing the ex-ante and the ex-post assessment. However, where strong evidence can be collected that deforestation in the leakage belt is attributable to deforestation agents that are not linked to the project area, the detected deforestation will not be attributed to the project activity, thus not considered leakage.

- **Revision of the baseline**

The current baseline is valid for 6 years, i.e. through 23-October-2025. The baseline will be reassessed every 6 years, and it will be validated at the same time as the subsequent verification.

Technical description of the monitoring task

The baseline scenario will be monitored through the assessment of agents and drivers variables and satellite images to project expected deforestation. Information on agents, drivers and underlying causes of deforestation in the reference region will be collected at the end of each fixed baseline period, as these are essential for improving future deforestation projections and the design of the project activity. In addition, in the same frequency, the projected annual areas of baseline deforestation for the reference region will be revisited and eventually adjusted for the subsequent fixed baseline period.

The location of the projected baseline deforestation will be reassessed using the adjusted projections for annual areas of baseline deforestation and spatial data. All areas credited for avoided deforestation in past fixed baseline periods will be excluded from the revisited baseline projections as these areas cannot be credited again.

Baseline monitoring task will be done in accordance with the applied methodology, VM0015, version 1.1 or the most recent.

Data to be collected

Data will be collected to comply with the parameters used in VM0015 version 1.1, listed in Appendix 5, or the most recent.

Overview of data collection procedures

Data will be collected according to measurement methods and procedures described in section 4.1 and 4.2 above. All *ex ante* and *ex post* parameters will be reassessed at the moment of revision of the baseline.

Quality control and quality assurance procedures

QA/QC will be done according to best practices in remote sensing and as stated by VM0015 methodology.

Data archiving

All data sources and processing, classification and change detection procedures will be documented and stored in a dedicated long-term electronic archive maintained by the project owner. The project proponent will also keep a digital copy of all documents generated during the development of the VCS PD (first fixed baseline period) and the first monitoring period, as well as further monitoring reports in case it participates in the development of subsequent monitoring periods in the future.

Given the extended time frame and the pace of production of updated versions of software and new hardware for storing data, electronic files will be updated periodically or converted to a format accessible to future software applications, as needed.

All maps and records generated during project implementation will be stored and made available to VVBs at verification for inspection. In addition, any data collected from ground-truth points (including GPS coordinates, identified land-use class, and supporting photographic evidence) will be recorded and archived.

5 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

5.1 Baseline Emissions

The total average biomass stock per hectare (Mg ha^{-1}) was converted to tCO_2e using the following equations:

$$Cab_{icl} = ab \times CF \times 44 / 12$$

Where,

Cab_{icl}	Average carbon stock per hectare in the above-ground biomass carbon pool of initial forest class icl ; $\text{tCO}_2\text{e ha}^{-1}$
ab	Average biomass stock per hectare in the above-ground biomass pool of initial forest class icl ; Mg ha^{-1}
CF	Default value of carbon fraction in biomass
$44/12$	Ratio converting C to CO_2e

$$Cbb_{icl} = bb \times CF \times 44 / 12$$

Where,

Cbb_{icl}	Average carbon stock per hectare in the below-ground biomass carbon pool of initial forest class icl ; $\text{tCO}_2\text{e ha}^{-1}$
bb	Average biomass stock per hectare in the below-ground biomass pool of initial forest class icl ; Mg ha^{-1}
CF	Default value of carbon fraction in biomass

44/12 Ratio converting C to CO₂e

The total baseline carbon stock change in the project area at year t is calculated as follows:

$$\Delta C_{BSLPA}t = \Delta C_{abBSLPA}icl,t + \Delta C_{bbBSLPA}icl,t$$

Where,

$\Delta C_{BSLPA}t$ Total baseline carbon stock changes in the project area at year t ; tCO₂e

$\Delta C_{abBSLPA}icl,t$ Total baseline carbon stock change for the above-ground biomass pool in the project area for initial forest class at year t ; tCO₂e

$\Delta C_{bbBSLPA}icl,t$ Total baseline carbon stock change for the below-ground biomass pool in the project area for initial forest class at year t ; tCO₂e

$$\Delta C_{abBSLPA}icl,t = ABSLPA_{icl,t} \times \Delta C_{ab}icl$$

Where,

$\Delta C_{abBSLPA}icl,t$ Total baseline carbon stock change for the above-ground biomass pool in the project area for initial forest class at year t ; tCO₂e

$ABSLPA_{icl,t}$ Area of initial forest class icl deforested at time t within the project area in the baseline case; ha

$\Delta C_{ab}icl$ Average carbon stock change factor per hectare in the above-ground biomass carbon pool of initial forest class icl ; tCO₂e ha⁻¹

$$\Delta C_{bbBSLPA}icl,t = ABSLPA_{icl,t} \times \Delta C_{bb}icl$$

Where,

$\Delta C_{bbBSLPA}icl,t$ Total baseline carbon stock change for the below-ground biomass pool in the project area for initial forest class at year t ; tCO₂e

$ABSLPA_{icl,t}$ Area of initial forest class icl deforested at time t within the project area in the baseline case; ha

$\Delta C_{bb}icl$ Average carbon stock change factor per hectare in the below-ground biomass carbon pool of category icl ; tCO₂e ha⁻¹

Project carbon stocks were calculated as presented in section 4.1.

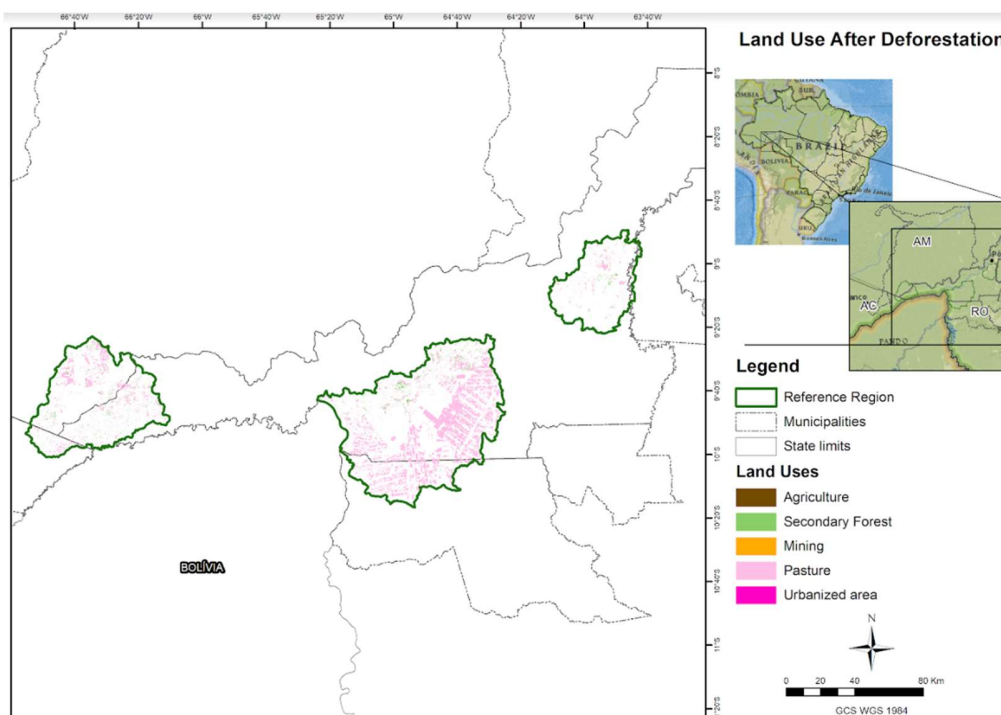
Average carbon stocks of post-deforestation classes

The average classification of post-deforestation land-uses within the reference region during the historical reference period (2009-2019) was conducted through MapBiomass, which is detailed below:

Land Use	Area (%)
Pasturelands	87.22%
Secondary Forests	12.76%
Agriculture	0.01%
Minning	0.00%
Urban Area	0.00%

Therefore, most of the post-deforestation land uses within the reference region is composed by pasturelands, with more than 87%, as available in the following image:

Figure 21. Post-deforestation land use within reference region



In order to estimate the post-deforestation carbon stocks, the average carbon stocks of pasturelands, agriculture and other land uses were taken from the National GHG Emissions Communication of Brazil to the UNFCCC (2019)⁹⁴.

For secondary forests, a regional study was conducted. Most secondary forests in the Brazilian Amazon are young. In 2017, 65% of secondary forests was ≤10 years old. On average, 35% of annual land abandonment to secondary forests was re-cleared within 5

⁹⁴ Available at: <https://www.gov.br/mcti/pt-br/acompanhe-o-mcti/sirene/publicacoes/comunicacoes-nacionais-do-brasil-a-unfccc/arquivos/3tcn_volume_3.pdf>

years, and 57% within 10 years⁹⁵. The half-life of secondary forests is 8 years, on average, which is also the same value found by other study that concludes that more than 50% of the secondary forests in the Amazon biome have less than 8 years old⁹⁶.

According to a study conducted in the Amazon Forest that analyzed the carbon stocks of a secondary forest with 14 years old, the average carbon stock in above ground biomass is around 19 tC/ha⁹⁷. Below ground biomass was estimated through the root-to-shoot ratio from the applied methodology. Therefore, the average value for secondary forests is around 22.8 tC/ha.

It was also considered the uncertainties involved in the mentioned studies, according to the adopted methodology. Thus, the post-deforestation carbon stock with after discounts due to uncertainty was applied. It is worth highlighting that, according to the adopted methodology, if uncertainty is higher than 10%, the lower boundary of the 90% confidence interval should be considered for final non-forest class in the leakage belt. In the other hand, the same error condition implies that the higher boundary of the 90% confidence interval should be considered for final non-forest class in the project area, as follows:

Land Use	Average post-deforestation carbon stock 90% CI			
	Estimated carbon stock (tCO ₂ e/ha)	Uncertainty (tCO ₂ e/ha)	C _{tot fcl} +90% (within PA)	C _{tot fcl} +90% (within LB)
Pasturelands	27.76	7.45	35.21	20.30
Secondary Forests	83.59	4.04	83.59	83.59
Agriculture	77.00	20.68	97.68	56.32
Minning	0.00	0.00	0.00	0.00
Urban Area	0.00	0.00	0.00	0.00

Therefore, the weighted average carbon stock was calculated through the data below.

Land Use	Area (%)	C _{tot fcl} +90% (within PA)	C _{tot fcl} +90% (within LB)
Pasturelands	87.22%	35.21	20.30
Secondary Forests	12.76%	83.59	83.59
Agriculture	0.01%	97.68	56.32
Minning	0.00%	-	0.00
Urban Area	0.00%	-	0.00

⁹⁵ Sâmia Nunes *et al* 2020 *Environ. Res. Lett.* **15** 034057. Available at: <<https://iopscience.iop.org/article/10.1088/1748-9326/ab76db>>

⁹⁶ Silva Junior, C.H.L., Heinrich, V.H.A., Freire, A.T.G. *et al.* Benchmark maps of 33 years of secondary forest age for Brazil. *Sci Data* **7**, 269 (2020). Available at: <<https://doi.org/10.1038/s41597-020-00600-4>>

⁹⁷ Pereira, Izaura Cristina Nunes. Estoque de biomassa e carbono florestal em unidades de paisagem na Amazônia: uma análise a partir da abordagem metodológica. Universidade Federal do Pará, , Belém, 2013. Available at: <<https://ppgdstu.propesp.ufpa.br/ARQUIVOS/teses/TESES/2013/IZAURA%20CRISTINA%20NUNES%20PEREIRA.pdf>>

Weighted average of post-deforestation carbon stocks	41.39	28.38
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After converting the weighted average of post-deforestation carbon stock (in terms of tC/ha) using the conversion factor previously mentioned, the carbon stock in terms of tCO₂e/ha is available as follows:

Table 31. Average carbon stocks per hectare of post-deforestation LU/LC classes present in the reference region

Post deforestation class <i>fcl</i>	
Name	Non forest
ID _{fcl}	1
Average carbon stock per hectare ±90% CI	
C _{totfcl}	
tCO ₂ e/ha	
41.39	

Analysis of Baseline Deforestation – comparison of deforestation in Legal Reserve areas during the current monitoring period

Following the analysis carried out in the JointPD&MR regarding deforestation in areas inside and outside Legal Reserves (LR) Areas in the historical period (2008-2019), the same was repeated for the current monitoring period (2022), considering the following scenarios:

○ **Scenario 1: 2013 to 2022**

Deforestation rate in the Reference Region: 3.08%

Deforestation rate in Legal Reserve area: 2.74%

Comparison: - 11.18%

Notes: This scenario replicates the analysis for the 1st monitoring period, shifting the final year to match the monitored period. Note that the deforestation rate inside Legal Reserve it was 11% lower than outside.

○ **Scenario 2: 2021 to 2022**

Deforestation rate in the Reference Region: 0.53%

Deforestation rate in Legal Reserve area: 0.62%

Comparison: + 17.04%

Notes: The deforestation rate in the Legal Reserve is higher than in other areas.

○ **Scenario 3: 2019 to 2022**

Deforestation rate in the Reference Region: 1.44%

Deforestation rate in Legal Reserve area: 1.42%

Comparison: - 1.45%

Notes: The deforestation rate in the Legal Reserve is lower than in other areas during the crediting period.

After analyzing the deforestation behavior within the project boundaries and only in Legal Reserve Areas, it was possible to conclude that among all the scenarios, Scenario 1 corresponds to the highest discount. It is important to note that in the year prior to the monitoring period, deforestation in Legal Reserve Areas was even higher than outside. However, in order to be conservative, the same 20% discount used in the first monitoring period was applied. The analysis was shared with VVB. It is worth emphasizing scenarios 2 and 3 points out deforestation is increasing within Legal Reserve Areas in the most recent years, what reinforces that adopting the 20% discount from the first monitoring period is a conservative approach.

Analysis of Baseline Approach in this monitoring period (2022)

To ensure that the appropriate baseline approach for the current monitoring period is being used, an analysis was carried out to compare the applicability of different approaches. As described in the previous sections and in the JointPD & MR, the deforestation rates in the region are high, mainly by cattle ranching, and follow a clear trend that is an increase of the deforestation.

When comparing the real deforestation using the historical average approach for the monitoring period (2022), it is possible to note that the projection would be around 40% lower than the real scenario, proving not to be the best approach to use, as demonstrated in table below:

Table 32. Comparison between ex-ante and ex-post deforestation within Reference Region with Historical Average approach during the monitoring period (01-January-2022 to 31-December-2022)

Ex-ante (ha)	Ex-post (ha)
15,039.78	25,130.88

When comparing the time function approach (ex-ante used in the JointPD&MR) and actual deforestation (ex-post) within the reference region during 2022, the ex-post is around 13% higher than the projection using time function. Such analysis reinforces the correct use of the baseline approach used by the project activity. The following table shows the time function projection and actual deforestation in the reference region during the current monitoring period:

Table 33. Comparison between ex-ante and ex-post deforestation within Reference Region with Time Function approach during the monitoring period (01-January-2022 to 31-December-2022)

Ex-ante (ha)	Ex-post (ha)
21,667.80	25,130.88

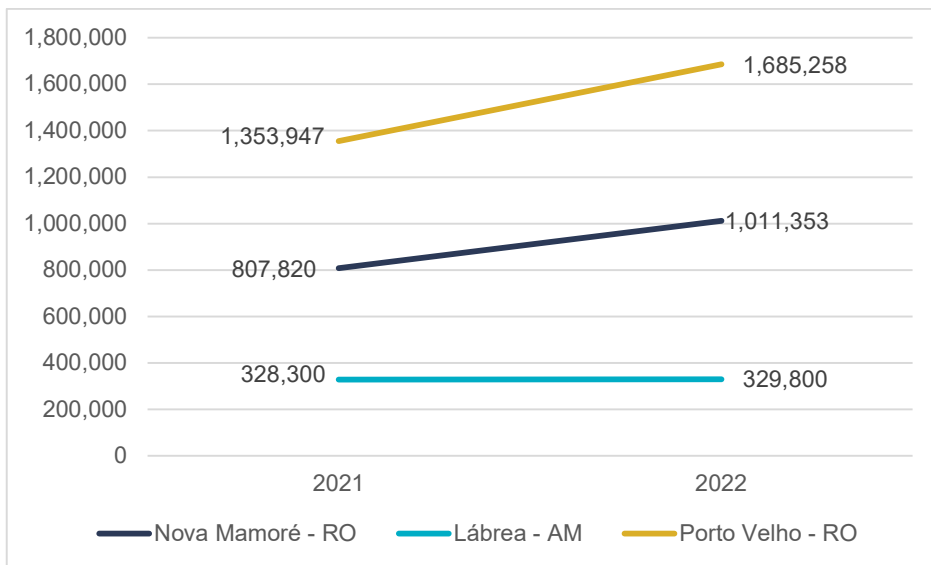
Besides reinforcing the correct baseline approach, it is worth highlighting the current monitoring period adopted the 20% discount factor used in the first Joint PDMR. Again, it was applied to the projected annual areas of baseline deforestation within Project Area and Leakage Belt, as previously discussed in the topic “Analysis of Baseline Deforestation – comparison of deforestation in Legal Reserve areas during the current monitoring period” in the present section.

In addition, an updated analysis of the behavior of deforestation agents in the region was carried out in order to confirm the correct use of the approach validated in the VCSPD. Through this analysis, it was possible to observe that during the second monitoring period (from 01-January-2022 to 31-December-2022) cattle ranching continues to represent a remarkable agent, contributing to deforestation in the municipalities where the properties are located.

The Figure below shows the increase in the cattle herd during 2022, where there was a gain of 536,344 heads, representing a 22% increase during the monitored period. The municipality responsible for the largest cattle herd is Porto Velho, the 3rd largest producer in Brazil⁹⁸ during the present monitoring period.

