



EVERGREEN REDD+ PROJECT



Document Prepared by Carbonext

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1. PROJECT DETAILS

1.1 Summary Description of the Project

The Evergreen REDD+ Project is a 130,554.81 hectare area of tropical rainforest located in Apuí Municipality, Amazonas, which is currently the municipality with the 10th highest deforestation rate in Brazil¹. The municipal deforestation rates reached the highest levels ever recorded by PRODES data in 2019, at 287.7 km² deforested, being 41% higher than the previous annual record, making it a priority area for forest conservation worldwide.

The project arose from a partnership between Ricardo Stoppe and Renan Boehm, who own the properties containing the Evergreen REDD+ area, but have carried out no economic activities in the area to date, only forest conservation. They were finding it very difficult to stop illegal deforestation and invasions of their land and had intended to fell 20% of the forests on one of the properties, to create pastureland and some much-needed income. However, provided that the present REDD+ project is approved, the landowners intend to: improve the surveillance mechanisms inside the Project Area; discontinue their plans to deforest 20% of the Fazenda Alvorada property; and implement community and institutional outreach activities that will result in climate, community, and biodiversity benefits.

The activities to be implemented by the project are summarized as follows:

- Expand from one surveillance post currently located on Boa Lembrança farm, and construct further surveillance posts around the project area;
- New motorcycles will be purchased, with a view to ensuring security at the project site and surrounding areas;
- Two airplanes have been purchased and are used to carry out aerial monitoring;
- Continue terrestrial monitoring carried out by a third-party company;
- Fire brigade training will be given for all the project employees and neighbours;
- Training courses will be carried out to qualify the project's employees and neighbours; regarding sustainable forest management and wild-harvesting;
- One of the project properties has plans for sustainable forest management activities scheduled for 2027, which will permit further reinforcement of monitoring of the areas by staff, to reduce the pressures of trespassing illegal wood harvesters inside the Project Area.

Summing all types of avoided deforestation, the project's net GHG emission reductions are a predicted 46,996,404 tCO₂e (annual average of 1,566,547tCO₂e), corresponding to:

- A total Avoided Unplanned Deforestation (AUD) area of 44,818 hectares over the project lifetime, corresponding to 63% of the total avoided GHG emissions;
- A total avoided Planned Deforestation (APD) area of 26,471 hectares over five years, equating to approximately 37% of the total avoided GHG emissions.

¹ Source PRODES: http://terrabrasilis.dpi.inpe.br/app/dashboard/deforestation/biomes/legal_amazon/rates

1.2 Sectoral Scope and Project Type

Sectoral Scope: 14 - Agriculture, Forestry, Land Use

Project Category: Avoided Unplanned Deforestation (AUD project activity) and Avoided Planned Deforestation (APD project activity)

This is a grouped project.

1.3 Project Eligibility

According to the AFOLU Requirements regarding Reduced Emissions from Deforestation and Degradation (REDD) projects², eligible activities are those which reduce net GHG emissions by reducing deforestation, which is the case for this project activity. Deforestation is defined as the direct, human-induced conversion of forest land to non-forest land. The entirety of the Project Area currently meets the internationally accepted definition of forest³, and was forest for a minimum of 10 years before the project start date.

The evidence of the presence of forest 10 years prior to start date, and the correspondence of the forest types in the PA (Submontane Dense Tropical Rainforest (code “Ds”) and Submontane Open Tropical Forest (code “As”) was presented at audit.

The definition of forest may include mature forests, secondary forests, and degraded forests. Under the VCS, secondary forests are defined as forests that have been cleared and have recovered naturally, are at least 10 years old and meet the lower limit of the forest threshold parameters at the start of the project. The main effect of this project activity to reduce carbon emissions by preventing the conversion of forest lands with high carbon stocks to non-forest lands with lower carbon stocks. In addition, avoiding conversion of forests to cropland or pasture can reduce emissions of CH₄ that are associated with biomass burning used to clear the land. This project activity stops unsanctioned deforestation on forested lands and is thus eligible as a REDD activity. It reduces GHG emissions by stopping deforestation of mature forests, that would have occurred because of:

- i) socio-economic forces that promote alternative uses of forest land and the inability of institutions to control these activities;
- ii) poor law enforcement and lack of property rights;
- iii) subsistence farming and illegal logging.

The configuration of deforestation applicable to this project, as defined by the methodology, is frontier, which is described as the result of the expansion of roads and other infrastructure into forest lands. Roads and other infrastructure can improve forest access and lead to increased encroachment by human populations, such as subsistence farming on previously inaccessible forest lands.

² Source Verra: <https://verra.org/wp-content/uploads/2020/11/PREVIOUS-VERSION-AFOLU-Requirements-v3.6.pdf>

³ Source FAO: <http://www.fao.org/3/Y4171E/Y4171E10.htm>

This project activity is also eligible in the sense that it respects all Brazilian forest legislation and is in accordance with local and national environmental interests, as described in “1.17 Additional Information Relevant to the Project”, subsection “Sustainable Development”.

As required in VCS standard 4.1, this project meets the following requirements:

- This project meets all applicable rules and requirements set out under the VCS Program, as described in Section 3;
- This project was developed with a methodology eligible under the VCS Program, as described in Section 3;
- This project and the implementation of the project activities does not lead to the violation of any applicable law;
- This is an eligible AFOLU project category under the VCS Program: reduced emissions from deforestation and degradation (REDD);
- This project is not located within a jurisdiction covered by a jurisdictional REDD+ program, as cited in 1.11;
- Implementation partners are identified in the project activity;
- This project does not convert native ecosystems to generate GHG. The project area only contains native forested land for a minimum of 10 years before the project start date, as shown in Section 1.13;
- This project does not occur on wetlands and does not drain native ecosystems or degrade hydrological functions;
- Non-permanence risk will be analyzed in accordance with the VCS Program document AFOLU Non-Permanence Risk tool.

1.4 Project Design

This is a grouped project and it was designed as an Avoided Unplanned Deforestation and Avoided Planned Deforestation, applying VM0007 methodology, Version 1.6, dated 08 September 2020.

Eligibility Criteria

This AFOLU project activity is designed to include REDD Avoided Unplanned Deforestation (AUD) and Avoided Planned Deforestation (APD) components. In addition, this project activity is designed to include more than one “project activity instance”, such as different communities or landowners along the project lifetime. Thus, this grouped project is designed to allow the expansion of the project activity after project validation.

This grouped project has one clearly defined geographic area within which project activity instances shall be developed. This geographic area is defined using geodetic polygons. The determination of the baseline scenario and demonstration of additionality were based upon the initial project activity instances (O5 properties), that are included in this VCS-PD at validation. For inclusion of new geographic areas, it will be demonstrated that such areas are subject to the same baseline scenario and rationale for the demonstration of additionality, as the geographic area that does include initial project activity instances.

Regarding the AUD component, a single baseline scenario is determined for the entire designated geographic area, in accordance with VM0007 methodology. The additionality of the initial project activity instances was demonstrated for each designated geographic area, in accordance with the methodology applied to the project. All factors relevant to the determination of the baseline scenario or demonstration of additionality (i.e., common practice; laws, statutes, regulatory frameworks, or policies relevant to demonstration of regulatory surplus; historical deforestation rates) were assessed across the grouped project geographic area and respective reference region.

The project proponent has not defined a capacity limit for this project activity in terms of its geographic area. However, it has been established that any such limit will respect the same conditions of similarity of historical deforestation rates as applied in the initial project instances.

For this grouped project, the following set of eligibility criteria for the inclusion of new project activity instances has been defined, as shown in the table below, which is applicable for VM0007 REDD APD and AUD activities and geographic area comprised within the Reference Region.

Table 1: Eligibility Criteria for Grouped Projects

Eligibility Criteria	Criteria Assessment
Meet the applicability conditions set out in the methodology applied to the project.	All new instances will meet the applicability conditions applied in the project.
Use and apply the technologies or measures specified in the project description	All new instances to be included in this project activity will necessarily be assessed using the same satellite imagery and field techniques as applied for the first 5 instances, as described in the VCS-PD.
Apply the technologies or measures in the same manner as specified in the project description.	All new instances will be subject to the same technologies or measures as specified in this project description in Section 5.
Are subject to the baseline scenario determined in the project description for the specified project activity and geographic area	All new instances shall be subject to the baseline scenario determined in the project description, in Section 3.4, for the specified project activity and geographic area.

Have characteristics with respect to additionality that are consistent with the initial instances for the specified project activity and geographic area. For example, the new project activity instances have financial, technical and/or other parameters (such as the size/scale of the instances) consistent with the initial instances, or face the same investment, technological and/or other barriers as the initial instances.	All new instances to be included will be consistent with the initial instances in terms of financial, technical and will be within the same geographic area.
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Also, grouped projects provide for the inclusion of new project activity instances subsequent to the initial validation of the project. The table below shows the eligibility criteria for new project activity instances.

Table 2: Criteria for the Inclusion of New Project Activity Instances

Eligibility Criteria	Criteria Assessment
Occur within one of the designated geographic areas specified in the project description	All new instances will preferentially occur within the Reference Region (as mentioned above any instance to be included outside the Reference Region will undergo all the required similarity assessments).
Comply with at least one complete set of eligibility criteria for the inclusion of new project activity instances. Partial compliance with multiple sets of eligibility criteria is insufficient.	All new instances will comply with all the set of eligibility criteria for the inclusion of new project activity instances (cited in the table above).
Be included in the monitoring report with sufficient technical, financial, geographic, and other relevant information to demonstrate compliance with the applicable set of eligibility criteria and enable sampling by the validation/verification body.	All new instances will be included in the monitoring report with sufficient information to demonstrate compliance with the applicable set of eligibility criteria and enable sampling by the validation/verification body.
Be validated at the time of verification against the applicable set of eligibility criteria.	New instances will be validated at the time of verification in terms of the applicable eligibility criteria.
Have evidence of project ownership, in respect of each project activity instance, held by the project proponent from the respective start date of each project activity instance (i.e., the date	Evidence of the project ownership for each property activity instance, held by the project proponent from the respective start date, will be provided.

upon which the project activity instance began reducing or removing GHG emissions).	
Have a start date that is the same as or later than the grouped project start date.	The start date for the new instance will be in the same as or later than the grouped project start date, which is November 25 th 2020.
In the case APD, activities must present the relevant deforestation activity requests, signed by the relevant State authority.	New activities, in the case APD, will present relevant deforestation activity requests, signed by the relevant State authority.
Be eligible for crediting from the start date of the instance through to the end of the project crediting period (only).	All new instances will be eligible for crediting from the start date of the instance through to the end of the project crediting period.

Where a new project activity instance starts in a previous verification period, no credit may be claimed for GHG emission reductions or removals generated during a previous verification period and new instances are eligible for crediting from the start of the next verification period. Where inclusion of a new project activity instance necessitates the addition of a new project proponent to the project, such instances shall be included in the grouped project within five years of the project activity instance start date. The procedure for adding new project proponents will respect the rules of the VCS Program document Registration and Issuance Process.

AFOLU non-permanence risk analyses will be assessed for each new geographic area. Activity-shifting, market leakage and ecological leakage assessments will be reassessed where new instances of the project activity are included in the project.