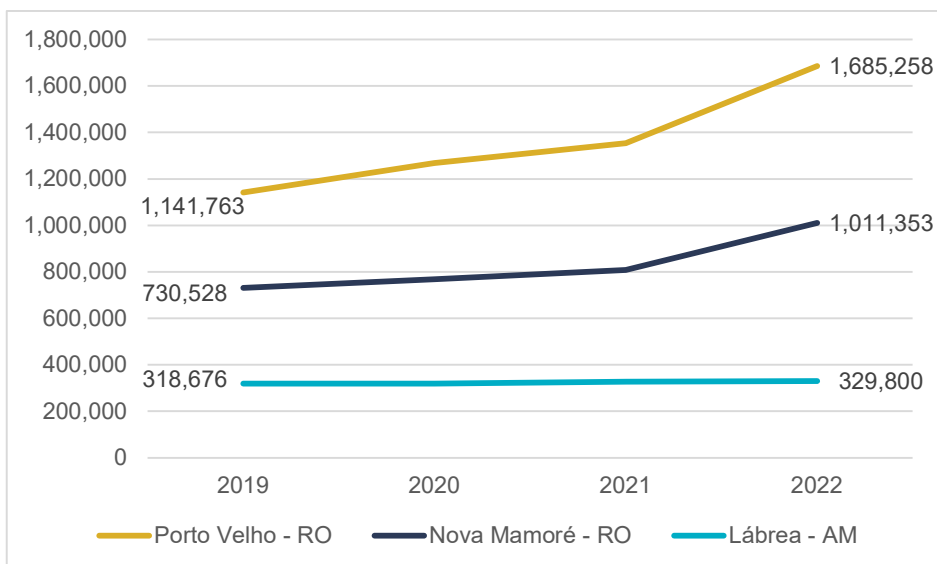
⁹⁸ IBGE – Instituto Brasileiro de Geografia e Estatística. Brasil. Available at: < <https://sidra.ibge.gov.br/tabela/3939>>.

Figure 22. Cattle herd growth in the surrounding municipalities during 2022⁹⁹



When analyzing the credit period, it can be observed the livestock growth is consistent, as shown in the following Figure:

Figure 23. Cattle herd growth in the surrounding municipalities during the crediting period (2019-2022)¹⁰⁰



⁹⁹ IBGE – Instituto Brasileiro de Geografia e Estatística. Brasil. Available at: <<https://cidades.ibge.gov.br/>>.

¹⁰⁰ IBGE – Instituto Brasileiro de Geografia e Estatística. Brasil. Available at: <<https://cidades.ibge.gov.br/>>.

This cattle ranching increase can be linked to several factors, such as the region's location near agricultural frontiers, the high consumption of the product by the international market and also the creation of tax incentives and policies favorable to the agricultural sector, especially in 2021, such as the Safrá Plan¹⁰¹. Such program offers rural credit to producers, as well as other facilitators. Finally, the region has a history of occupation of the agricultural frontier and cattle ranching since the colonization process, as described in the registered Joint VCSPD section 3.4.

Calculation of baseline carbon stock changes

The resulting changes in carbon stock for initial forest classes for the reference region, project area and leakage belt are as presented as follows:

¹⁰¹ Available at: < <https://www.gov.br/agricultura/pt-br/assuntos/politica-agricola/todas-publicacoes-de-politica-agricola/plano-agricola-pecuario/plano-safra-2021-2022.pdf> >

Table 34. Ex post carbon stock change in the reference region

Carbon stock change in the above-ground biomass per initial forest class icl				Carbon stock change in the below-ground biomass per initial forest class icl				Carbon stock changes in above-ground biomass per post-deforestation zone z				Total net carbon stock change in the reference region	
Total carbon stock change in the above-ground biomass of initial forest class in the reference region		Total carbon stock change of post deforestation zones in the reference region		Total carbon stock change in the below-ground biomass of initial forest class in the reference region		Total carbon stock change of post deforestation zones in the reference region		Total net carbon stock change in the reference region					
ID _{cl}	1	$\Delta C_{abBSLRR_{icl,t}}$	$\Delta C_{abBSLRR_{icl}}$	ID _{cl}	1	$\Delta C_{bbBSLRR_{ic,t}}$	$\Delta C_{bbBSLRR_{icl}}$	ID _z	1	$\Delta C_{BSLRR_{z,t}}$	ΔC_{BSLRR_z}	ΔC_{BSLRR_t}	ΔC_{BSLRR}
Name	Forest	annual	cumulative	Name	Forest	annual	cumulative	Name	Non-forest	annual	cumulative	annual	cumulative
Project year	tCO _{2e}	tCO _{2e}	tCO _{2e}	Project year	tCO _{2e}	tCO _{2e}	tCO _{2e}	Project year	tCO _{2e}	tCO _{2e}	tCO _{2e}	tCO _{2e}	tCO _{2e}
2022	13,011,094	13,011,094	38,220,975	2022	917,283	917,283	1,864,778	2022	223,941	223,941	350,703	13,704,435	39,735,050

Table 35. Ex post carbon stock change in the project area

Carbon stock change in the above-ground biomass per initial forest class <i>icl</i>				Total carbon stock change in the above-ground biomass of initial forest class in the project area	
ID _{cl}	1	1	1	$\Delta C_{abBSLPA_{icl,t}}$	$\Delta C_{abBSLPA_{icl}}$
Name	Grupo Rovema	Grupo Tupá	Grupo Leite	annual	cumulative
Project Year	tCO _{2e}	tCO _{2e}	tCO _{2e}	tCO _{2e}	tCO _{2e}
2022	6,177	2,563	26,813	35,553	99,542

Carbon stock change in the below-ground biomass per initial forest class <i>icl</i>				Total carbon stock change in the below-ground biomass of initial forest class in the project area	
ID _{cl}	1	1	1	$\Delta C_{bbBSLPA_{icl,t}}$	$\Delta C_{bbBSLPA_{icl}}$
Name	Grupo Rovema	Grupo Tupá	Grupo Leite	annual	cumulative
Project Year	tCO _{2e}	tCO _{2e}	tCO _{2e}	tCO _{2e}	tCO _{2e}
2022	849	826	714	2,389	4,695

Carbon stock changes in above-ground biomass per post-deforestation zone <i>z</i>		Total carbon stock change of post deforestation zones in the project area		Total net carbon stock change in the project area	
ID _{iz}	1	$\Delta C_{BSLPA_{z,t}}$	ΔC_{BSLPA_z}	ΔC_{BSLPA_t}	ΔC_{BSLPA}
Name	Non-forest	annual	cumulative	annual	cumulative
Project Year	tCO _{2e}	tCO _{2e}	tCO _{2e}	tCO _{2e}	tCO _{2e}
2022	568	568	854	37,373	103,384

Table 36. Ex post carbon stock change in the leakage belt

Carbon stock change in the above-ground biomass per initial forest class <i>icl</i>				Total carbon stock change in the above-ground biomass of initial forest class in the leakage belt				Carbon stock change in the below-ground biomass per initial forest class <i>icl</i>				Total carbon stock change in the below-ground biomass of initial forest class in the leakage belt				Carbon stock changes in above-ground biomass per post-deforestation zone <i>z</i>				Total carbon stock change of post deforestation zones in the leakage belt				Total net carbon stock change in the leakage belt	
ID _{cl}	1	$\Delta C_{abBSLLK_{icl,t}}$	$\Delta C_{abBSLLK_{icl}}$					ID _{cl}	1	$\Delta C_{bbBSLLK_{icl,t}}$	$\Delta C_{bbBSLLK_{icl}}$					ID _{lz}	1	$\Delta C_{totBSLLK_{z,t}}$	$\Delta C_{totBSLLK_z}$					$\Delta C_{totBSLLK_t}$	$\Delta C_{totBSLLK_z}$
Name	Forest	annual	cumulative					Name	Forest	annual	cumulative					Name	Non-forest	annual	cumulative					annual	cumulative
Project year	tCO ₂ e	tCO ₂ e	tCO ₂ e					Project year	tCO ₂ e	tCO ₂ e	tCO ₂ e					Project year	tCO ₂ e	tCO ₂ e	tCO ₂ e					tCO ₂ e	tCO ₂ e
2022	740,618	740,618	1,638,549					2022	39,324	39,324	73,846					2022	5,469	5,469	8,762					774,472	1,700,000

Baseline non-CO2 emissions from forest fires

As described in baseline scenario, slash-and-burn deforestation to clear the area is carried out for cattle ranching, which is the main cause of deforestation within the project area.

Therefore, baseline deforestation in the project area involves fire and all above ground biomass is burnt. It is worth mentioning that the effect of fire on CO2 emissions is counted in the estimation of carbon stock changes; therefore, CO2 emissions from biomass burning were ignored to avoid double counting. However, non-CO2 emissions (CH4 and N2O) from forest fires (EBBBSLPAt) were quantified and included as baseline emissions, as follows.

$$EBB_{tot_{icl,t}} = EBB_{N_2O_{icl,t}} + EBB_{CH_4_{icl,t}}$$

Where,

$EBB_{tot_{icl,t}}$	Total GHG emission from biomass burning in forest class icl at year t; tCO ₂ e/ha
$EBB_{N_2O_{icl,t}}$	N ₂ O emission from biomass burning in forest class icl at year t; tCO ₂ e/ha
$EBB_{CH_4_{icl,t}}$	CH ₄ emission from biomass burning in forest class icl at year t; tCO ₂ e/ha

$$EBB_{N_2O_{icl,t}} = EBB_{CO_2_{icl,t}} * 12/44 * NCR * ER_{N_2O} * 44/28 * GWP_{N_2O}$$

Where,

$EBB_{CO_2_{icl,t}}$	Per hectare CO ₂ emission from biomass burning in slash and burn in forest class icl at year t; tCO ₂ e/ha
NCR	Nitrogen to Carbon Ratio (IPCC default value = 0.01); dimensionless
ER_{N_2O}	Emission ratio for N ₂ O (IPCC default value = 0.007)
GWP_{N_2O}	Global Warming Potential for N ₂ O (IPCC default value) ¹⁰²

$$EBB_{CH_4_{icl,t}} = EBB_{CO_2_{icl,t}} * 12/44 * ER_{CH_4} * 16/12 * GWP_{CH_4}$$

Where,

$EBB_{CO_2_{icl,t}}$	Per hectare CO ₂ emission from biomass burning in slash and burn in forest class icl at year t; tCO ₂ e/ha
ER_{CH_4}	Emission ratio for CH ₄ (IPCC default value = 0.012)

¹⁰² According to the VCS Standard, the six Kyoto Protocol greenhouse gases and ozone-depleting substances shall be converted using 100 year global warming potentials derived from the IPCC's Fifth Assessment Report (GWP for N₂O = 265).

GWP_{CH4} Global Warming Potential for CH₄ (IPCC default value) ¹⁰³

$$EBBCO_{2icl,t} = F_{burnt_{icl}} * (C_{picl,t} * P_{burnt_{p,icl}} * CE_{p,icl})$$

Where,

EBBCO _{2icl,t}	Per hectare CO ₂ emission from biomass burning in the forest class icl at year t; tCO ₂ e/ha
F _{burnt_{icl}}	Proportion of forest area burned during the historical reference period in the forest class icl; %
C _{picl,t}	Average carbon stock per hectare in the carbon pool p burnt in the forest class icl at year t; tCO ₂ e/ha
P _{burnt_{p,icl}}	Average proportion of mass burnt in the carbon pool p in the forest class icl; %
CE _{p,icl}	Average combustion efficiency of the carbon pool p in the forest class icl; dimensionless (IPCC default of 0.5)
p	Carbon pool that could burn, above-ground biomass

For the F_{burnt}, it was considered default value from MCTI (Science, Technology and Innovation Ministry)¹⁰⁴. According to the governmental publication, the combustion factor for the phytophysionomy Open Tropical Rainforest (Aa, Ab, As) is 45%.

The P_{burnt} estimated using the average biomass per hectare that has commercial value and could be removed prior to clear cutting and burning. Based on literature, an average value of 61.6 m³/ha was obtained, which would correspond to approximately 11% of the total biomass in 1 ha. In this way, the remaining is burned to clear the area, therefore, its new value is 88.6%.

However, due to the lack of literature estimates, a study from the Brazilian Amazon in the Cerrado vegetation was used for the comparison. This study reported that the total biomass consumed by fires varies from 72% to 84% (average 78%) in denser Cerrado types, which is a forest vegetation.

The most conservative value between these two estimates were used, i.e., P_{burnt} was estimated as 78%.

It is important to note that slash and burn practices are commonly used in the Amazon region to clear the area for other land uses thus, when burning an area, the main objective is to completely

¹⁰³ According to the VCS Standard, the six Kyoto Protocol greenhouse gases and ozone-depleting substances shall be converted using 100 year global warming potentials derived from the IPCC's Fifth Assessment Report (GWP for CH₄ = 28).

¹⁰⁴ Value of "Biomass combustion factors by phytophysionomies group in the Amazon biome" for Open Tropical Rainforest available at the Third National Communication from Brazil to the United Nations Framework Convention on Climate Change Volume 3, Table A2.4, page 305 <<http://www.ccst.inpe.br/publicacao/terceira-comunicacao-nacional-do-brasil-a-convencao-quadro-das-nacoes-unidas-sobre-mudanca-do-clima-portugues/>>

remove all the remaining biomass. Therefore, assuming that 78% of the biomass is combusted, there would still be a 22% remaining biomass that shall be left to decompose, which also emits GHG to the atmosphere in this process.

Thus, the total actual non-CO₂ emissions from forest fire at year t in the project area at the baseline scenario (EBBBSLPA_t) were calculated as follows.

$$EBBBSLPA_t = ABSLPA_{icl,t} * EBBtot_{icl,t}$$

Where,

EBBBSLPA_t Total actual non-CO₂ emissions from forest fire at year t in the project area in the baseline scenario; tCO₂e/ha

ABSLPA_{icl,t} Annual area of deforestation of initial forest classes icl in the project area at year t; ha

EBBtot_{icl,t} Total GHG emission from biomass burning in forest class icl at year t; tCO₂e/ha

Values of all used parameters and baseline non-CO₂ emissions from forest fires are available at the following tables:

Table 37. Parameters used to calculate non-CO₂ emissions from forest fires

Initial Forest Class		Parameters								
		Fburnt _{icl}	C _{ab}	Pburnt _{ab,icl}	CE _{ab,icl}	ECO ₂ -ab	EBBCO ₂ -tot	EBBN ₂₀ _{icl}	EBBCH ₄ _{icl}	EBBtot _{icl}
IDcl	Name	%	tCO ₂ e/ha	%	%	tCO ₂ e/ha	tCO ₂ e/ha	tCO ₂ e/ha	tCO ₂ e/ha	tCO ₂ e/ha
1	Open Tropical Rainforest (Forest)	45.00%	517.73	78%	50%	90.86	90.86	0.72	11.10	11.82

Table 38. Baseline non-CO₂ emissions from forest fires in the project

Project year t	Emissions of non-CO ₂ gasses from baseline forest fires	Total baseline non-CO ₂ emissions from forest fires in the project area
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	Grupo Rovema		Grupo Tupá		Grupo Leite		annual	cumulative
	ABSLPA _{icl,t}	EBBBSL _{tot,icl}	ABSLPA _{icl,t}	EBBBSL _{tot,icl}	ABSLPA _{icl,t}	EBBBSL _{tot,icl}	EBBBSLPA _t	EBBBSLPA
	ha	tCO ₂ e/ha	ha	tCO ₂ e/ha	ha	tCO ₂ e/ha	tCO ₂ e	tCO ₂ e
2019	167.16	11.82	0.00	11.82	0.00	11.82	1,976.52	1,976.52
2020	926.37	11.82	355.62	11.82	60.77	11.82	15,876.94	17,853.47
2021	1,159.14	11.82	422.24	11.82	92.01	11.82	19,786.22	37,639.69
2022	1,224.50	11.82	455.08	11.82	132.01	11.82	21,420.35	59,060.04

5.2 Project Emissions

As detailed in section 5.2 below, the instances within the Rio Madeira Grouped REDD Project may have sustainable forest management plan implemented. This type of economic activity enables the harvesting of an economically feasible volume of forest products, however allowing the regeneration of the natural stock in accordance with the growth and recovery rates of the biome.

Two instances, Grupo Rovema and Grupo Tupá have Sustainable Forest Management Plan. During the current monitoring period, two APU was harvested, according to Tables below.

Grupo Rovema (instance 1):

APU	Area (ha)	Initial date	Final date	Days	Volume (m³)	Volume/ha (m³/ha)
POA 5	3,476.12	31/05/2021	31/12/2021	215	40,072.31	11.53
		01/04/2022	31/12/2022	275	34,402.41 ¹⁰⁵	21.42
		TOTAL		490	74,474.72	21.42

Grupo Tupá (instance 3):

APU	Area (ha)	Initial date	Final date	Days	Volume (m³)	Volume/ha (m³/ha)
UPF 4	484.22	01/05/2022	31/12/2022	245	1,789.62	3.70
		TOTAL		245	1,789.62	3.70

The ex post carbon stock decrease due to planned deforestation in the project area was calculated using the following equation:

¹⁰⁵ Volume obtained from POA 5 Ending Report during the monitored period for instance 1. The total exploited within POA5 was 74,474.72m³ was subtracted from the exploited during previous years (40,072.31). Thus, the difference between these volumes corresponds to total exploited during the monitored period.

$$\Delta CPDdPA_t = (APDPA_{icl,t} \times \Delta Ct_{tot,icl})$$

Where,

$\Delta CPDdPA_t$	Total decrease in carbon stock due to planned deforestation at year t in the project area; tCO ₂ e
$APDPA_{icl,t}$	Areas of planned deforestation in forest class icl at year t in the project area; ha
$\Delta Ct_{tot,icl}$	Average carbon stock change of all accounted carbon pools in forest class icl at time t ; tCO ₂ e/ha

The *ex post* carbon stock decrease due to unplanned deforestation in the project area was calculated using the following equation:

$$\Delta CUDdPA_t = (AUDPA_{icl,t} \times \Delta Ct_{tot,icl})$$

Where,

$\Delta CPUdPA_t$	Total <i>ex post</i> actual carbon stock change due to unavoidable unplanned deforestation at year t in the project area; tCO ₂ e
$AUDPA_{icl,t}$	Areas of unplanned deforestation in forest class icl at year t in the project area; ha
$\Delta Ct_{tot,icl}$	Average carbon stock change of all accounted carbon pools in forest class icl at time t ; tCO ₂ e/ha

Therefore, the total carbon stock decreases due to planned and unplanned deforestation in the project area could be calculated, as depicted in Table below.