Table 3: Project Description for Grouped Projects

Eligibility Criteria	Criteria Assessment
A delineation of the geographic area(s) within which all project activity instances shall occur.	The geographic area within which all project activity instances shall occur is delineated with the Reference Region set in this VCS-PD, as indicated in Section 3.3.
One or more determinations of the baseline for the project activity in accordance with the requirements of the methodology applied to the project.	The determination of the baseline for the project activity is in accordance with the requirements of the methodology applied to the project.
One or more demonstrations of additionality for the project activity in accordance with the requirements of the methodology applied to the project.	The demonstrations of additionality for the project activity are in accordance with the requirements of the methodology applied to the project, as stated in Section 3.5.

One or more sets of eligibility criteria for the inclusion of new project activity instances at subsequent verification events.	A set of eligibility criteria for the inclusion of new project activity instances at subsequent verification events is defined in this VCS-PD (above in this topic).
A description of the central GHG information system and controls associated with the project and its monitoring.	A description of the central GHG information system and controls associated with the project and its monitoring is provided in the Monitoring Plan.

1.5 Project Proponent

Organization name	Ituxi Administração e Participação Ltda.
Contact person	Ricardo Stoppe Junior
Title	Project Proponent (Landowner)
Address	Av. Calama N. 5040 Sala 01, Porto Velho, Rondônia
Telephone	55 (92) 3634-7521
Email	aamericardo@ig.com.br

Organization name	Milenio Empreendimentos
Contact person	Renan Vitoriano Bohem
Title	Project Proponent (Landowner)
Address	Av Lauro Sodré, 2300 AP 1205 – Torre Plants – São Joao Bosco, Porto Velho-RO
Telephone	55 (69) 99310-7061
Email	empreendimentos.milenio@gmail.com

Organization name	Carbonext Consultoria Ltda.
Contact person	Janaína Dallan, Luiz Fernando de Moura & David Swallow
Title	Project developer

Address	Rua Tabapuã, 1123 – cj 104-108 Itaim Bibi São Paulo/SP Brazil www.carbonext.com.br
Telephone	+55 (11) 2339-6931
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1.6 Other Entities Involved in the Project

Organization name	Avix Engenharia e Estudos Técnicos
Role in the project	Satellite imagery analysis for baseline assessment
Contact person	Mateus Trez
Title	Technology, Remote Sensing and Geoprocessing Coordinator
Address	www.avix.com.br
Telephone	+55 (19) 3427-2438
Email	mateus@avix.com.br

1.7 Ownership

Organization name	I. Fazenda Boa Lembrança: Milenio Empreendimentos (CNPJ 34.095.846/0001-74 (Brazilian corporate registration nº)), II. Fazenda São Damião: Milenio Empreendimentos (CNPJ 34.095.846/0001-74 (Brazilian corporate registration nº)) III. Fazenda Alvorada: Ituxi Administração e Participação Ltda (23.831.247/0001-55 (Brazilian corporate registration nº)) IV. Fazenda Buiucu: Ituxi Administração e Participação Ltda (23.831.247/0001-55 (Brazilian corporate registration nº)) V. Fazenda Aroeira: Ituxi Administração e Participação Ltda (23.831.247/0001-55 (Brazilian corporate registration nº))
Contact person	Ricardo Stoppe Junior
Title	Main Project Proponent (Landowner)

Address	Av Calama 5040, sala 01 76820-594 Flodoaldo Pontes Pinto Porto Velho – RO, Brazil
Telephone	+55 (92) 3634-7521
Email	aamericardo@ig.com.br

1.8 Project Start Date

25th November 2020 is defined as the project start date for both APD and AUD components of the Evergreen REDD+ Project.

Regarding APD activities, 25/11/20 was the date that the project owner submitted a request to the official organ IPAAM, to obtain permission to deforest a legal proportion of the Alvorada property in the Project Area (PA), which was approved. This planned deforestation activity was necessary because, as of that time, maintaining forests without carbon credits within the PA was no longer financially viable for the project owner. It is clarified that the approved avoided planned deforestation request is the most advanced documentation that the project owner was able to obtain without in fact deforesting the property. If a deforestation permit had been obtained, the project owner would then have been obliged to carry out the planned deforestation, or face complications in the IPAAM organ.

Regarding the AUD activities, all the project properties already had contractual intentions of conserving forests and REDD+ projects prior to 25/11/20, as evidenced by:

- The contract between Carbonext and the project proponent (regarding the Alvorada, Buiuçú and Aroeira properties) (07/11/2020);
- And the partnership contract between the project proponents Milênio and Ituxi Administração companies (regarding the São Damião and Boa Ventura II properties) (01/09/2020).

To substantiate the intentions to conserve the Evergreen Project's forests, mentioned above, an amendment was made with effect as of 25/11/20 to the contract with a private security company, which had been hired originally on 01 December 2019, to monitor all the REDD+ projects led by Ituxi Administração (being the Unitor and Ituxi REDD+ projects).

The original contract only mentions the Boa Lembrança Property, while the amendment specifies that private security services were implemented on all the Evergreen REDD+ properties as of 25/11/20, which are mentioned by name, location and municipality. All the relevant contractual evidence was made available at audit.

1.9 Project Crediting Period

Start date: 25th November 2020

End date: 24th November 2050

30 years.

1.10 Project Scale and Estimated GHG Emission Reductions or Removals

Project Scale	
Project	
Large project	x

Regarding the AUD component, the baseline corresponds to deforestation rate of 1.86% was made, which was calculated via analyses of historical deforestation in the RRD between 2012 and 2020.