Table 39. Ex post carbon stock decrease due to planned and unplanned deforestation in the project area

Project year t	Areas of planned deforestation x Carbon stock change (decrease) in the project area						Total carbon stock decrease due to planned deforestation		Areas of unplanned deforestation x Carbon stock change (decrease) in the project area						Total carbon stock decrease due to unplanned deforestation		Total carbon stock decrease due to planned and unplanned deforestation	
	Grupo Rovema		Grupo Tupá		Grupo Leite		annual	cumulative	Grupo Rovema		Grupo Tupá		Grupo Leite		annual	cumulative	annual	cumulative
	APDPAicl,t	Ctoticl,t	APDPAicl,t	Ctoticl,t	APDPAicl,t	Ctoticl,t	ΔCPDdPA _t	ΔCPDdPA	AUDPAicl,t	Ctoticl,t	AUDPAicl,t	Ctoticl,t	AUDPAicl,t	Ctoticl,t	ΔCUDdPA _t	ΔCUDdPA	tCO ₂ e	tCO ₂ e
	ha	tCO ₂ e/ha	ha	tCO ₂ e/ha	ha	tCO ₂ e/ha	tCO ₂ e	tCO ₂ e	ha	tCO ₂ e/ha	ha	tCO ₂ e/ha	ha	tCO ₂ e/ha	tCO ₂ e	tCO ₂ e		
2019	17.77	641.99	0.00	641.99	0.00	641.99	11,408.10	11,408.10	4.56	641.99	0.00	641.99	0.00	641.99	2,928.62	2,928.62	14,336.72	14,336.72
2020	0.00	641.99	10.40	641.99	0.00	641.99	6,673.69	18,081.79	23.85	641.99	23.34	641.99	5.70	641.99	33,955.11	36,883.73	40,628.80	54,965.52
2021	35.50	641.99	0.00	641.99	0.00	641.99	22,790.52	40,872.31	27.97	641.99	38.17	641.99	0.00	641.99	42,463.08	79,346.81	65,253.60	120,219.12
2022	6.75 ¹⁰⁶	641.99	9.14	641.99	0.00	641.99	10,201.17	51,073.47	11.93	641.99	4.95	641.99	51.79	641.99	44,085.21	123,432.02	54,286.38	174,505.50

¹⁰⁶ Please note there is a typo in the 2021 data and thus is has not been considered as a number. Therefore, although no roads were opened in 2022, the value of this cell was taken into account to correct the discount that should be applied in 2021.

Figure 24. Deforestation in the Project Area in Serra Verde farm (Instance 1) during the monitoring period (January 2022 to December 2022)

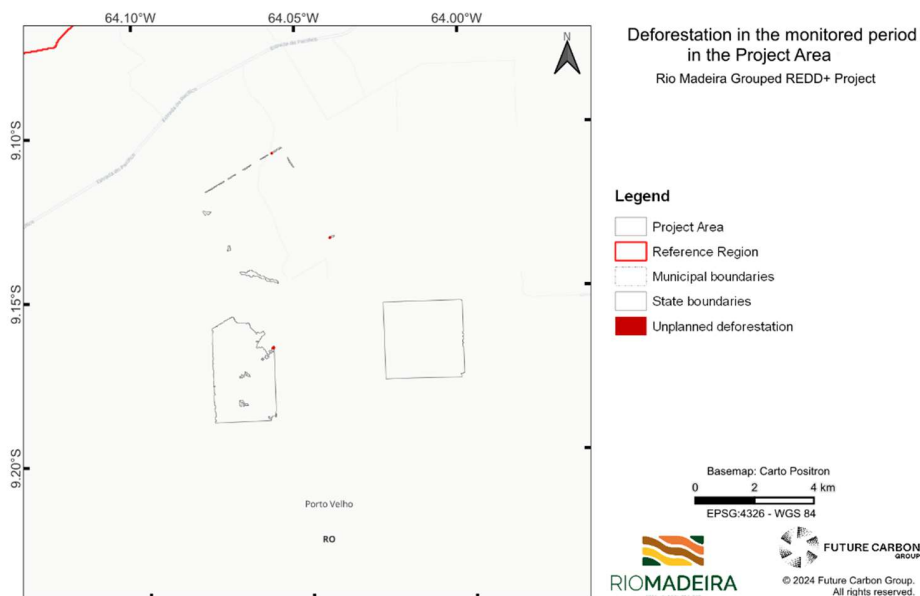


Figure 25. Deforestation in the Project Area in Rio Madeira and Santa Carmen's Farm (Instances 1 and 2) during the monitoring period (January 2022 to December 2022)

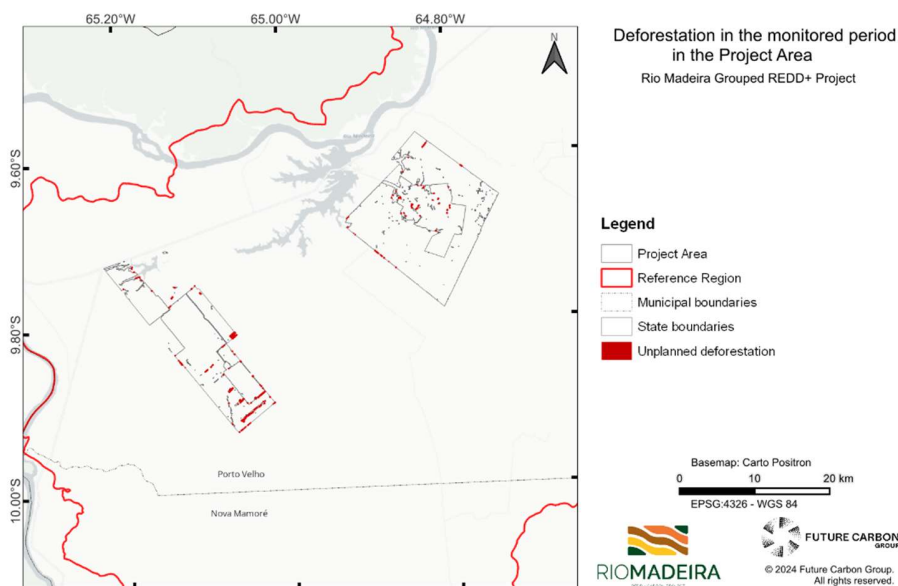


Figure 26. Deforestation in the Project Area in Nova Fronteira farm (Instance 3) during the monitoring period (January 2022 to December 2022)

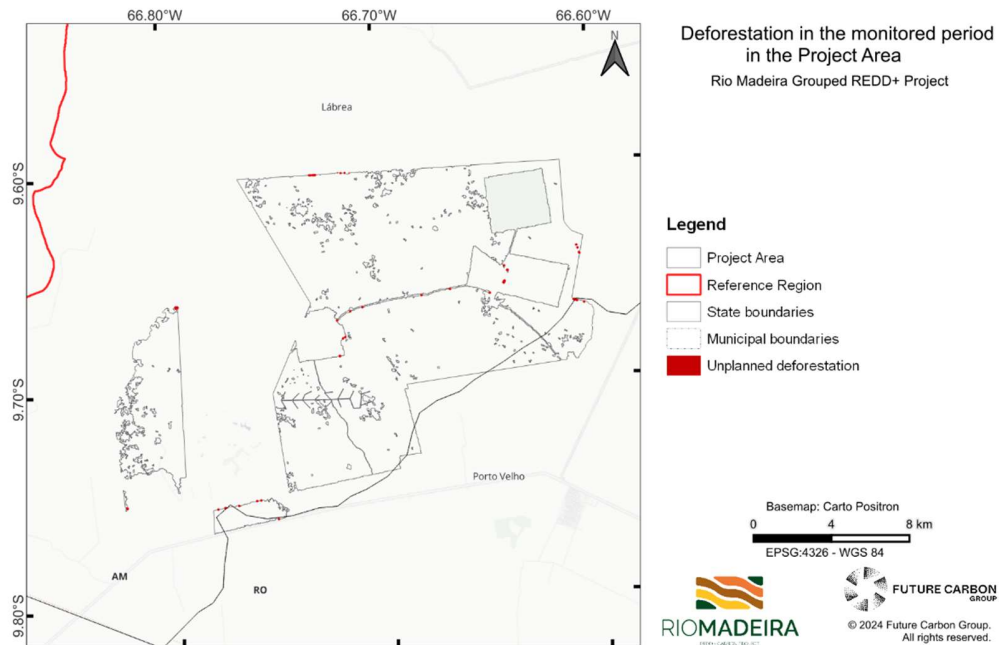


Figure 27. Deforestation in the Leakage Belt (Instance 1) during the monitoring period (January 2022 to December 2022)

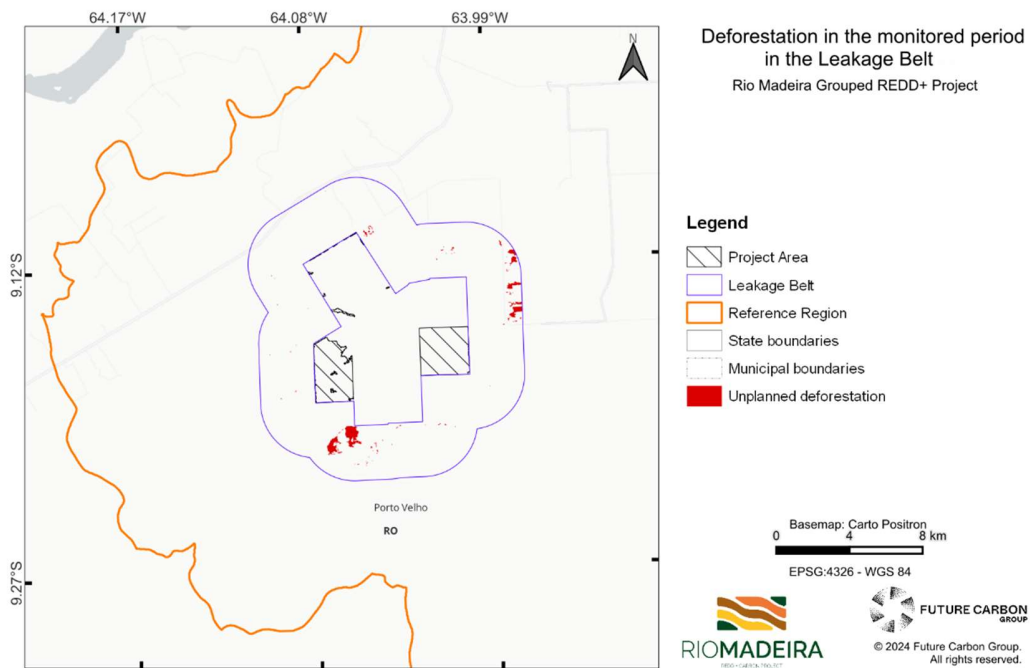


Figure 28. Deforestation in the Leakage Belt (Instance 2) during the monitoring period (January 2022 to December 2022)

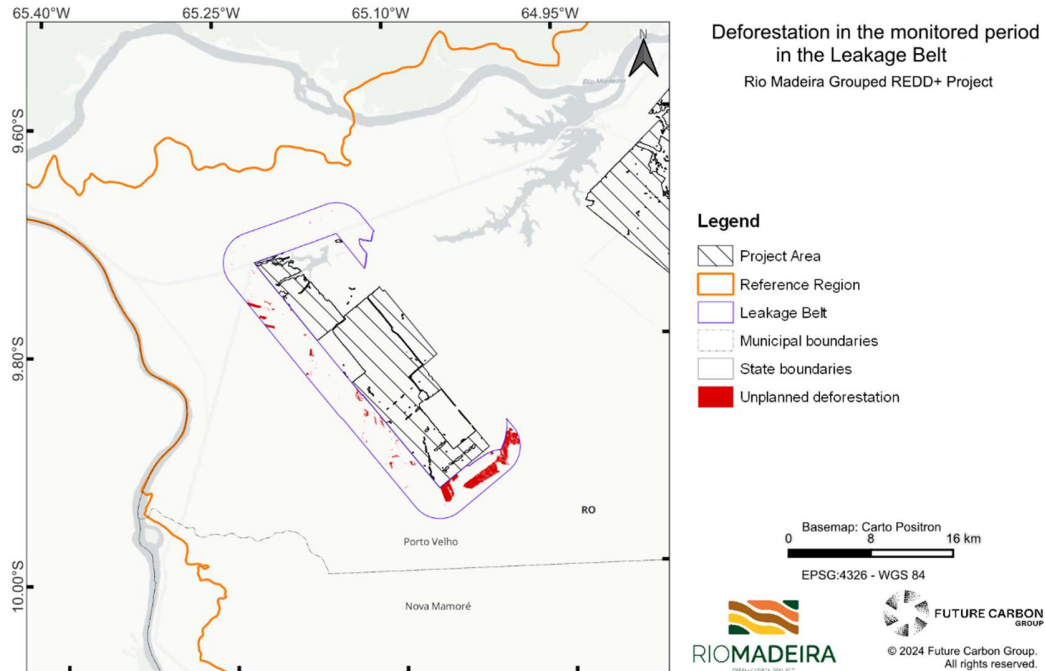


Figure 29. Deforestation in the Leakage Belt (Instance 3) during the monitoring period (January 2022 to December 2022)

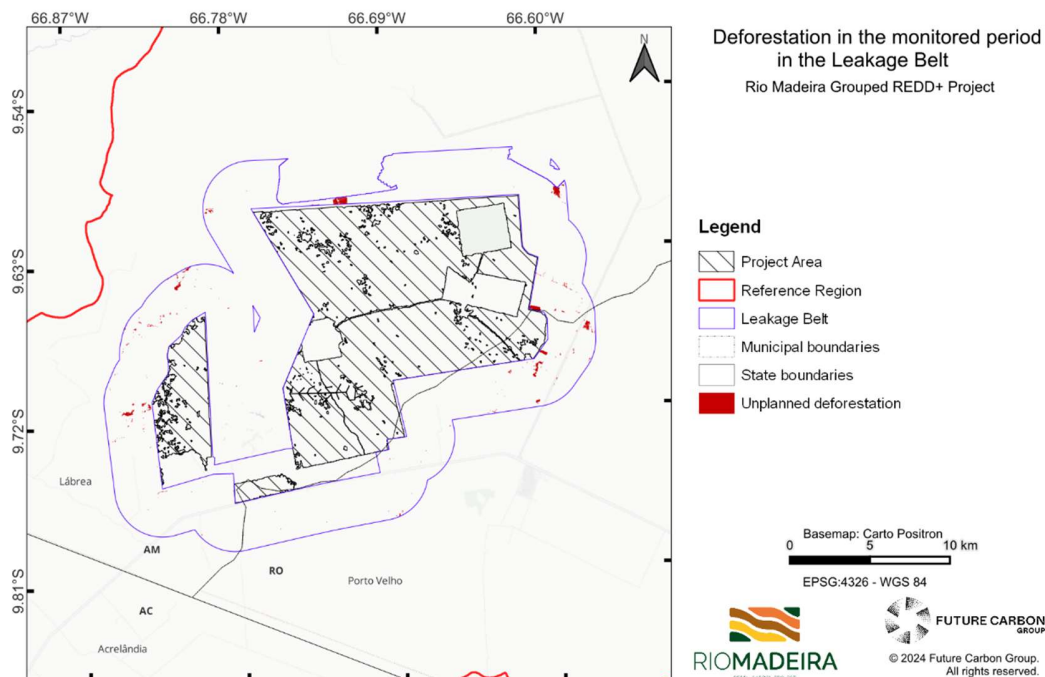


Figure 30. Deforestation in the Reference Region (Instance 1) during the monitoring period (January 2022 to December 2022)