Regarding the APD component a summary follows below, a deforestation cycle covering the period from 2022 to 2027, corresponding to a total avoided planned deforestation of 26,471 hectares.

The table below shows the net emissions reductions for the thirty-year project lifetime.

Year	Estimated GHG emission reductions or removals (tCO ₂ e)
2020	127.089
2021	1.251.351
2022	2.925.193
2023	4.599.467
2024	4.577.052
2025	4.555.053
2026	4.533.464
2027	3.813.661
2028	1.097.253
2029	1.076.846
2030	1.056.818
2031	1.037.163
2032	1.017.874

2033	998.943
2034	980.364
2035	962.131
2036	944.237
2037	926.676
2038	909.441
2039	892.527
2040	875.928
2041	859.637
2042	843.649
2043	827.959
2044	812.560
2045	797.448
2046	782.617
2047	768.061
2048	753.777
2049	739.758
2050	652.405
Total estimated ERs	46.996.404
Total number of crediting years	30
Average annual ERs	1.566.547

1.11 Description of the Project Activity

The EVERGREEN REDD+ PROJECT consists of a 130,554.8 hectare total Project Area of protected Amazon rainforest, located in the municipality with the tenth highest deforestation rate in the Amazon Biome in 2021: Apuí, Amazonas⁴. Being one of the southernmost municipalities in the Brazilian state of Amazonas, it is geographically located near the “Arc of Deforestation” (see Figure 2) and borders with the highly deforested municipality of Colniza, Mato Grosso, to the South.

Regarding the AUD component, the present REDD project is predicted to avoid 44,818.5 hectares of deforestation, equating to 30,424,829 CO₂e in emissions reductions over the 30-year project lifetime (25th November 2020 to 24th November 2050), including buffer (RF), leakage (DLF) and project efficiency (EI) reductions.

⁴ Source PRODES (accessed 22/03/21): <http://terrabrazilis.dpi.inpe.br/>

As for the APD component, the project proponents are discontinuing plans to deforest a total of 26,470.88 hectares over five years, equating to 17,969,648 tCO₂e of avoided carbon emissions.

Over the historical reference period of the present project (2012 – 2020) in the State of Amazonas, we see a consistent year-on-year increase in deforestation – except for 2017 (10% decrease) –, according to PRODES data: 405 km² in 2009 grew to 1,000 km² in 2018, representing an overall increase of 147%. The years 2019 and 2020 taken together saw 2,955 km² of deforestation: rates not seen since 1995-1996. An IPAM/ISA/IMAZON (2014) study presents several factors that have traditionally been linked to the felling of forests:

- i) the increase in prices, for example agricultural products, have historically spurred deforestation for both productive and speculative purposes;
- ii) major infrastructure works, such as hydroelectric projects, paving of highways (which in the present case is represented by the BR-364 federal highway) and construction of ports, change the regional dynamics and may have contributed in part to the recent increase in felling of forests;
- iii) and the government's continued weakening of environmental regulations: The Forest Code approved in 2012 allowed the legalization of a significant proportion of areas illegally deforested in the past, which created expectations that amnesty would be granted for deforestation in the future.

Indeed, since the time of this study, this tendency has been confirmed by the progressive weakening of the enforcement of environmental legislation, which has been linked to the almost unprecedented levels of deforestation of recent years^{5,6}.

The Evergreen Project Area borders with the following public conservation areas ("UCs"), which are further described below in Section 1.12:

- The Jatuarana National Forest (or "FLONA"); and
- The Aripuanã wild harvesting Reserve (or "RESEX");
- The Sucunduri National Forest (or "FLONA").

⁵ Source Folha de São Paulo (accessed 22/03/21): <https://www1.folha.uol.com.br/ambiente/2020/09/amazonia-tem-2o-pior-agosto-de-desmate-so-perdendo-para-o-do-1o-ano-sob-bolsonaro.shtml>

⁶ Source A Pública (accessed 22/03/21): <https://apublica.org/2020/08/governo-bolsonaro-reduz-multas-em-municipios-onde-desmatamento-cresce/>

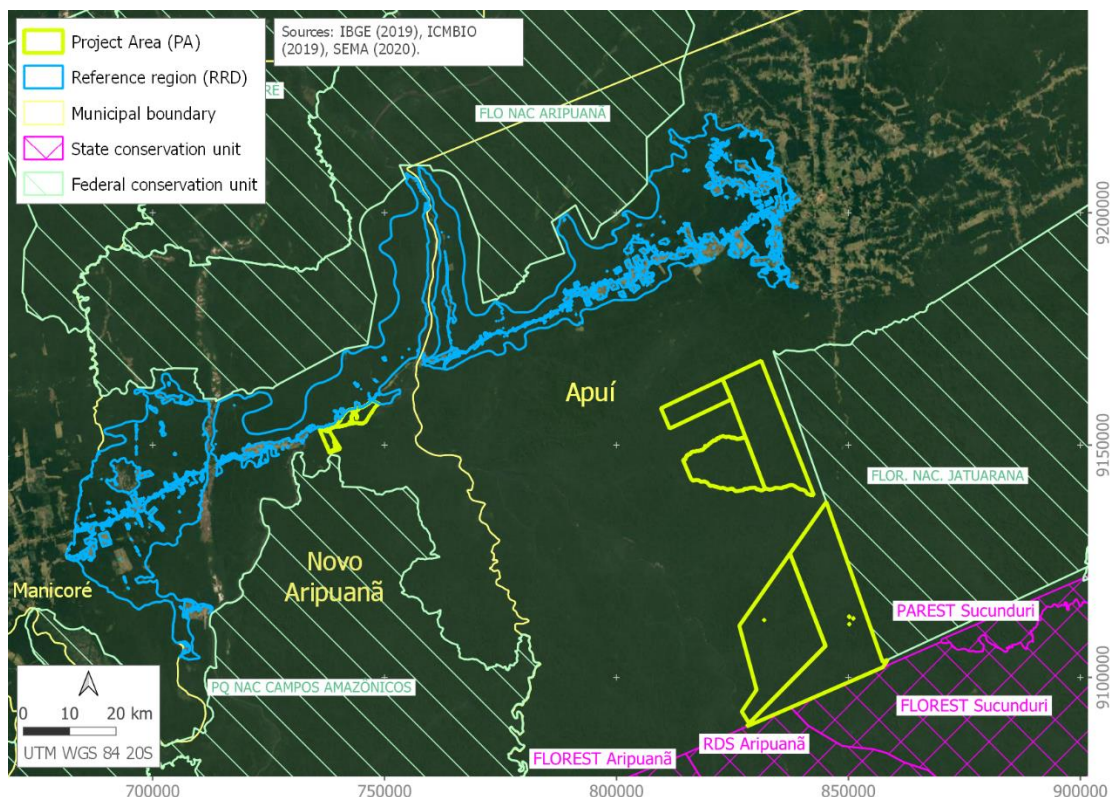


Figure 1. Protected areas in the vicinity of the Project Area

Despite the crucially important role of protected areas in the fight against deforestation, they often do not attain their Sustainable Development Goals due to shortfalls in management and monitoring, leaving them vulnerable to criminal activity such as land-grabs, illegal wood harvesting and deforestation, particularly in areas close to the Arc of Deforestation (see figure below), which is the case in the present project. The continued deforestation in Conservation Units can be seen in the table below, in the considerable proportion that this category represented of the total Amazon deforestation in 2013. Furthermore, it is important to note that successive governments – Dilma in 2012, Temer in 2016, and Bolsonaro in 2019⁷ – have put forward measures to reduce the areas Conservation Units (“UCs”)⁸, therefore further putting these overlapping areas in peril.

⁷ Source Amazônia.org (accessed 22/07/21): <https://www.oeco.org.br/noticias/bolsonaro-conversa-com-governadores-sobre-revisar-unidades-de-conservacao/>

⁸ Source Terra de Direitos (accessed 22/07/21): <https://terradedireitos.org.br/acervo/artigos/ameacas-concretas-do-governo-bolsonaro-sobre-unidades-de-conservacao/23231>

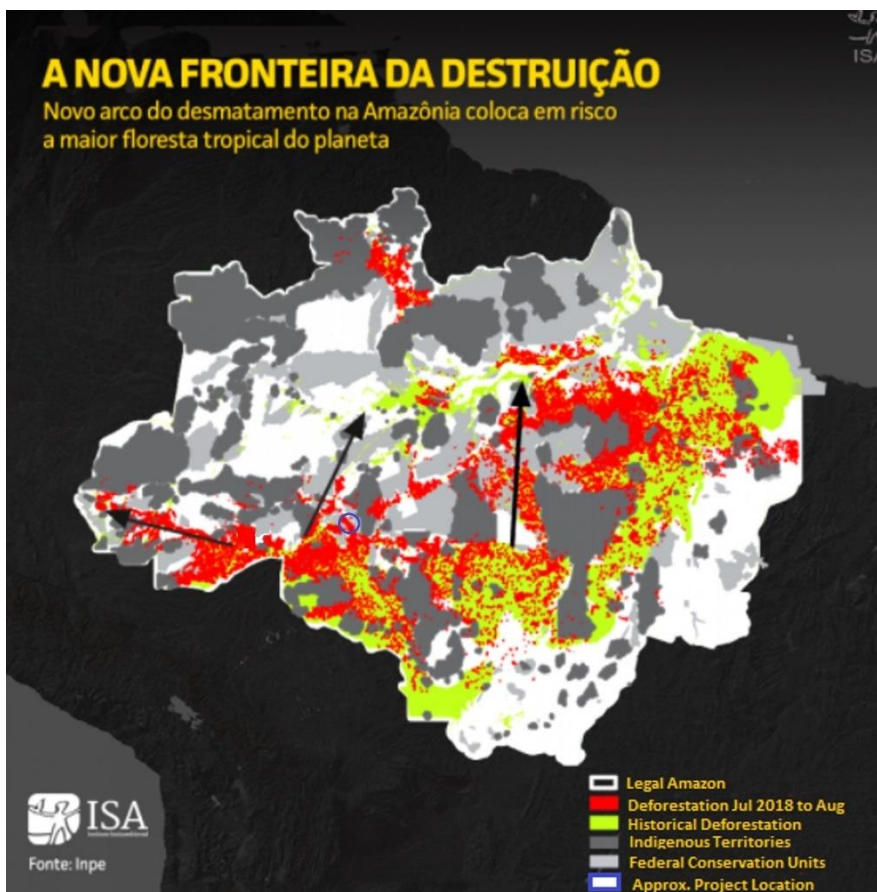


Figure 2. Location of the Arc of Deforestation in 2019 (Source: ISA, 2019)

Table 4. Deforestation in 2020 by land title category in the Brazilian Amazon⁹

Land title category	Area deforested in 2020 (ha)	% of the total deforested
Indigenous Land	27.410	3%
Conservation Unit (integral protection)	6.752	1%
Conservation Unit (sustainable use)	40.883	5%
INCRA Settlement	187.975	23%
Private Property	366.793	44%
Non-designated public land	122.538	15%
Designated public land	14.999	2%
Land lacking land title information	60.284	7%