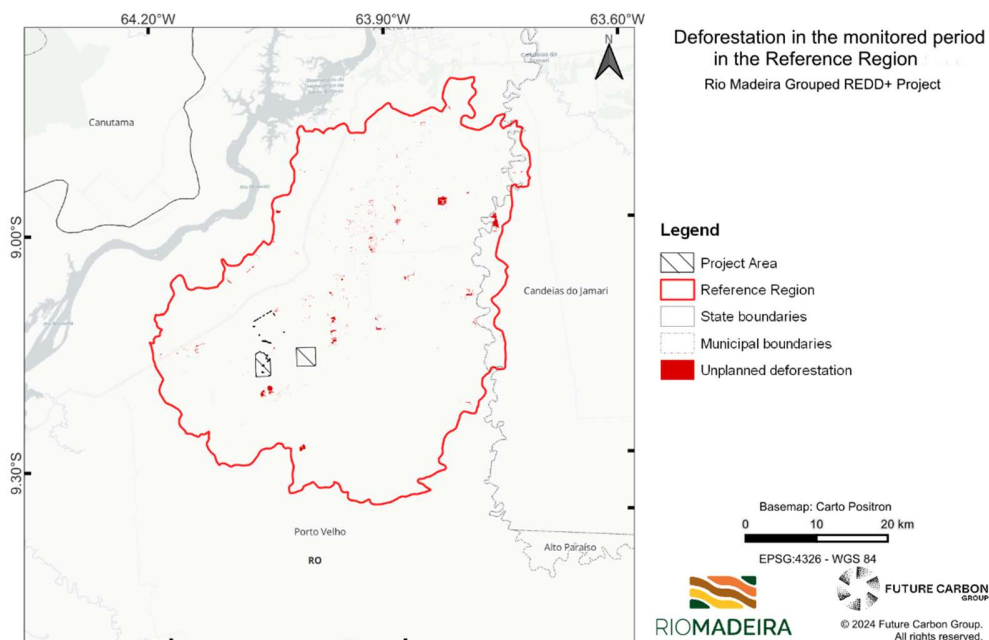


Figure 31. Deforestation in the Reference Region (Instances 1 e 2) during the monitoring period (January 2022 to December 2022)

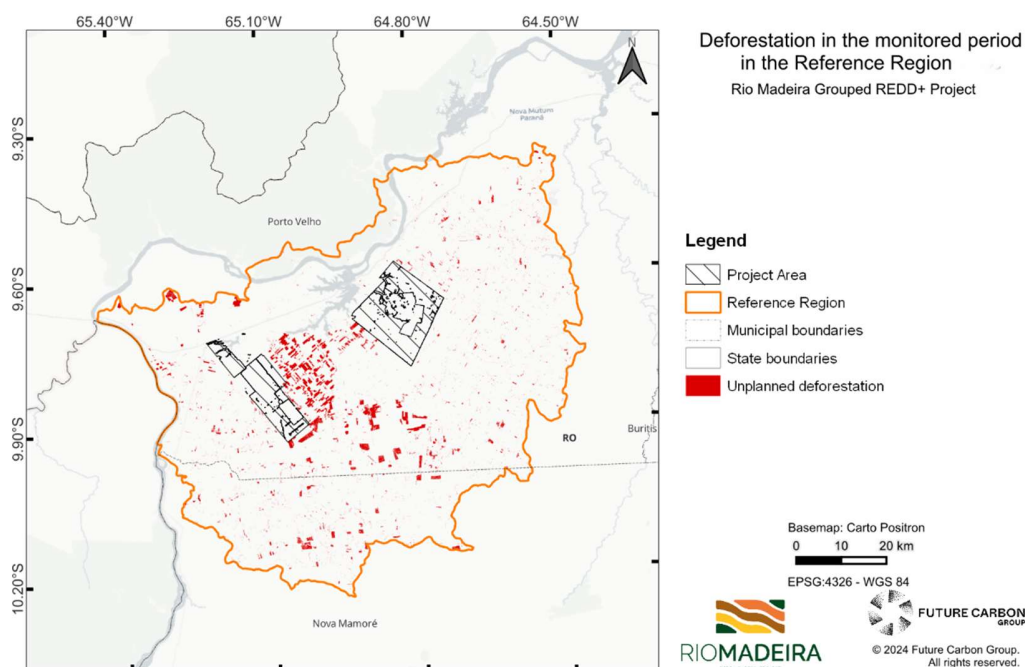


Figure 32. Deforestation in the Reference Region (Instance 3) during the monitoring period (January 2022 to December 2022)

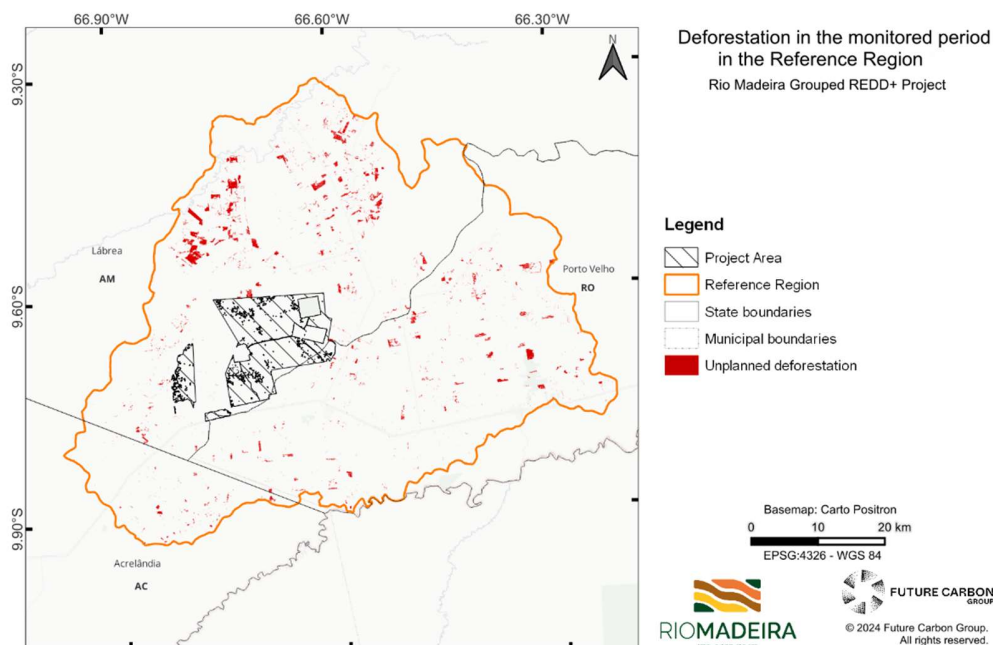


Figure 33. Comparison between projection and classification in 2022 for the Project Area at Instance 1 (Serra Verde Farm)

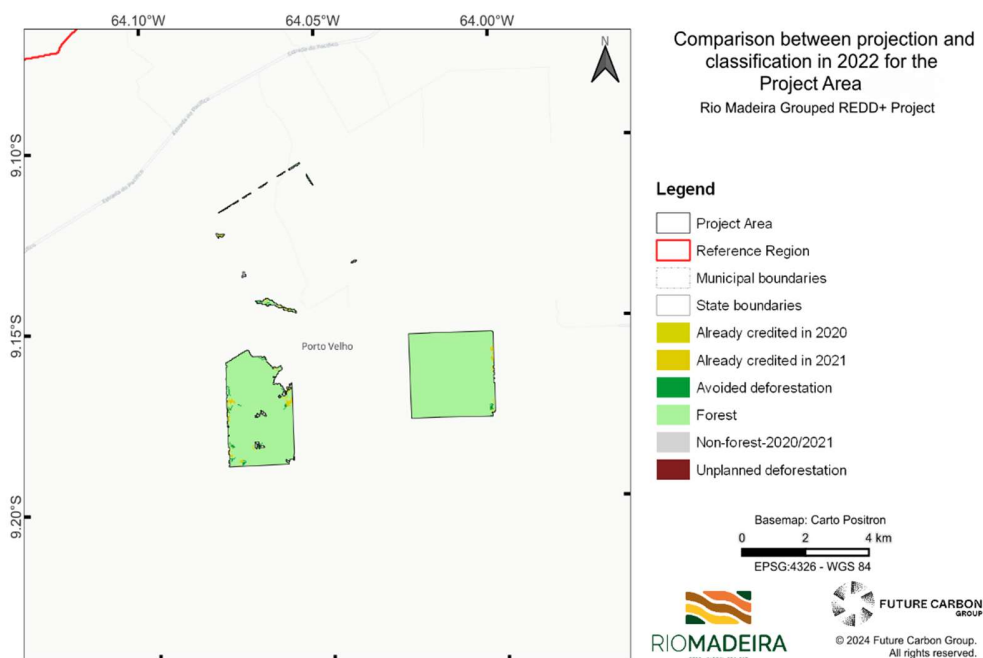


Figure 34. Comparison between projection and classification in 2022 for the Project Area in Instances 1 and 2 (Rio Madeira e Santa Carmen's Farm)

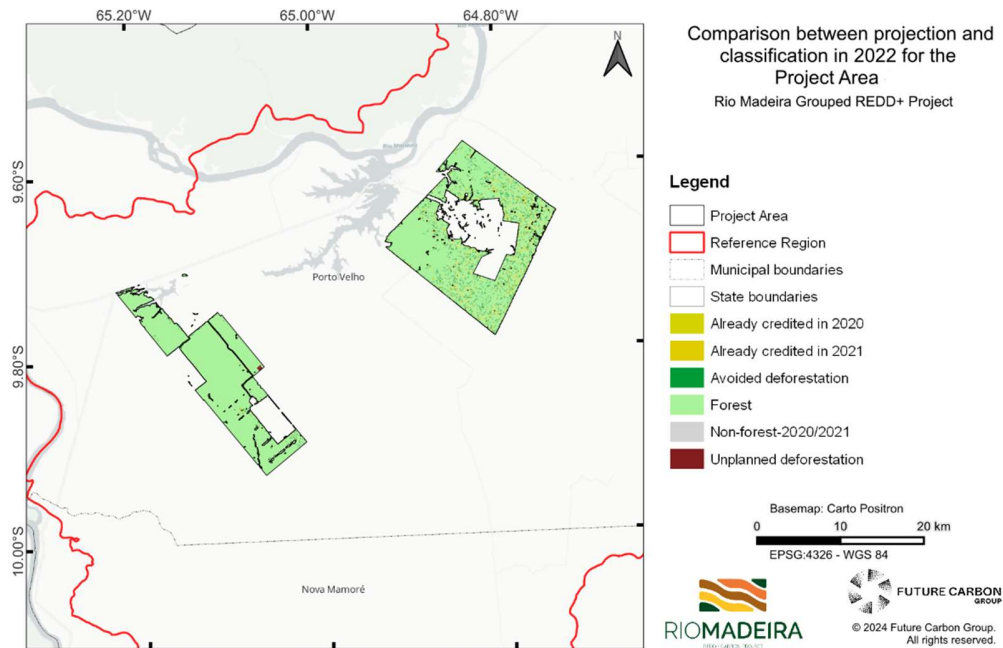


Figure 35 Comparison between projection and classification in 2022 for the Project Area in Instance 3 (Nova Fronteira Farm)

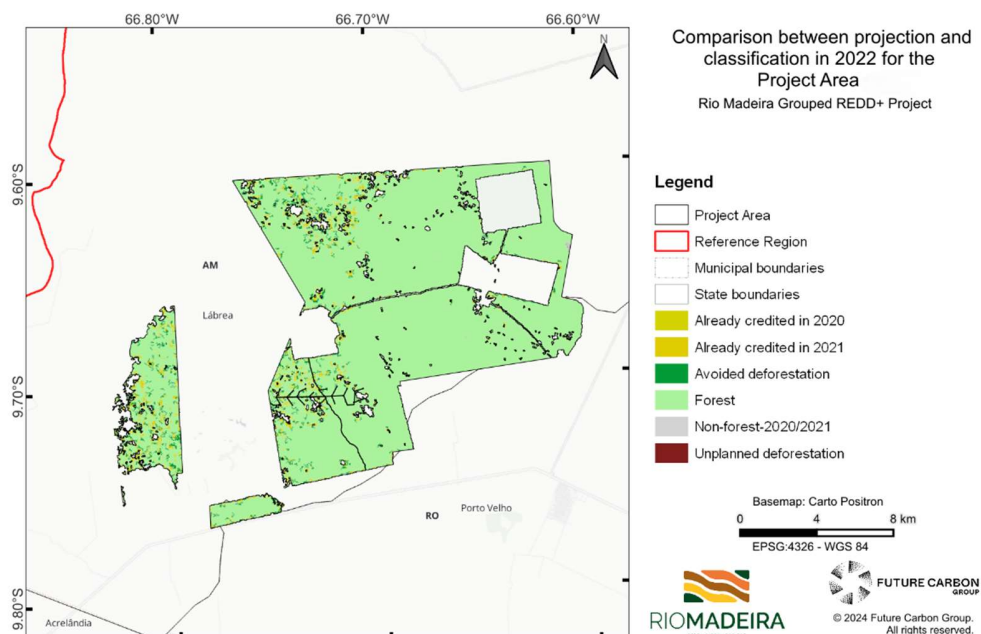


Figure 36. Comparison between projection and classification in 2022 for the Leakage Belt in Instance 1 (Serra Verde Farm)

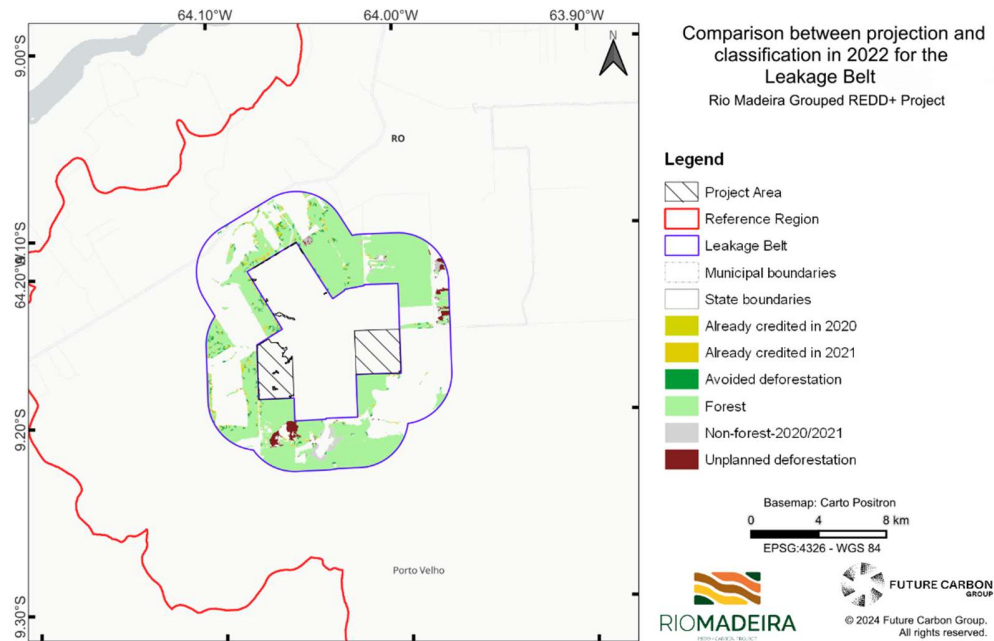


Figure 37. Comparison between projection and classification in 2022 for the Reference Region in Instance 2 (Santa Carmen Farm)

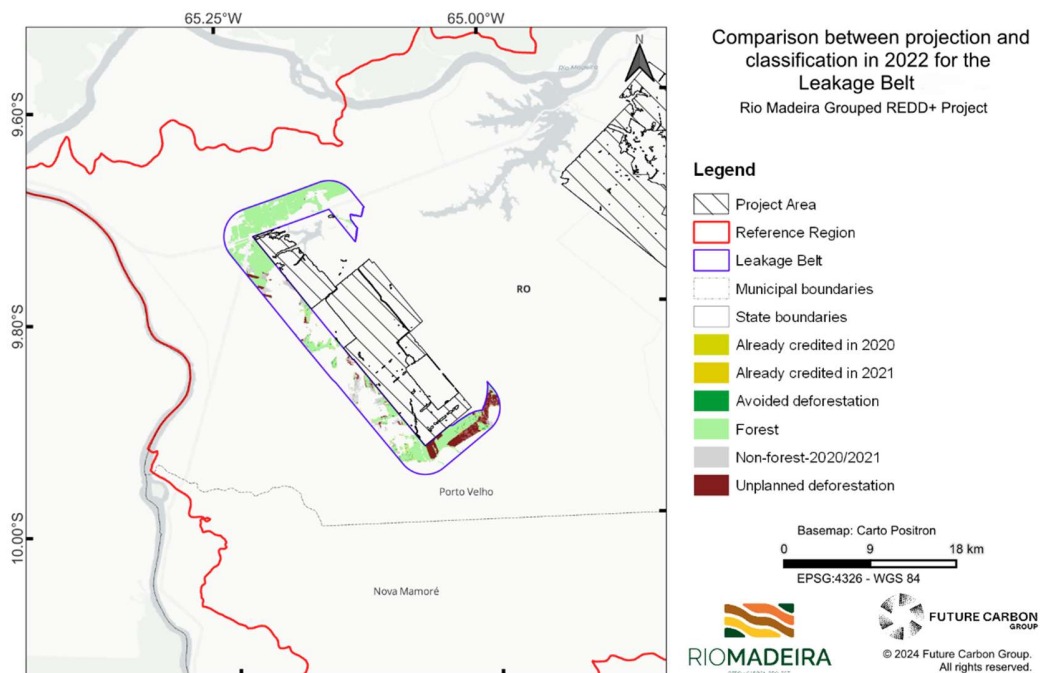


Figure 38. Comparison between projection and classification in 2022 for the Reference Region in Instance 3 (Nova Fronteira Farm)