⁹ Source: Relatório Anual do Desmatamento no Brasil 2020 - São Paulo, Brasil - MapBiomas, 2021: https://s3.amazonaws.com/alerta.mapbiomas.org/rad2020/RAD2020_MapBiomasAlerta_FINAL.pdf

Others	4.519	1%
Total	832.153	100%

In accordance with the Southern Amazon Mosaic Management Plan, the CEUC determined that Sustainable Forest Management Plans (SFMPs) are permitted on private lands, provided that the property meets the Decree's single paragraph about the creation of Protected Areas, as follows: Private lands whose properties are properly registered under Brazilian law are permitted within Aripuanã Sustainable Development Reserve, Guariba Extractive Reserve, and Aripuanã State Forest

In this way, if a property has a land title issued by the National Institute for Colonization and Agrarian Reform (INCRA), it may carry out a (SFMP), subject to IBAMA's approval. Therefore, there are no restrictions regarding SFMPs within the Protected Areas in the vicinity of the Evergreen REDD project properties. It is notable that the project property which is predicted to carry out sustainable forest management in 2027 (Fazenda Aroeira), currently does not have the necessary license as the date is too far in the future, however the latter will be obtained in due course.

Thus we can note the importance of the Evergreen REDD+ Project's activities in the portions that overlap with Conservation Units: its mission and actions sum with those of the Protected Areas in its surroundings, through its implementation of forest conservation and promotion of rational use of forest resources.

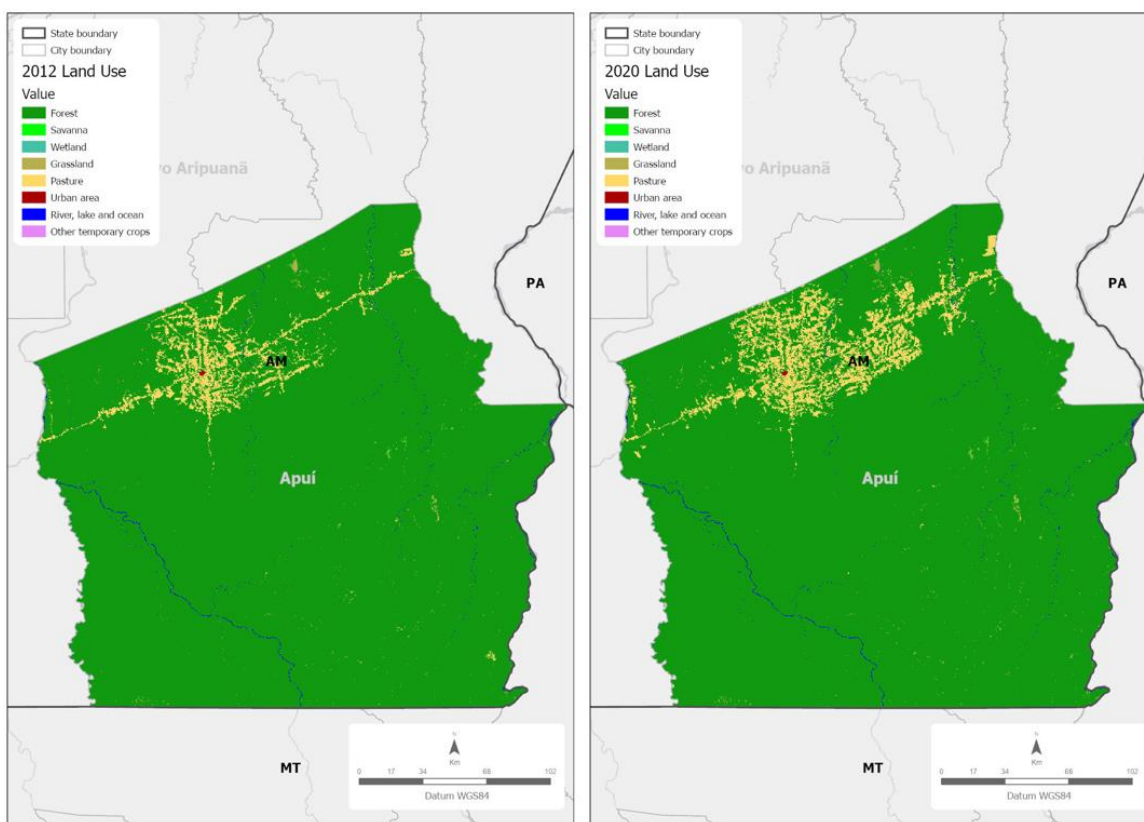


Figure 3. Land-use in Apuí Municipality in 2012 and 2020 (Source: Mapbiomas)

Table 5. Land-use areas in Apuí Municipality in 2012 and 2020 (Source: Mapbiomas)

2012			2020		
Non-forest			Non-forest		
Class	Area (ha)	%	Class	Area (ha)	%
Fields	14,055	8.5%	Fields	12,888	4.5%
Pastureland	150,599	91.2%	Pastureland	270,714	95.3%
Agriculture	48	0.0%	Agriculture	32	0.0%
Urban areas	499	0.3%	Urban areas	505	0.2%
Total	165,202	100%	Total	284,139	100%
Other			Other		
Class	Area (ha)	%	Class	Area (ha)	%
Forest	5,230,896	99.5%	Forest	5,110,674	99.4%
Water bodies	27,957	0.5%	Water bodies	29,240	0.6%
Total	5,258,852	100%	Total	5,139,914	100%

The deforestation agents analyzed for the Avoided Unplanned Deforestation (AUD) component (as further described in Sections 3.4 and 3.5) were: cattle ranching, mainly producing beef; timber harvesters, acting both legally and illegally; and infrastructure, primarily construction of roads and highways. The primary baseline scenario resulting from these analyses is cattle

ranching because we see that pasture represents 91% of non-forest land in the municipality in 2012, and 95% in 2020. Furthermore, cattle ranching represents 51% of the municipal GDP (see Section 3.4). This predominance and increasing trend is borne out in the analyses of land-uses in the Reference Region ("RR") (see Section 3.4), as pasturelands grew from 98.9% of non-forest land-uses in 2012 to 99.4% in 2019.

In the case of the Avoided Planned Deforestation (APD) component of the present project, economic pressures were going to compel the project proponent to deforest, to gain income from cattle farming, making them themselves the deforestation agent, which plans have been discontinued.

In the south the municipality of Apuí, approximately 70 km from the project area, planned major road construction is planned, which generally increases access to and trade of products. That is the case of the road that links the property Alvorada and the city Colniza, the BR-174, that has plans of being expanded¹⁰. Furthermore, it will probably affect demographic growth in the region, resulting in higher population pressure and deforestation rates. It is likely that these infrastructure projects will also lead to a considerable increase in migration to the region and colonization through land grabbing (IDESAM 2011).

Furthermore, according to IDESAM, the municipality of Apuí (which contains the Project Area in its entirety) is an agricultural expansion front in the Amazon and occupies the 9th position of the most deforested municipalities annually between 2013 and 2019 (IDESAM 2019). Despite the barrier to the expansion of deforestation formed by the Southern Amazon Mosaic, some of these protected areas fall within the sustainable use category, and moreover, they are close to the Brazilian arc of deforestation, which increases deforestation pressure and illegal logging.

The Evergreen REDD project is committed to conserving the property, despite a consistently negative financial balance. For this reason, and because of competition pressures described in section 3.5, Additionality, the revenue from the present REDD project is essential for the continued conservation of this native rainforest area. Conservation activities involve the prevention of invasion by outside agents to prevent illegal logging and other illicit degradation of the project area. Supervision is carried out by 12 supervisors from within the project region, who keep the project owner updated constantly. The supervision team monitors the area on alternate schedules, flying over the area every two weeks. Monitoring by river is carried out almost daily, and there are two boats available for this activity. Lastly, the project owner provides motorcycles, pickups and quads when needed.

The entirety of the Project Area has retained its original vegetation cover. There are no buildings, or permanent settlements and 47.2 hectares, which were deforested for roads, which were duly removed from the Project Area. Deforestation or extraction of forest products have never been carried out within the project area because the main objective of the project owners is forest

¹⁰ Sources: [Aprosoja realiza primeiro Estradeiro de 2016 na BR-174 a partir de segunda - Releases - Comunicação - APROSOJA/MT](#) ; [Aprosoja e Movimento Pró-logística encerram estradeiro e relatório irá à Sinfra e Dnit - Releases - Comunicação - APROSOJA/MT](#)

conservation combined with Sustainable Forest Management, along with planned future training activities for communities related to the collection of non-timber forest products (NTFPs).

A Sustainable Forest Management Plan (SFMP) may be implemented during the project period, to harvest forest products/by-products in a manner consistent with the conservation of the local ecosystem. 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. The SFMP is further detailed at the end of this section.

Sustainable Forest Management Plan within the Evergreen REDD project area

The predicted total area for SFMP is 20% (2,793.40 ha) of one of the properties, Fazenda Aroeira, which has a total area of 13,967 ha. The harvesting of selected trees for timber, according to the approved parameters mentioned below, and these activities are implemented by the project owner as one component of the sustainable economic activities, which provide the necessary income to keep forests standing.

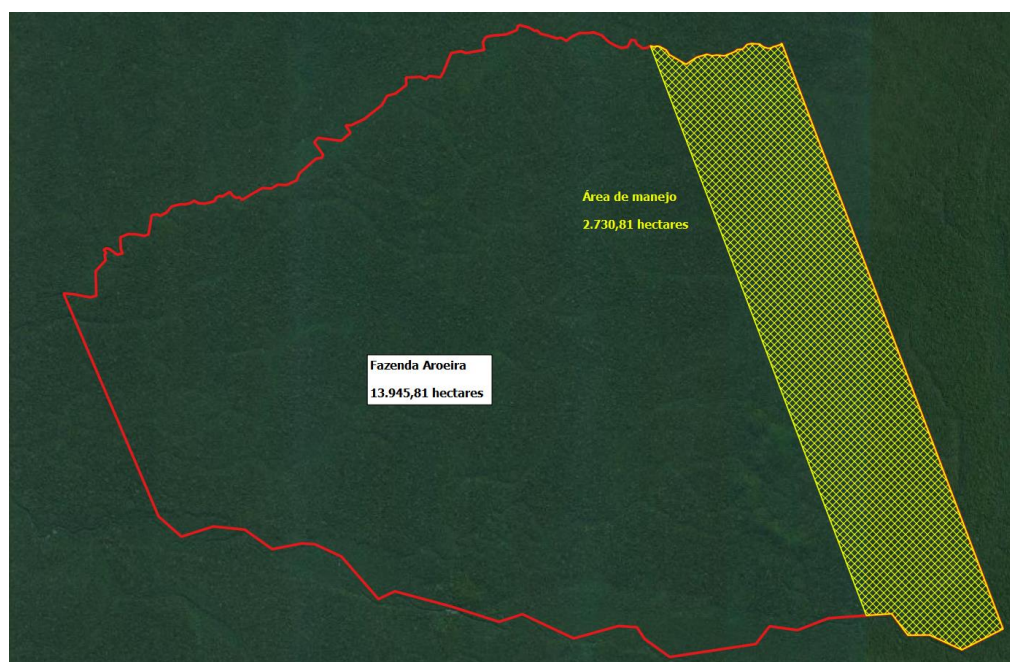


Figure 4. Total planned forest management area within the Aroeira property

The project owner has probable plans to pursue a Sustainable Forest Management Plan (SFMP) in one of the five Evergreen properties (Aroeira) in 2027. The forest management will be certified by the FSC, thus, due to the costs linked to certification, the operations schedule may be altered according to the project's cash flow and market demand. Therefore, there is currently no specific data on this. Furthermore, the implementation of SFMPs depends on prior authorization by the

responsible environmental body, being, in this case, the Instituto de Proteção Ambiental do Amazonas - IPAAM.