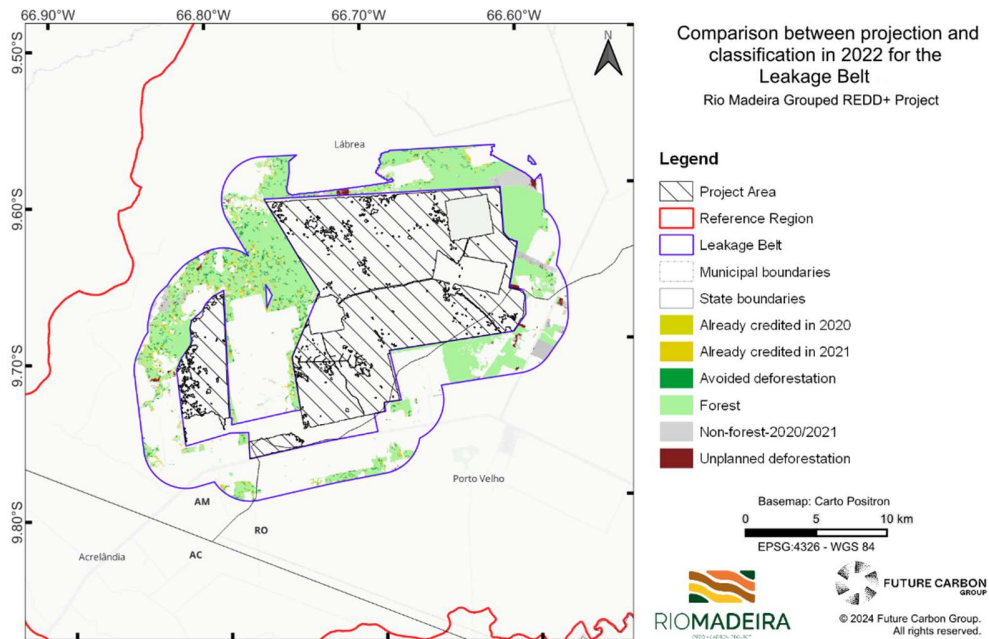


Figure 39. Comparison between projection and classification in 2022 for the Reference Region in Instance 1 (Serra Verde Farm)

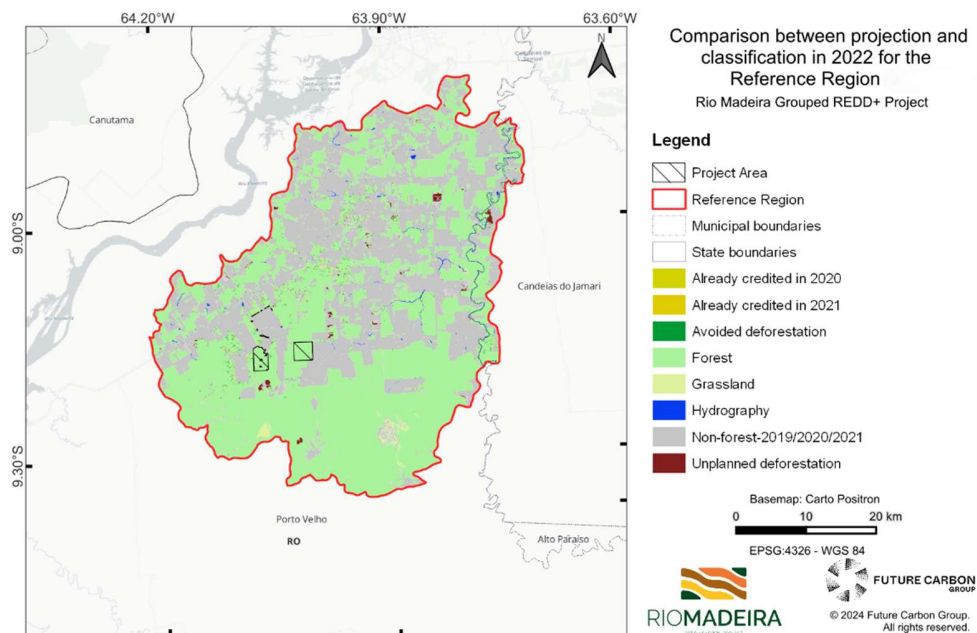


Figure 40. Comparison between projection and classification in 2022 for the Reference Region in Instances 1 and 2 (Rio Madeira and Santa Carmen's Farm)

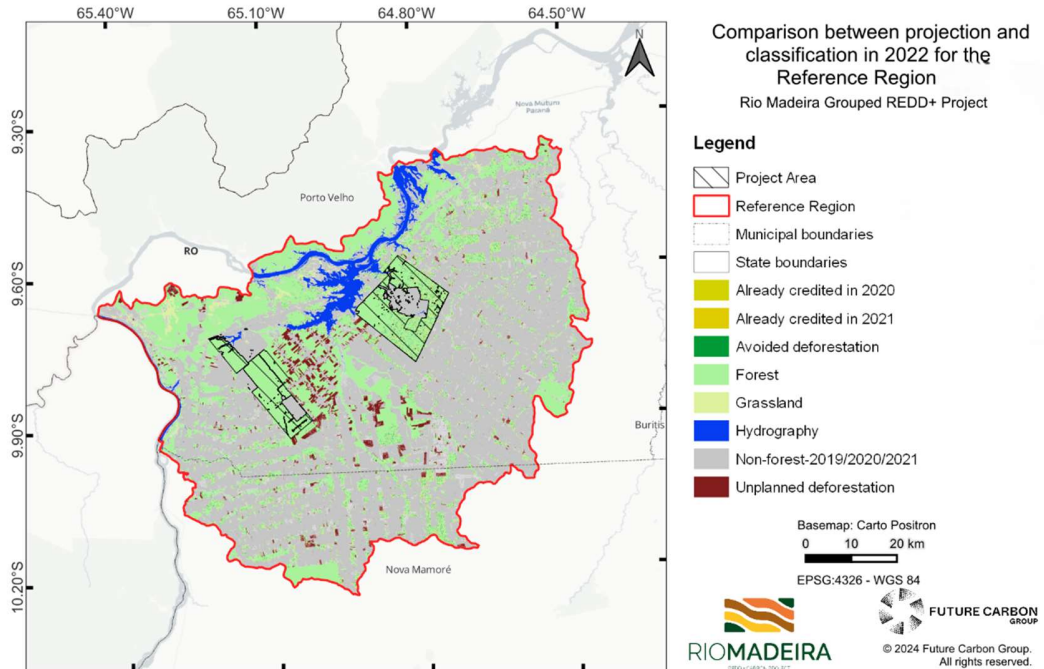
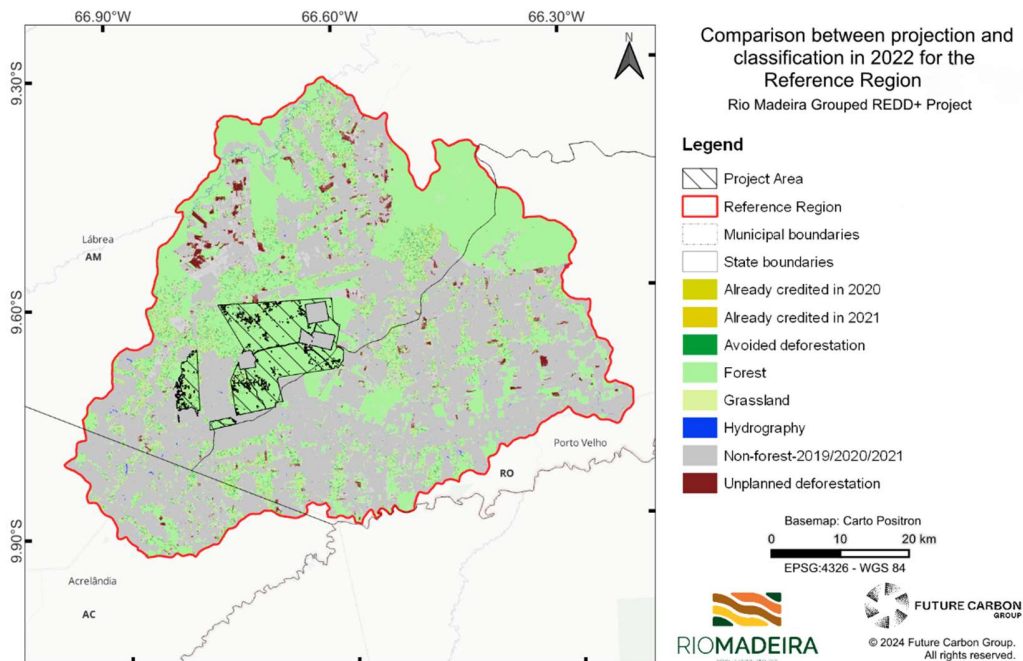


Figure 41. Comparison between projection and classification in 2022 for the Reference Region in Instance 3 (Nova Fronteira Farm)



In the project scenario, emissions due to planned logging activities results from timber harvesting and also from damages to vegetation during the directional tree felling, which generate forest residues (branches, remains of logs and other damaged trees during the tree felling).

According to Feldpausch et al (2005), the mean Coarse woody debris returned to the soil as necromass following logging and damage in: (1) tree felling gap formation (trees killed by tree-fall), (2) residual canopy from the felled tree, (3) road, (4) deck construction (whole trees plowed to the ground) and (5) skid maneuvering during logging, is about 6.9 Mg C/ha. According to section 4.3 (pg 212) from this same study, this represents 2.4 times the carbon taken off site in logs.

However, the MR already takes into account as planned deforestation the roads and decks constructions, which represent around 16% of the total damage¹⁰⁷. Therefore, the LDF is $2.4 * (1-0,159) = 2.0174$.

Thus, GHG emissions from logging activities include the volume of harvested timber plus the logging damage factor, as follows.

$$\Delta CLd_{icl} = (HI_{icl,t} + LDF) \times D_m \times CF \times 44 / 12$$

Where,

$\Delta CLd_{icl,t}$	Average carbon stock decrease due to logging activities in forest class <i>icl</i> at time <i>t</i> ; tCO ₂ e/ha
$HI_{icl,t}$	Harvesting intensity of timber in forest class <i>icl</i> at year <i>t</i> in the project area due to planned logging activities (i.e., sustainable forest management plan); m ³ /ha
LDF	Logging damage factor; m ³ /ha
D_m	Mean wood density; g/cm ³
CF	Default value of carbon fraction in biomass; tC t-1 d.m.
44/12	Ratio of molecular weight of CO ₂ to carbon; dimensionless

Harvested wood products were not accounted as carbon pool. Therefore, the *ex post* carbon stock decrease due to planned logging activities in the project area was calculated using the following equation:

¹⁰⁷ According to Feldpausch et al (2005), Table 6 shows mean damages divided into five groups, totaling 6.9 Mg/ha. However, if roads and log decks are excluded, 1.1Mg/ha should be discounted. Thus, 1.1/6.9 represent 16% of already discounted damage.

$$\Delta CPLdPA_t = (APLPA_{icl,t} \times \Delta CLd_{icl,t}) - (APLPA_{icl,t} \times \Delta Cwp_t)$$

Where,

$\Delta CPLdPA_t$	Total decrease in carbon stock due to planned logging activities at year t in the project area; tCO ₂ e
$APLPA_{icl,t}$	Areas of planned logging activities in forest class icl at year t in the project area; ha
$\Delta CLd_{icl,t}$	Average carbon stock decrease due to logging activities in forest class icl at time t ; tCO ₂ e/ha
ΔCwp_t	Average carbon stock per hectare in the harvested wood products carbon pool at time t ; tCO ₂ e/ha

Thus, table below presents the ex post carbon stock decrease due to planned logging activities in the project area.

Table 40. Ex post actual carbon stock decrease due to planned logging activities in the project area

Project year t	Areas of planned logging activities x Carbon stock change (decrease) in the project area						Total carbon stock decrease due to planned logging activities	
	Grupo Rovema		Grupo Tupá		Grupo Leite		annual	cumulative
	$APLPA_{icl,t}$	$\Delta CLd_{icl,t}$	$APLPA_{icl,t}$	$\Delta CLd_{icl,t}$	$APLPA_{icl,t}$	$\Delta CLd_{icl,t}$	$\Delta CPLdPA_t$	$\Delta CPLdPA$
	ha	tCO ₂ e/ha	ha	tCO ₂ e/ha	ha	tCO ₂ e/ha	tCO ₂ e	tCO ₂ e
2022	1,605.74	67.02	484.22	11.56	0.00	0.00	113,207.12	314,792.96

Fossil fuel emissions from sustainable forest management activities are likely to be less than 5% of the total GHG emissions reductions benefits generated by the present project. Considering that emissions from deforestation and forest degradation would be much higher than those associated with timber harvesting, the emissions from fossil fuel during transport and machinery use can be considered *de-minimis*. In addition, according to VCS AFOLU Requirements, fossil fuel emissions from transport and machinery use in REDD project activities can be considered *de minimis*.

Nevertheless, in order to estimate the fossil fuel emissions, it was counted all the invoices from diesel and other fossil fuel acquired from the instances during the monitored period. Then, it was estimated 5% of such volume was used for REDD project, including surveillance activities, SFMP, fire break maintenance, among others. It is worth emphasizing all instances have heavy machinery for the traditional agribusiness activities (tractors, trucks, plows, harvester etc), therefore 5% is considered reasonable as informed by the landowners. Afterwards, the fuel

volume was applied to the Brazilian GHG Protocol calculation tool¹⁰⁸ in order to estimate de fossil fuel emissions, which is summarized in the following table:

Table 41. Fossil fuel emissions during monitored period

Project year <i>t</i>	Fossil fuel emissions per instance			Total CO ₂ emissions from fossil fuel
	Grupo Rovema	Grupo Tupá	Grupo Leite	
	tCO ₂	tCO ₂	tCO ₂	tCO ₂
2022	68.09	15.54	25.59	109.22

Considering the total VCU during the monitored period as shown in Table 50, the fossil fuel emissions during the monitored period can be considered *de minimis* since it represents than 5% of total VCUs.

No production of fuel wood or charcoal occurred within the project area during the monitoring period.

Thus, table below presents the total ex post carbon stock decrease due to planned activities in the project area.

Table 42. Total ex post carbon stock decrease due to planned activities in the project area

Project year <i>t</i>	Total carbon stock decrease due to planned deforestation		Total carbon stock decrease due to planned logging activities		Total carbon stock decrease due to planned fuel-wood and charcoal activities		Total carbon stock decrease due to planned activities	
	annual	cumulative	annual	cumulative	annual	cumulative	annual	cumulative
	ΔCPDdPA_t	ΔCPDdPA	ΔCPLdPA_t	ΔCPLdPA	ΔCPFdPA_t	ΔCPFdPA	ΔCPAdPA_t	ΔCPAdPA
	tCO _{2e}	tCO _{2e}	tCO _{2e}	tCO _{2e}	tCO _{2e}	tCO _{2e}	tCO _{2e}	tCO _{2e}
2022	10,201	51,073	113,207	314,793	0	0	123,408	365,866

Neither planned protection of secondary/degraded forests without harvest nor production of fuel-wood and charcoal are expected to occur within the project area under the project scenario. Thus, carbon stock increase due to growth without harvest or due to planned fuel-wood and charcoal activities were not monitored. However, if any of these activities is implemented in the future, a measurement of the carbon stock changes was carried out.

¹⁰⁸ Available at

<https://docs.google.com/forms/d/e/1FAIpQLSd28GUG1Kc8wXj8JNRAfhMRh32r24Wome4RBuEdsnEb3OLB0Q/viewform> Last visit on 21/September-2023

According to the applied methodology, if the project activity generates a significant change in carbon stocks due to these activities, the carbon stock change shall be measured *ex post*. However, if the project activity generates an increase in carbon stocks, ignoring the carbon stock change is conservative, which applies until the next baseline reassessment and it is demonstrated in the table below and in the MR spreadsheet.

The calculation of the *ex post* net carbon stock change in the project area under the project scenario ($\Delta CPSPA_t$) is described as follows.

$$\Delta CPSPA_t = \Delta CPAdPA_t + \Delta CUDdPA_t - \Delta CPAiPA_t$$

Where,

- $\Delta CPSPA_t$ Sum of ex post actual carbon stock changes in the project area at year t; tCO₂e
- $\Delta CPAdPA_t$ Total decrease in carbon stock due to all planned activities at year t in the project area; tCO₂e
- $\Delta CUDdPA_t$ Total ex post actual carbon stock change due to unavoidable unplanned deforestation at year t in the project area; tCO₂e
- $\Delta CPAiPA_t$ Total increase in carbon stock due to all planned activities at year t in the project area; tCO₂e

Ex post carbon stock change in the project area under the project scenario is shown below.

Table 43. Ex post net carbon stock change in the project area under the project scenario

Project year t	Total carbon stock decrease due to planned activities		Total carbon stock increase due to planned activities		Total carbon stock decrease due to unavoids unplanned deforestation		Total carbon stock change in the project case	
	annual	cumulative	annual	cumulative	annual	cumulative	annual	cumulative
	$\Delta CPAdPA_t$	$\Delta CPAdPA$	$\Delta CPAiPA_t$	$\Delta CPAiPA$	$\Delta CUDdPA_t$	$\Delta CUDdPA$	$\Delta CPSPA_t$	$\Delta CPSPA$
	tCO ₂ e	tCO ₂ e	tCO ₂ e	tCO ₂ e	tCO ₂ e	tCO ₂ e	tCO ₂ e	tCO ₂ e
2022	123,408	365,866	0	7,914	40,612	119,959	164,020	477,911

No forest fire was used by the landowner for carrying out planned deforestation or timber harvesting activities. However, there were 68.67 ha of unplanned deforestation within the project area during the monitored period, which conversion of forest to non-forest could have involved fires.

The effect of fire on carbon emissions is counted in the estimation of carbon stock changes in the parameter $\Delta CUDdPA_t$; therefore CO₂ emissions from forest fires were ignored to avoid double counting. However, non-CO₂ emissions (CH₄ and N₂O) from forest fires must be counted in the project scenario, when they are significant.

It was conservatively assumed that all unplanned deforestation within the project area involved fire and all above ground biomass was burnt. Therefore, non-CO₂ emissions from forest fires were quantified and deducted from emission reductions, as follows:

$$EBB_{tot,icl,t} = EBB_{N_2O,icl,t} + EBB_{CH_4,icl,t}$$

Where,

$EBB_{tot,icl,t}$	Total GHG emission from biomass burning in forest class <i>icl</i> at year <i>t</i> ; tCO ₂ e/ha
$EBB_{N_2O,icl,t}$	N ₂ O emission from biomass burning in forest class <i>icl</i> at year <i>t</i> ; tCO ₂ e/ha
$EBB_{CH_4,icl,t}$	CH ₄ emission from biomass burning in forest class <i>icl</i> at year <i>t</i> ; tCO ₂ e/ha

$$EBB_{N_2O,icl,t} = EBB_{CO_2,icl,t} * 12/44 * NCR * ER_{N_2O} * 44/28 * GWP_{N_2O}$$

Where,

$EBB_{CO_2,icl,t}$	Per hectare CO ₂ emission from biomass burning in slash and burn in forest class <i>icl</i> at year <i>t</i> ; tCO ₂ e/ha
NCR	Nitrogen to Carbon Ratio (IPCC default value = 0.01); dimensionless
ER_{N_2O}	Emission ratio for N ₂ O (IPCC default value = 0.007)
GWP_{N_2O}	Global Warming Potential for N ₂ O ¹⁰⁹

$$EBB_{CH_4,icl,t} = EBB_{CO_2,icl,t} * 12/44 * ER_{CH_4} * 16/12 * GWP_{CH_4}$$

Where,

$EBB_{CO_2,icl,t}$	Per hectare CO ₂ emission from biomass burning in slash and burn in forest class <i>icl</i> at year <i>t</i> ; tCO ₂ e/ha
ER_{CH_4}	Emission ratio for CH ₄ (IPCC default value = 0.012)
GWP_{CH_4}	Global Warming Potential for CH ₄ ¹¹⁰

$$EBB_{CO_2,icl,t} = F_{burnt,icl} * (C_{p,icl,t} * P_{burnt,p,icl} * CE_{p,icl})$$

Where,

¹⁰⁹ According to the VCS Standard, the six Kyoto Protocol greenhouse gases and ozone-depleting substances shall be converted using 100 year global warming potentials derived from the IPCC's Fifth Assessment Report. GWP for N₂O = 265.

¹¹⁰ According to the VCS Standard, the six Kyoto Protocol greenhouse gases and ozone-depleting substances shall be converted using 100 year global warming potentials derived from the IPCC's Fifth Assessment Report. GWP for CH₄ = 28.

$EBBCO_{2icl,t}$	Per hectare CO ₂ emission from biomass burning in the forest class <i>icl</i> at year <i>t</i> ; tCO ₂ e/ha
$F_{burnt,icl}$	Proportion of forest area burned during the historical reference period in the forest class <i>icl</i> ; %
$C_{p,icl,t}$	Average carbon stock per hectare in the carbon pool <i>p</i> burnt in the forest class <i>icl</i> at year <i>t</i> ; tCO ₂ e/ha
$P_{burnt,p,icl}$	Average proportion of mass burnt in the carbon pool <i>p</i> in the forest class <i>icl</i> ; % (conservatively assumed as 100%)
$CE_{p,icl}$	Average combustion efficiency of the carbon pool <i>p</i> in the forest class <i>icl</i> ; dimensionless (IPCC default of 0.5 was used)
<i>p</i>	Carbon pool that could burn, in the project case, above-ground biomass

Thus, the total actual non-CO₂ emissions from forest fire at year *t* in the project area ($EBBPSPA_t$) were calculated as follows.

$$EBBPSPA_t = ABSLPA_{icl,t} * EBBtot_{icl,t}$$

Where,

$EBBPSPA_t$	Total actual non-CO ₂ emissions from forest fire at year <i>t</i> in the project area; tCO ₂ e/ha
$ABSLPA_{icl,t}$	Annual area of deforestation of initial forest classes <i>icl</i> in the project area at year <i>t</i> ; ha
$EBBtot_{icl,t}$	Total GHG emission from biomass burning in forest class <i>icl</i> at year <i>t</i> ; tCO ₂ e/ha

Table 44. Total ex post emissions of GHG due to forest fires in the project area

Project year <i>t</i>	Areas of unplanned deforestation x Carbon stock change (decrease) in the project area						Total carbon stock decrease due to unplanned deforestation	
	Grupo Rovema		Grupo Tupá		Grupo Leite		annual	cumulative
	$AUDPA_{icl,t}$	$EBBPSPA_{icl,t}$	$AUDPA_{icl,t}$	$EBBPSPA_{icl,t}$	$AUDPA_{icl,t}$	$EBBPSPA_{icl,t}$	$EBBPSPA_t$	$EBBPSPA$
	ha	tCO ₂ e/ha	ha	tCO ₂ e/ha	ha	tCO ₂ e/ha	tCO ₂ e	tCO ₂ e
2022	7.68	11.82	4.68	11.82	50.90	11.82	747.99	2,209.39

Total ex post project emissions for the project area

The ex post carbon stock changes and non-CO₂ emissions in the Project area during the monitoring period is summarized in Table below:

Table 45. Total ex post actual net carbon stock changes and emissions of GHG gases in the project area

Project year <i>t</i>	Total ex post carbon stock decrease due to planned activities		Total ex post carbon stock increase due to planned activities		Total ex post carbon stock decrease due to unavoided unplanned deforestation		Total ex post carbon stock change		Total ex post estimated actual non-CO ₂ emissions from forest fires in the project area	
	annual	cumulative	annual	cumulative	annual	cumulative	annual	cumulative	annual	cumulative
	ΔCPAdPA_t	ΔCPAdPA	ΔCPAiPA_t	ΔCPAiPA	ΔCUDdPA_t	ΔCUDdPA	ΔCPSPA_t	ΔCPSPA	EBBPSPA_t	EBBPSPA
	tCO _{2e}	tCO _{2e}	tCO _{2e}	tCO _{2e}	tCO _{2e}	tCO _{2e}	tCO _{2e}	tCO _{2e}	tCO _{2e}	tCO _{2e}
2022	123,408.29	365,866.44	0.00	7,914.18	44,085.21	123,432.02	167,493.50	481,384.27	811.96	2,273.36

5.3 Leakage

According to the applied methodology, two sources of leakage are considered: a) decrease in carbon stocks and increase in GHG emissions associated with leakage prevention measures; and b) decrease in carbon stocks and increase in GHG emissions associated with activity displacement leakage.

Ex post estimation of decrease in carbon stocks and increase in GHG emissions due to leakage prevention measures

To reduce the risk of activity displacement leakage, baseline deforestation agents could participate in activities within the project area and leakage management area that together will replace baseline income, product generation and livelihood of the agents as much as possible, so that deforestation was reduced, and the risk of displacement minimized. As such, a reduction in carbon stocks and/or an increase in GHG emissions may occur compared to the baseline case. If this decrease in carbon stock or increase in GHG emission is significant, it must be accounted, and ex post monitoring is required.

In order to calculate the net carbon stock changes that the planned leakage prevention measures are expected to occasion during the monitoring period, the projected carbon stocks shall be estimated in the leakage management area under the baseline case and project scenario.

$$\Delta CLPMLK_t = \Delta CPSLK_t - \Delta CBSLLK_t$$

Where,

$\Delta CLPMLK_t$ Carbon stock decrease due to leakage prevention measures at year t ; tCO₂e

$\Delta CBSLLK_t$ Annual carbon stock changes in leakage management areas in the baseline case at year t ; tCO₂e

$\Delta CPSLK_t$ Annual carbon stock change in leakage management areas in the project case; tCO₂e

If the net sum of carbon stock changes within a monitoring period is more than zero, leakage prevention measures are not causing any carbon stock decrease. The net increase shall conservatively be ignored in the calculation of net GHG emission reductions of the project activity. Nevertheless, if the net sum is negative, it must be accounted if significant.

According to the planned interventions carried out by the Rio Madeira Grouped REDD+ Project in the baseline case, no decrease in carbon stocks due to activities implemented in the leakage management area were identified, thus $\Delta CBSLLK = 0$.

However, during the current monitoring period, there were carbon stock changes within the leakage management area due to deforestation of regenerated forests. The deforestation of 0.18 ha was detected in the LMA.

Therefore, the ex post carbon stock change in leakage management areas in the project case (ΔCPSLK_t) was calculated as follows. The annual values are detailed in the Table below.

$$\Delta\text{CPSLK}_t = \text{APSLK}_{fcl,t} * \Delta\text{Ctot}_{icl}$$

Where,

ΔCPSLK_t	Annual carbon stock change in leakage management areas in the project case; tCO ₂ e
$\text{APSLK}_{fcl,t}$	Annual area of class fcl with decreasing carbon stock in leakage management areas in the project case at year t; ha
ΔCtot_{icl}	Average carbon stock change of all accounted carbon pools in forest class icl at time t; tCO ₂ e/ha

Table 46. Ex post carbon stock change in leakage management areas in the project case

Project year	Carbon stock changes in leakage management area in the project case			
	ID _{fcl}	1	annual	cumulative
	APSLK _{fcl,t}	C _{tot} _{fcl,t}	ΔCPSLK_t	ΔCPSLK
	ha	tCO ₂ e/ha	tCO ₂ e	tCO ₂ e
2022	0.18	27.70	4.99	10.12

The table below shows that the net sum of carbon stock changes within the leakage management area during the current monitoring period is less than zero, i.e., leakage prevention measures are causing carbon stock decrease and therefore, are included as leakage emissions.

Table 47. Ex post estimated net carbon stock change in leakage management areas

Project year	Total carbon stock change in the baseline case		Total carbon stock change in the project case		Net carbon stock change due to leakage prevention measures	
	annual	cumulative	annual	cumulative	annual	cumulative
	ΔCBSLLK_t	ΔCBSLLK	ΔCPSLK_t	ΔCPSLK	ΔCLPMLK_t	ΔCLPMLK
	tCO ₂ e	tCO ₂ e	tCO ₂ e	tCO ₂ e	tCO ₂ e	tCO ₂ e
2022	0.00	0.00	4.99	10.12	4.99	10.12

Furthermore, leakage prevention measures carried out by the present project during the current monitoring period did not include agricultural intensification, fertilization, fodder production and/or other measures to enhance cropland and grazing land areas.

Therefore, the total ex post estimated carbon stock changes and increases in GHG emissions due to leakage prevention measures during this monitoring period is calculated as follows.

$$\text{ELPMLK}_t = \text{EgLK}_t + \Delta\text{CLPMLK}_t$$

Where,

ELPMLK_t Annual total increase in GHG emissions due to leakage prevention measures at year t ; tCO₂e

Table 48. Ex post estimated total emissions above the baseline from leakage prevention activities

Project year	Carbon stock decrease due to leakage prevention measures		Total ex ante GHG emissions from increased grazing activities		Total ex ante increase in GHG emissions due to leakage prevention measures	
	annual	cumulative	annual	cumulative	annual	cumulative
	ΔCLPMLK_t	ΔCLPMLK	EgLK_t	EgLK	ELPMLK_t	ELPMLK
	tCO ₂ e	tCO ₂ e	tCO ₂ e	tCO ₂ e	tCO ₂ e	tCO ₂ e
2022	4.99	10.12	0.00	0.00	4.99	10.12

Ex post decrease in carbon stocks and increase in GHG emissions due to activity displacement leakage

Activities that cause deforestation within the project area in the baseline case could be displaced outside the project boundary due to the implementation of the AUD project activity. A greater decrease in carbon stocks within the leakage belt during the project scenario than those predicted ex ante would indicate displacement of deforestation activities due to the project.

It is important to note that activity data for the leakage belt area was determined using the same methods applied to monitoring deforestation activity data in the project area. Leakage due to displacement activity was monitored by mapping forest cover change in the leakage belt.

As defined in the VCS Methodology VM0015 v1.1, if carbon stocks in the leakage belt area decrease more during project implementation than projected in the baseline case, this will be an indication that leakage due to displacement of baseline activities has occurred. Where strong evidence can be collected that deforestation in the leakage belt is attributable to deforestation agents that are not linked to the project area, the detected deforestation may not be attributed to the project activity and considered leakage.

From this perspective, it is possible to state that land-grabbing is a relevant phenom in the region that causes deforestation. Land-grabber is an illegal activity with the intention to have the land rights and make huge amounts of money selling areas that belong to the state or private owners¹¹¹. Utilizes aggressive methods based on encroachment, illegal settlements, wood and cattle stealing, fire outbreaks, among other illegal methods to steal private or public lands as they are occupied. In some extreme cases, it is possible to have gun fights, facilities destruction, and tortures.

Once the land grabbers stablish in the intended area to be robbed, the usual practice is cattle ranching in order to create a productive environment and avoid different versions of the land succession rather than illegal practice¹¹². When such episodes involve private areas, many times the landowners prefer to give up their lands and preserve their families and lives.

Generally, it is more likely to attack areas where the land titles are not fully legalized in notary and public authorities. Nevertheless, since the criminals are not always aware of the legal status of the land, the practice can also occur in fully legal properties.

Although the practice is undoubtedly illegal, there is no governmental efforts in order to stop it. Instead, there are political intentions to attenuate legal penalties for those who invade public

¹¹¹ Available at <https://theintercept.com/2022/12/01/profissionais-colocam-estado-a-servico-da-grilagem-de-terras-publicas-na-amazonia/> Last visit on 02/January/2023.

¹¹² Available at http://www.bibliotecaflorestal.ufv.br/bitstream/handle/123456789/4031/Livro_A-grilagem-de-terras-publicas-na-Amazonia-Brasileira_MMA.pdf?sequence=1&isAllowed=y Last visit on 02/January/2023.

lands in Brazil¹¹³. The region where the project activity instances are located is known for this illegal practice, where several episodes were publicly announced recently^{114 115 116 117}.

Regarding leakage emissions due to activity displacement, it is calculated as the difference between the *ex ante* and the *ex post* assessments.

Furthermore, the monitoring of increases in GHG emissions within leakage belt was also carried out. Although GHG emissions within the leakage belt *has increased*, this can be justified by the lack of actions implemented during the period monitored (2022), since the revenue from the credits only occurred in 2024. In addition, since the project adopted a 20% discount within the projection deforestation within Leakage Belt, there is a higher impact on leakage emissions.

However, it is important to note that actions were implemented during 2023 and 2024 before the carbon credits revenues. Although such activities are not covered by the current monitoring period, they demonstrate the project commitment with local communities and positive impact, such as:

- Electrical infrastructure renovation and internet installation at the Flor do Cupuaçu School;
- Good practices in Brazil nuts training, provided by EMBRAPA¹¹⁸;
- Investment in the infrastructure of the “Guerreiros da Natureza” Karate School.

Such activities will be further detailed in the next monitoring reports.

Ex post estimation of total leakage

The result of all sources of leakage is calculated as follows:

$$\Delta CLK_t = \Delta CLPMLK_t + \Delta CADLK_t$$

Where:

ΔCLK_t Total decrease in carbon stocks within the leakage belt at year t; tCO_{2e}

$\Delta CLPMLK_t$ Carbon stock decrease due to leakage prevention measures at year t; tCO_{2e}

¹¹³ Available at <https://www.greenpeace.org/brasil/blog/pl-da-grilagem-legaliza-o-desmatamento-e-o-roubo-de-terras-publicas-no-brasil/> Last visit on 02/January/2023.

¹¹⁴ Available at <https://g1.globo.com/jornal-nacional/noticia/2022/08/18/grileiros-aproveitam-tempo-seco-para-abrir-novas-areas-na-floresta-ja-desmatada-no-sul-do-amazonas.ghtml> Last visit on 02/January/2023.

¹¹⁵ Available at <https://oeco.org.br/noticias/organizacao-criminosa-envolvida-com-grilagem-de-terras-em-rondonia-e-alvo-de-acao-policial/> Last visit on 03/January/2023.

¹¹⁶ Available at <https://www.tudorondonia.com/noticias/policia-federal-deflagra-operacao-de-combate-a-grilagem-de-terras-publicas-federais,89592.shtml> Last visit on 03/January/2023.

¹¹⁷ Available at <https://www12.senado.leg.br/noticias/materias/2022/11/29/marcos-rogerio-denuncia-invasao-da-fazenda-norbrasil-em-rondonia> Last visit on 02/January/2023.

¹¹⁸ Available at: <https://www.embrapa.br/>

ΔCADLK_t Total decrease in carbon stocks due to displaced deforestation at year t ; tCO_2e

$$\text{ELK}_t = \text{EgLK}_t + \text{EADLK}_t$$

Where:

ELK_t Sum of *ex post* leakage emissions at year t ; tCO_2e

EgLK_t Emissions from grazing animals in leakage management areas at year t ; tCO_2e

EADLK_t Total *ex post* increase in GHG emissions due to displaced forest fires at year t ; tCO_2e

The results of all *ex post* estimations of leakage are summarized in the table below.

Table 49. Ex post estimated total leakage

Project year	Total ex post GHG emissions from increased grazing activities		Total ex post increase in GHG emissions due to displaced forest fires		Total ex post decrease in carbon stocks due to displaced deforestation		Carbon stock decrease due to leakage prevention measures		Total net carbon stock change due to leakage		Total net increase in emissions due to leakage	
	annual	cumulative	annual	cumulative	annual	cumulative	annual	cumulative	annual	cumulative	annual	cumulative
	EgLK_t	EgLK	EADLK_t	EADLK	ΔCADLK_t	ΔCADLK	ΔCLPML_t	ΔCLPMLK	ΔCLK_t	ΔCLK	ELK_t	ELK
	tCO_2e	tCO_2e	tCO_2e	tCO_2e	tCO_2e	tCO_2e	tCO_2e	tCO_2e	tCO_2e	tCO_2e	tCO_2e	tCO_2e
2022	0.00	0.00	6,058.28	6,059.00	270,963.60	270,995.67	4.99	10.12	270,968.59	271,005.79	6,058.28	6,059.00

5.4 Net GHG emission reductions and removals

The net anthropogenic GHG emission reduction of the proposed AUD project activity is calculated as follows:

$$\Delta\text{REDD}_t = (\Delta\text{CBSLPA}_t + \text{EBBBSLPA}_t) - (\Delta\text{CPSPA}_t + \text{EBBPSPA}_t) - (\Delta\text{CLK}_t + \text{ELK}_t)$$

Where:

ΔREDD_t *Ex post* net anthropogenic greenhouse gas emission reduction attributable to the AUD project activity at year t ; tCO_2e

ΔCBSLPA_t Sum of baseline carbon stock changes in the project area at year t ; tCO_2e

EBBBSLPA_t Sum of baseline emissions from biomass burning in the project area at year t ; tCO_2e

ΔCPSPA_t Sum of *ex post* estimated actual carbon stock changes in the project area at year t ; tCO_2e

Note: If $\Delta CPSPA_t$ represents a net increase in carbon stocks, a negative sign before the absolute value of $\Delta CPSPA_t$ shall be used. If $\Delta CPSPA_t$ represents a net decrease, the positive sign shall be used.

EBBPSA_t Sum of actual emissions from biomass burning in the project area at year t ; tCO₂e

ΔCLK_t Sum of ex post estimated leakage net carbon stock changes at year t ; tCO₂e

Note: If the cumulative sum of ΔCLK_t within a fixed baseline period is > 0 , ΔCLK_t shall be set to zero.

ELK_t Sum of ex post estimated leakage emissions at year t ; tCO₂e

t 1, 2, 3 ... T , a year of the proposed project crediting period; dimensionless.

The number of Verified Carbon Units (VCUs) to be generated through the proposed AUD project activity at year t is calculated as follows:

$$VCU_t = \Delta REDD_t - VBC_t$$

$$VBC_t = (\Delta CBSLPA_t - \Delta CPSPA_t) \times RF_t$$

Where:

VCU_t Number of Verified Carbon Units that can be traded at time t ; tCO₂e

Note: If $VCU_t < 0$ no credits (VCUs) will be awarded to the proponents of the AUD project activity.

$\Delta REDD_t$ Ex post estimated net anthropogenic greenhouse gas emission reduction attributable to the AUD project activity at year t ; tCO₂e

VBC_t Number of Buffer Credits deposited in the VCS Buffer at time t ; tCO₂e

$\Delta CBSLPA_t$ Sum of baseline carbon stock changes in the project area at year t ; tCO₂e

$\Delta CPSPA_t$ Sum of ex post carbon stock changes in the project area at year t ; tCO₂e ha⁻¹

RF_t Risk factor used to calculate VCS buffer credits; %

t 1, 2, 3 ... T , a year of the proposed project crediting period; dimensionless.

The RF_t was estimated using the most recent version of the VCS-approved AFOLU Non-Permanence Risk Tool and the resulting value of RF_t for the present REDD project during the current monitoring period was 12%.

The specific summary of GHG reductions and removals in the Rio Madeira REDD project during the current monitoring period is included in Table below. The latter table includes estimates of

GHG emissions reduction ($REDD_t$), calculations of buffer and leakage, and the resulting calculation of tradable Verified Carbon Units (VCU_t).

Table 50. Ex post estimated net anthropogenic GHG emissions reductions and VCUs

Project year	Baseline carbon stock changes		Baseline GHG emissions from biomass burning		Ex post project carbon stock changes		Ex post project GHG emissions from biomass burning		Ex post leakage carbon stock changes		Ex post leakage GHG emissions		Ex post net anthropogenic GHG emission reductions		Ex post VCUs tradable		Ex post buffer credits	
	annual	cumulative	annual	cumulative	annual	cumulative	annual	cumulative	annual	cumulative	annual	cumulative	annual	cumulative	annual	cumulative	annual	cumulative
	ΔCBSLPA_t	ΔCBSLPA	EBBBSLPA_t	EBBBSLPA	ΔCPSPA_t	ΔCPSPA	EBBPSPA_t	EBBPSPA	ΔCLK_t	ΔCLK	ELK_t	ELK	ΔREDD_t	ΔREDD	VCU_t	VCU	VBC_t	VBC
	tCO _{2e}	tCO _{2e}	tCO _{2e}	tCO _{2e}	tCO _{2e}	tCO _{2e}	tCO _{2e}	tCO _{2e}	tCO _{2e}	tCO _{2e}	tCO _{2e}	tCO _{2e}	tCO _{2e}	tCO _{2e}	tCO _{2e}	tCO _{2e}	tCO _{2e}	tCO _{2e}
2019	88,622	88,622	1,977	1,977	47,557	47,557	53.94	54	32	32	1	1	42,955	42,955	38,028	38,028	4,927	4,927
2020	713,187	801,809	15,877	17,853	50,426	97,982	625.38	679	0	32	0	1	678,013	720,968	598,482	636,510	79,531	84,458
2021	898,977	1,700,786	19,786	37,640	215,909	313,891	782.08	1,461	5	37	0	1	702,067	1,423,035	620,099	1,256,609	81,968	166,426
2022	985,342	2,686,128	21,420	59,060	167,494	481,384	811.96	2,273	270,969	271,006	6,058	6,059	561,430	1,984,465	495,805	1,752,414	65,625	232,051

The net GHG emission reductions and removals in the Rio Madeira REDD Project are summarized in the table below.

Compared to what was estimated at the VCS PD during 2022 full year, the actual carbon credits generation was around 13% lower. While 561,614 tCO₂e of net GHG emission reductions or removals were predicted, the actual net reduction at the present Monitoring Report is 495,805 tCO₂e. This reduced generation is mainly due to leakage emissions. In addition, carbon stock increase due to logging was ignored, as detailed in section 3.2.2.

The ex-post analysis of these indexes points that the project effectiveness is higher than predicted. While 1,811.59 hectares (20% discount included) were predicted to be deforested during the present monitoring period, 68.67 hectares were deforested in the same period, which demonstrates the Effectiveness Index was conservative during the PD (85% vs 96% in the present monitoring period).

Table 51. Net GHG emissions reductions and removals in the Rio Madeira Grouped REDD Project

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)	Buffer pool allocation	VCUs eligible for issuance
2022	1,006,762	168,305	277,027	561,430	65,625	495,805

6 SOCIALCARBON RESULTS

6.1 Results

6.1.1 Social Resource

Indicator	Women inclusion
Description	Evaluates initiatives implemented by the company to promote women inclusion in the community activities.
Situation	In the community of Jirau - RO there used to be a community founded by the resident (Geraldo) more than 30 years ago that counted on the participation of men and women. But it is no longer functioning due to lack of interest from new representatives. In the community of Morrinhos-RO there is the association "Ás do Amor", where most members are women, but it is a mixed association focused on community development and local agriculture. The Jirau community association no longer exists, but there is interest from 8 residents to open a women's association. There has not yet been any initiative on this issue in the community.

There are no initiatives related to women inclusion.	There are plans to implement actions to promote women inclusion in the community activities.	There are campaigns aiming to promote women inclusion in the community activities.	There are monitored programs to promote women inclusion in the community activities.	In addition to the previous scenario, there are positive results related to women inclusion in the communities.	There is no barrier and women are fully integrated into the community.
Score	1.				
Prospects	No actions foreseen.				

Indicator	Expansion of community activities				
Description	Evaluates whether the community activities implemented by the company extend to all affected communities.				
Situation	A partnership was formalized between the Tupá Group and the Brazil nut collectors for the extraction of Brazil nuts within the farm area. This partnership encourages and improves the economic and social activity of the neighboring communities using non-timber products.				
There are no social activities to the surrounding community.	There are social activities that reach at least one community.	There are social activities that reach up to three communities.	There are activities that reach up to five communities.	There are activities that reach up to eight communities.	Social activities reach 100% of the communities affected by the project.
Score	2.				
Prospects	It will be necessary to carry out a diagnosis and map the productive potential of the exploited areas to allow sustainable management, and only then analyze whether it is possible to include more communities in this exploration activity. There are currently no foreseen improvements.				

Indicator	Associations and Cooperatives				
Description	Evaluates whether communities residing in/around the project area are involved in associations or cooperatives. Association: Group of two or more people who organize themselves to defend their common interests, without financial ends and existing as a legal entity. Cooperative: Organization consisting of at least twenty private individuals acting cooperatively and mutually assisting each other, with democratic, participatory management, with common economic and social goals, of which the legal and doctrinal aspects are independent of those of other organizations and societies.				
Situation	Instance 3 (Grupo Tupá) allowed in the first monitoring period the entry of Brazil nut gatherers to harvest the product from November to April without any formal partnership document. In this monitoring period (2022) there was the formalization of sustainable extraction and entry of the collectors to the farm, ensuring safety for the collectors and for the forest. However, there are no associations or cooperatives, considering the Brazil nut gatherers work autonomously.				
Absence of associations and cooperatives; individual action predominates.	Attempts to form associations or cooperatives have been made, meetings are informal.	An association or cooperative is regularly attended and formally registered; however, there are no recognized leaders within the community.	An association or cooperative is regularly attended and formally registered, and there are recognized leaders from the community.	In addition to the previous scenario, there is a formally registered, regularly attended association or cooperative that is generating positive results for the community (e.g. objectives have been achieved).	In addition to the previous scenario, the association/cooperative is independent (not in need of external support).

Score	4.
Prospects	No actions foreseen.

6.1.2 Human Resource

Indicator	Conflict management				
Description	Evaluates the company's procedures to identify and deal with conflicts in the surrounding communities, as well as the actions that are being taken so that they do not recur.				
Situation	The owner of Grupo Leite carries out protection actions on his lands in 2021. Companies were contracted for assistance and guidance for protection against invasions. Nowadays there is a fixed workforce in the region (security and there have been no more threats or invasions since then. An invasion occurred in instance 2 in 2021 and was peacefully solved according to legal process shared with VVB team.				
There are no actions related to conflict management ..	There are actions related to conflict management however they are informal.	There are procedures to identify AND deal with conflicts.	In addition to the previous scenario, all conflicts identified are being treated and monitored. Efforts are carried out to ensure that they will not be repeated.	In addition to the previous scenario, the company has preventive actions to prevent the emergence of new conflicts, e.g. the company provides a team to gather opinions and solve conflicts.	In addition to the previous scenario, the local community is satisfied with community activities.
Score	4.				
Prospects	The instances intend to establish an operational procedure to standardize actions in case of threat to the security of properties.				

Indicator	Public health					
Description	Evaluates the company's actions to mitigate the impacts of its activities related to the public health of surrounding communities.					
Situation	No healthcare actions were performed in this monitoring period.					
There are no initiatives related to public health.	There are isolated initiatives, which have little impact, in the public health area, for example: distribution of information pamphlets.	There are lectures OR campaigns to create awareness in the communities and prevent themes related to public health (e.g. prostitution, violence against women, alcohol abuse, drug use, among others).	There are monitored programs to promote women inclusion in the community activities.	In addition to the previous scenario, the company monitors public health problems in the communities affected by the project.	In addition to the previous scenario, there are actions to solve the public health problems.	
Score	1.					
Prospects	The three instances have the intention to identify and map possible health actions to integrate in the community.					

Indicator	Community education and training					
Description	Evaluates the relevant education and training programs implemented as a project activity, including additional programs to the stakeholders and broader community.					
Situation	There are no education and training activities in this monitoring period so far.					

There are no education and training activities.	There are no education and training activities, however the company promotes lectures on different themes. community activities.	The company offers an education / training activity in ONE of the following areas: - alternative income sources (e.g. collecting Brazil nuts) - education (e.g. literacy) - sustainable forest management	The company offers an education / training activity in TWO of the following areas: - alternative income sources (e.g. collecting Brazil nuts) - education (e.g. literacy) - sustainable forest management	The company offers an education / training activity in the following areas: - alternative income sources (e.g. collecting Brazil nuts) - education (e.g. literacy) - sustainable forest management	In addition to the previous scenario, the company simulates entrepreneurship (e.g. support, lectures, microloans among others).
Score	2.				
Prospects	The three instances have the objective of identifying and mapping possible professional and basic education actions to be implemented in the communities around the project.				

6.1.3 Financial Resource

Indicator	Alternative income sources
Description	Evaluates whether the project created alternative sources of income generation for the communities living within/surrounding the project area.
Situation	A partnership was formalized between Grupo Tupá and collectors for the extraction of Brazil nuts within the private area of the farm. This partnership encourages and improves the economic and social activity of the surrounding communities, guaranteeing income through sustainable harvesting. This partnership provides stability to nut collectors, as it guarantees that they will have areas available to collect nuts during the harvest period, reducing the risk of not having areas available for collection. Consequently, this partnership helps to generate an alternative source of income by allowing the sustainable exploitation of Brazil nut trees within the project area.

The project does not generate any alternative income sources for the local communities.	The project generates one alternative income source for the local communities.	The project generates two alternative income sources for the local communities.	The project generates three alternative income sources for the local communities.	The project generates four alternative income sources for the local communities.	The project generates more than five alternative income sources for the local communities.
Score	2.				
Prospects	There is no foreseen improvement.				

Indicator	Carbon credit benefits				
Description	Evaluates whether proceeds from the sale of carbon credits was distributed to carbon project improvements or activities that benefit the local community.				
Situation	The Rio Madeira Grouped REDD+ Project generated income only in 2024.				
The income generated by carbon credit sales was not distributed to the carbon project or in the community, or there are no organized controls of the allocation of proceeds.	Less than 20% of the income generated by carbon credit sales was distributed to the carbon project or in the community development .	Between 20 and 40% of the income generated by carbon credit sales was distributed to the carbon project or in the community development .	Between 40 and 60% of the income generated by carbon credit sales was distributed to the carbon project or in the community development .	Between 60 and 80% of the income generated by carbon credit sales was distributed to the carbon project or in the community development .	Between 80 and 100% of the income generated by carbon credit sales was distributed to the carbon project or in the community development .
Score	1.				
Prospects	After the sale of the credits, the company intends to build an action plan for socio-environmental investments.				

Indicator	Securing of funds					
Description	Evaluates the project proponent's participation in requests for proposals/ programs to secure funds. Also monitors whether project participants were successful, and whether the funds raised are creating activities for communities resident in/around the project area.					
Situation	There is no securing of funds so far.					
The project proponent does not take any action to secure funds.	The project proponent participates in programs/ requests for proposal; however no funding has been secured so far.	The project proponent participates in programs/ requests for proposal, and has secured funding, and initiatives have been put into practice. However, the latter were inactive or nonexistent in the period analysed.	The project proponent participates in programs/ requests for proposal, and has secured funding, and initiatives have been put into practice. In the period analysed at least one initiative is operating.	The project proponent participates in programs/ requests for proposal, and has secured funding, and initiatives have been put into practice. In the period analysed, more than one initiative is operating, however the latter are not self-sustaining (they require funding to continue).	As well as the previous scenario, at least one of the initiatives undertaken is financially self-sufficient, not requiring any further funding to continue.	
Score	1.					
Prospects	All three instances aim to identify and map potential partnerships and investors.					

6.1.4 Natural Resource

Indicator	Land tenure					
Description	Evaluates the existence of conflicts due to land tenure, as well as whether actions are being taken to manage the issue.					
Situation	The Leite Group suffered with invasions, illegal occupation, aggression of farm employees and loss of 200 hectares of forest in the year 2021 in Santa Carmem Farm (first monitoring). After that, the Leite Group hired a security company for the period from 05/19/2021 to 05/19/2022 for the company "Impactual Vigilância e Segurança Ltda". During the rest of the period (5/12/2022 until the end of 2022), the monitoring and protection of the area was maintained through formalized contracts. The deforestation that took place on Grupo Tupá's property was caused by the actions of a neighbor who lives near the farm. According to the Tupá Group, the neighbor deforested only the area he owned, in order to open pasture, but lost control of the opening activity, which ended up overtaking and impacting the Tupá Group's area. The Tupá group did not file a police report in order to avoid future conflicts.					
There are protests in the project area due to problems with land tenure.	The company has conflicts related to land tenure, and has no actions addressed to solve them.	The company has conflicts related to land tenure and started a dialogue to solve them.	The company has conflicts due to land tenure and is in the process of solving them.	Part of land tenure proceedings has been concluded and the owners already have the terms of concession and the legal land title as well as right to use those localities.	All land tenure proceedings are concluded and the owners already have the terms of concession and the legal land title as well as right to use those localities. Beyond that, the company monitors the management plan area to avoid new land occupation.	
Score	6.					

Prospects	There are currently no foreseen improvements.					
Indicator	Social and environmental investments					
Description	Evaluates the socio-environmental investments in the different areas: education; alternative income generation; environment; sport and infrastructure.					
Situation	Although there is not even one action or financial investment made in this monitoring period, the nut extraction action carried out on the Tupá group's properties has been regularized and the nuts provide extra income for the collectors during the harvest season. There was no financial investment, just the regularization of the collection.					
There are no actions related to socio-environmental investments.	The company has social-environmental actions for at least one of the following topics: - education; - alternative income generation; - environment; - sport; - infrastructure.	The company has social-environmental actions for two of the following topics: - education; - alternative income generation; - environment; - sport; - infrastructure.	The company has social-environmental actions for three of the following topics: - education; - alternative income generation; - environment; - sport; - infrastructure.	The company has social-environmental actions for four of the following topics: - education; - alternative income generation; - environment; - sport; - infrastructure.	The company has social-environmental actions for all of the following topics: - education; - alternative income generation; - environment; - sport; - infrastructure.	
Score	2.					
Prospects	The project is intended to structure and implement a quality control plan for the operations and actions carried out in the project area, with the aim of mitigating, identifying and resolving problems both in the forest areas and in socio-environmental investments.					

Indicator	Quality control				
Description	Evaluates the quality control of the management plan operation				
Situation	During this monitoring period, no actions regarding the quality control of the sustainable forest management plan were developed.				
There are no actions to ensure quality control of the management plan operations.	There are plans to implement quality control actions of the management plan operation.	There is quality control actions of the management plan operation in place, however failures exist (e.g. the team can only identify problems of low difficulty).	There is quality control actions of the management plan operation in place, however failures exist (e.g. the team can identify problems of low and moderate difficulty).	There is quality control actions of the management plan operation in place, however failures exist (e.g. the team can identify problems of low, moderate and high difficulty).	There is a quality control team, and the problems are identified and solved.
Score	1.				
Prospects	The project is intended to structure and implement a quality control plan for the operations and actions carried out in the project area, with the aim of mitigating, identifying and resolving problems both in the forest areas and in socio-environmental investments. There are currently no foreseen improvements.				

6.1.5 Biodiversity/Technology Resource

Indicator	Non-timber forest products (NTFPs)
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Description	Evaluates the sustainable use of natural resources by communities in/around the project area for income generation. “NTFPs are biological resources or products from flora– which are not wood – obtained from forests for subsistence or for trade. They can come from native, primary or secondary forest, planted forest or agro-forestry systems. NTFPs include a wide range of products including medicinal plants, fibres, resins, latex varieties, oils, rubbers, fruits, nuts, seasonings, dyes, rattan, bamboo etc.” (Brazilian Forest Service, 2013). Sustainable practices are taken to include the following: - Low-impact practices; - Exploitation/ collection practices of each NTFP that are compatible with their productivity levels and without affecting their regeneration and/or conservation of each utilized species.				
Situation	Instance 3 (Grupo Tupá) allows Brazil nut collectors to come and harvest the nuts from November to April each year and carry out the harvest in a sustainable way. With the harvest, the collectors support the farmer by reporting suspicious activities, such as trespassing, illegal trails, etc. The Tupá Group has an extractive partnership agreement with Brazil nut collectors within the area of the farm where the trees are located, which the owner does not use for commercial purposes. Through the agreement, the collectors can harvest the nuts and exploit them as an alternative source of income. The sustainable harvesting of nuts by the collectors is done manually, and no tree, animal or soil is damaged or affected by the harvest. In the area where the Brazil nut trees are located, no pesticides or similar are used, not even machines or harvesters, and people's access is controlled to avoid overharvesting. Therefore, no more Brazil nuts are removed than necessary, allowing the natural regeneration of the species and the feeding of the animals.				
Non-timber forest products are used exclusively for subsistence purposes.	Non-timber forest products are traded in/around the project area, however without sustainable practices.	Non-timber forest products are traded in/around the project area, with sustainable practices in use.	As well as the previous scenario, there are studies and plans with the community in order to determine the available volumes.	As well as the previous scenario, there are partnerships to exploit the business potential of non- timber forest products in/around	As well as the previous scenario: There is equitable distribution of the benefits of non-timber forest products.

			use, distribution, regeneration and conservation of non-timber forest products.	the project area.	Or there are facilities to add value to non-timber forest products in/around the project area.
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Score	3.
Prospects	In the future, training on sustainable exploitation of Brazil nuts will be carried out.

Indicator	Biodiversity monitoring				
Description	Evaluates whether the company has actions to identify and monitor the local fauna and flora.				
Situation	There are no actions for biodiversity monitoring.				
There is no process of identification and monitoring of fauna and flora, nor cataloguing of timber.	There are plans to implement identification and monitoring of fauna and flora.	There is monitoring and identification of fauna AND flora.	There is monitoring and identification of fauna AND flora annually.	In addition to the previous scenario, there is botanical collection of flora and herbarium.	In addition to the previous scenario, there is a catalogue of identified woods (xiloteca).
Score	1.				
Prospects	In the future, it is expected to elaborate flora and fauna inventories, identify High Conservation Values – HCVs and the main threats for the flora and fauna for the project area and its surrounding.				

Indicator	Impact on remaining flora
Description	Evaluates the company actions to monitor the impact on the remaining flora.

Situation	There are no actions for the impact on the remaining flora.				
There are no actions related to monitoring the impacts on the remaining flora.	There are plans to implement monitoring on the remaining flora.	The company is monitoring the impact on the remaining flora by one of the following operations: . Court . Drag . Road	The company is monitoring the impact on the remaining flora by two of the following operations: . Court . Drag . Road	The company is monitoring the impact on the remaining flora by all of the following operations: . Court . Drag . Road	In addition to the previous scenario, the company has measures / initiatives to reduce its impact on the remaining flora.
Score	1.				
Prospects	Carry out the monitoring and study of the local flora.				

6.1.6 Carbon Resource

Indicator	Buffer reduction				
Description	Measures the progression of the buffer in the current monitoring period compared to VCS PD and Monitoring Report.				
Situation	In the current monitoring period (2 nd) the buffer was 12%, the same applied for the previous monitoring period.				
The buffer is higher in the current monitoring than in any other monitoring period (or compared to the PD).	The buffer reduced by 0 to 5% compared to the previous monitoring period (or compared to the PD).	The buffer reduced by up to 10% compared to the previous monitoring period (or compared to the PD).	The buffer reduced by up to 15% compared to the previous monitoring period (or compared to the PD).	The buffer reduced by up to 20% compared to the previous monitoring period (or compared to the PD).	The buffer reduced by more than 20% compared to the previous monitoring period (or compared to the PD). Or The buffer is currently at

					the minimum V-C-S requirement.
Score	3.				
Prospects	There are currently no foreseen improvements.				

Indicator	Stakeholder consultation				
Description	Evaluates the methodology used for the stakeholder consultation regarding the carbon project.				
Situation	In September 2022, visits were made to the Flor do Cupuaçu school, Marechal rondon school, União Bandeirante Community and RECA Cooperative for the first visit and first mapping of information. Visits and meetings were also held with the agencies SEDAM (State Secretariat of Environmental Development) and SEMA (Municipal Secretariat of Environment and Sustainable Development). There was also an online consultation on 09/05/2022, in which employees from Future Carbon, IDESAM (Institute for Conservation and Sustainable Development of Amazonas), FUNAI (National Foundation of Indigenous Peoples), and others participated.				
During the time period analyzed, the company did not conduct a stakeholder consultation regarding the carbon project.	During the time period analyzed, the company conducted an informal stakeholder consultation regarding the carbon project.	During the time period analyzed, the company conducted a formal stakeholder consultation regarding the carbon project and all comments were registered.	During the time period analyzed, the company conducted a formal stakeholder consultation regarding the carbon project and all comments were registered. At least one of the suggestions	In addition to scenario 4, the company conducted systematic stakeholder consultation surveys.	In addition to scenario 5, the company has organized planning to implement stakeholder suggestions.

			was addressed.		
Score	3.				
Prospects	There are currently no foreseen improvements.				

Indicator	Project performance				
Description	Evaluates project performance in relation to verified emissions reductions. Project performance = Units verified in the Monitoring Report corresponding to the SCR period/ Estimate of emissions reductions in the VCS PD.				
Situation	The 2nd Monitoring Period generated 495,805 ton CO ₂ e, while the estimated volume in the VCS PD is 561,614 ton CO ₂ e. Therefore, the performance is around 90% expected in the PD.				
Not successful: 0% of carbon credits predicted for the period were generated.	Very Low: 1% to 25% of carbon credits predicted for the period were generated.	Low: 26% to 50% of carbon credits predicted for the period were generated.	Reasonable: 51% to 75% of carbon credits predicted for the period were generated.	Good: 76% to 95% of carbon credits predicted for the period were generated.	Excellent: More than 95% of carbon credits predicted for the period were generated.
Score	5.				
Prospects	There are currently no foreseen improvements.				

6.2 Analysis of Results

6.2.1 Current Performance

In the monitoring period in question, we can positively highlight the progress made in implementing social actions. The "social" and "human" resources increased by 1 point compared to point zero. The partnership between the Tupá Group and the Brazil nut collectors has led to improved implementation of activities in the communities, alternative sources of income, improved income for the collectors' families and greater protection of the project's forest area. In

the human aspect, actions to mitigate conflicts or risks that could harm the project area were carried out by Grupo Leite. Companies were contracted for assistance and guidance for protection against invasions. The carbon resource was also significantly improved compared to point zero. The 2nd Monitoring Period generated 506,373 ton CO₂e, while the estimated volume in the VCS PD is 561,614 ton CO₂e. Therefore, the performance is more than 90% expected in the PD.

Resource	Critical	Satisfactory	Sustainable	Average Score	Performance
Social	66,7%	33,3%%	0.0%	2.3	Critical
Human	66.7%	33.3%	0.0%	2.0	Critical
Financial	100%	0.0%	0.0%	1.3	Critical
Natural	66.7%	0.0%	33.3%	3.0	Satisfactory
Biodiversity/Tech	66,7%	33.3%	0.0%	1.7	Critical
Carbon	0.0%	66.7%	33.3%	3.7	Satisfactory

6.2.2 Historical Performance

Social	Point Zero	Point One
	1.3	2.3
Historic Analysis: So far, there are no actions aimed at local communities or the inclusion of women. The landowners intend to strengthen their relationship with technical assistance organizations to provide training and commercial opportunities for Brazil nut collectors. However, with regard to the project's overall performance for the period, the buffer was reduced by more than 20% compared to the previous monitoring period, so it is considered a satisfactory result.		
Human	Point Zero	Point One
	1.0	2.0
Historic Analysis: The companies do not have actions related to conflict management in their areas or even actions related to education and training activities, but the perspective is to develop actions based on the needs identified in the field visit and which will be listed in the action plan document. No actions were carried out in the health area either, however, they were mapped according to the needs presented by the communities. The low human performance was expected since this document is being developed together with the 2nd Monitoring Report. However, with regard to the project's overall performance for		

the period, the buffer was reduced by more than 20% compared to the previous monitoring period, so it is considered a satisfactory result.

Financial	Point Zero	Point One
	1.0	1.3

Historic Analysis: The communities that live around the company's areas collect nuts in the project area with the authorization of instance 3 and with an agreement already documented and signed by the parties that extract nuts with sustainable practices as an income alternative.

Natural	Point Zero	Point One
	2.7	3.0

Historic Analysis: The performance of natural resources in this report is primarily due to companies' efforts regarding land tenure and protection. No changes were identified in this monitoring.

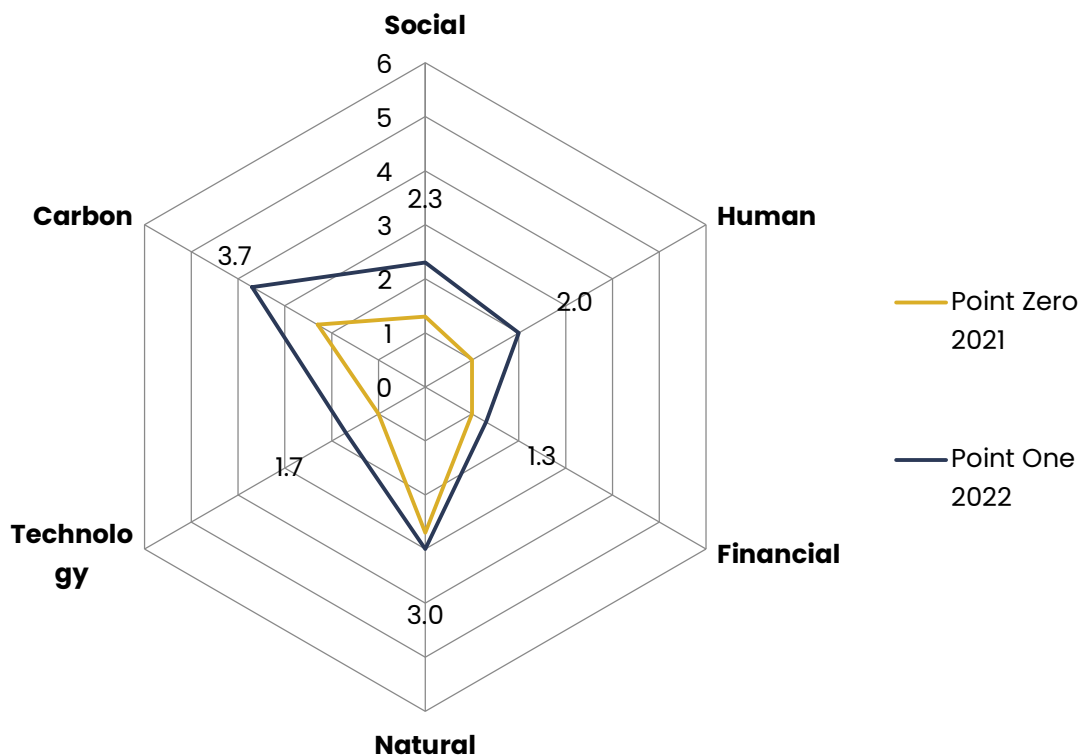
Biodiversity	Point Zero	Point One
	1.0	1.7

Historic Analysis: The Critical Performance of the Biodiversity resource is due to the lack of investment actions in non-timber forest products and the absence of fauna and flora monitoring initiatives. However, the landowners have already documented the partnership with the nut collectors and intend to promote partnerships.

Carbon	Point Zero	Point One
	2.3	3.7

Historic Analysis: The 2nd Monitoring Period generated 495,805 ton CO₂e, while the estimated volume in the VCS PD is 561,614 ton CO₂e. Therefore, the performance is around 90% than expected in the PD, which represent a performance decrease compared to the previous period.

6.2.3 Performance Hexagon



6.3 Prospect Status

6.3.1 Achieved Prospects

Human Resource	
Indicator	Community education and training
Prospect	The companies aim to carry out formal partnerships with cooperatives around the project area on sustainable management of non-timber forest products (NTFPs). Moreover, develop conflict management written procedures.
Details	During the monitoring period, a partnership agreement was signed between the Tupá Group and the Brazil nut gatherers. This agreement evidences and formalizes the sustainable harvesting of Brazil nuts and the absence of exploitation of non-timber products by this partnership. This partnership

	promotes the protection of the forest and the harvesting area. The existence of this document prevents possible invasions in the project area and conflicts with possible invaders.
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Financial Resource	
Indicator	Alternative income sources
Prospect	The companies will formalize and expand the allowance of the local communities' entrance into the project area to extract with sustainable practices nuts as an alternative income.
Details	A partnership was formalized between the Tupá Group and the Brazil nut gatherers to extract the nuts in a sustainable way within the farm area during harvest periods. This partnership encourages and improves the economic and social activity of the neighboring communities and also protects the forest.

Carbon Resource	
Indicator	Stakeholder consultation
Prospect	Develop partnership with neighbors to avoid forest loss, improve surveillance and firefighting measures to avoid forest loss.
Details	In 2022, after the signing of the term between Grupo Tupá and the Brazil nut gatherers, a partnership between the community (gatherers) and Grupo Tupá was also created. The collectors, besides extracting the nuts, also monitor the area and inform the owners about any possible invasion that may occur.

6.3.2 Not Achieved Prospects

Natural Resource	
Indicator	Social and environmental investments
Prospect	Develop partnership with education entities to develop environmental education and sports promotion
Details	Although there is not even one action or financial investment made in this monitoring period, the nut extraction action carried out on the Tupá group's properties has been regularized and the nuts provide extra income for the collectors during the harvest season. There was no financial investment, just the regularization of the collection. The project is intended to structure and implement a quality control plan for the operations and actions carried out in the project area, with the aim of mitigating, identifying and resolving problems both in the forest areas and in socio-environmental investments.

Biodiversity Resource	
Indicator	Biodiversity monitoring
Prospect	Develop partnership with education entities or companies to monitor fauna / flora within project area.
Details	There is no process of identification and monitoring of fauna and flora, nor cataloguing of timber because there was no contracting of consultants to carry out proper identification and monitoring in the period.

6.3.3 Identified Prospects

Social Resource	
Indicator	Associations and Cooperatives
Responsible	Rovema Group, Tupá Group and Leite Group
Timescale	2025
Prospects	There are no foreseen improvement.

Human Resource	
Indicator	Community education and training
Responsible	Rovema Group, Tupá Group and Leite Group.
Timescale	2025
Prospects	The three instances have the objective of identifying and mapping possible professional and basic education actions to be implemented in the communities around the project.

Financial Resource	
Indicator	Alternative income sources
Responsible	Rovema Group, Tupá Group and Leite Group.
Timescale	2025

Prospects	There are no foreseen improvement.
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Natural Resource	
Indicator	Quality control
Responsible	Rovema Group, Tupá Group and Leite Group.
Timescale	2025
Prospects	There are no foreseen improvement.

Biodiversity Resource	
Indicator	Biodiversity monitoring
Responsible	Rovema Group, Tupá Group and Leite Group.
Timescale	2025
Prospects	Carry out the monitoring and study of the local biodiversity.

Carbon Resource	
Indicator	Quality control
Responsible	Rovema Group, Tupá Group and Leite Group.
Timescale	2025
Prospects	There are no foreseen improvement.

APPENDIX – COMMERCIAL SENSITIVE INFORMATION

For the Rio Madeira Grouped REDD+ Project, some relevant information required by the VCS and/or co-benefit Standards is considered commercially sensitive information and cannot be made public by the project proponent. This information can be accessed by the third-party audit team during the validation process, attached to this MR document, but is not included in the public version. Below is a list of commercially sensitive documents that was available to the VVB team:

- Financial Performance Worksheet (budget) and other related documents;
- Agreements and contracts signed between the parties involved;
- Legal status and property right documents; and
- VCUs trade agreement.