The procedures and guidelines for forest management of the area are described below according to the Resolution nº406/02/02/2009 regulated by the National Environment Council (Conselho Nacional Do Meio Ambiente-CONAMA), which regulates the procedures and standardizes criteria for elaboration and implementation of sustainable forest management of forests in the Amazon Biome:

- i. Forest management systems located in the State of Amazonas (within the Amazon biome) using machines to drag and transport logs are based on a minimal cutting cycle of 25 years and maximum of 30 years¹¹. The maximum cutting level is 25 m³/ha (4 – 6 trees/ha) in reduced impact plans, provided that the trees have minimum diameter of 50cm for felling for all species for which specific felling diameters have not yet been specified.
- ii. Tree selection is conducted according to technical and ecological criteria to promote regeneration of managed tree species, soil preservation and quality of remaining forest. Thus, at least 10% of the remaining trees per species in the effective exploration area per plot are guaranteed, respecting the minimum limit of preservation of at least 3 trees per species per 100 ha, in each subdivision of the plot.
- iii. The estimated annual productivity of the managed forest for the group of commercial species, when there are no studies for the area, will be 0.86 m³/ha/year for management areas using log skidding machines
- iv. Regarding private properties, sustainable forest management plans cannot be implemented in permanent preservation areas (PPAs). However, legal reserve areas established by the Brazilian Forest Code can be harvested for production of goods and services, subject to the approval of the SFMP by the relevant environmental body.

A complete forest inventory will be the next necessary step to assess the area's forestry potential and determine the actual area for sustainable forest management to design the SFMP. The area under management will be divided into Annual Production Units (APUs), and each year one APU will be managed. In this way, APU1 will be harvested in year 0 of the timber harvesting plan (2027), and so on, which ensures the regeneration and preservation of the ecosystem. However, the division of the property into APUs will be defined during the elaboration of the Sustainable Forest Management Plan. It is important to note that an Annual Harvesting Operational Plan shall be carried out before harvesting each APU, which also depends on prior authorization by IPAAM.

Furthermore, Forest Stewardship Council (FSC) Certified Forest Management will be applied to the future SFMP, in accordance with the VCS VM0007 methodology requirements. FSC equates

¹¹ Source: <http://www.ipaam.am.gov.br/wp-content/uploads/2021/01/Conama-406-09-Plano-de-Manejo-Florestal-Sustent%C3%A1vel.pdf>

to low-impact harvest systems associated with forest longevity, continued ecological balance, socio-environmental responsibility, and financial efficiency.

According to the Brazilian Forest Code, permanent preservation areas (PPAs) at the borders of waterways will be comprehensively preserved.

Generally under SFMPs, some planned deforestation is predicted, within the project area, to build the necessary infrastructure, including main and secondary roads, skidding trails, and timber yards in each annual production unit (or “UPA” - Unidade de Produção Anual, in Portuguese) within the project area, estimated to be around 1% of each UPA.

Despite the importance of SFMPs for climate change adaptation and mitigation, their implementation is not considered common practice, primarily due to the shortage of human resources and funding required to implement the necessary measures (FAO 2012)¹².

Implementation of the proposed REDD+ mechanism together with the SFMP promotes sustainable forest use by implementing forest conservation and preserving the valuable carbon stocks in forests, while reducing pressure for illegal timber from other areas. In this way, biodiversity conservation, carbon emissions reductions, and development of the local economy can be achieved in a complementary fashion. Furthermore, REDD+ mechanisms in sustainably managed forests can provide a guarantee of purchasing an environmentally responsible product to buyers of wood products, thus catering to the growing market demand (FAO 2012)¹².

Discontinued Planned deforestation activities

Regarding the APD component of the project, the total area planned for deforestation was of 26,471 ha, which has been discontinued in accordance with the applied APD methodology modules of the present project.

Jurisdictional and Nested REDD (JNR)

The project is not currently located within a jurisdiction actively covered by a jurisdictional or nested REDD+ program (JNR). However, the situation is evolving, with the most relevant frameworks, within which JNR REDD+ policies are predicted to develop, being the federal policies and regulatory frameworks on environmental services and REDD+ in Brazil and in the state of Amazonas, as identified by Fundação Amazonas Sustentável (FAS, 2020) specifically:

- I. The National Policy on Climate Change (PNMC), Law No. 12.187/2009;
- II. The National Climate Change Plan, guided by Decree No. 6.263/2007;
- III. The Action Plan for the Prevention and Control of Deforestation in the Legal Amazon (PPCD-AM), 2016;
- IV. Brazil's Determined National Contribution (the 'NDC', which are the goals internationally assumed by Brazil in the Paris Agreement), 2015;

¹² FAO. Forest management and climate change: a literature review. <http://www.fao.org/3/md012e/md012e00.pdf>.

- V. The Amazon reference level for forests (FREL Amazônia), an instrument submitted by the Brazilian Federal Government to the United Nations Framework Convention on Climate Change (UNFCCC), as part of Brazil's registration as an eligible country to receive resources REDD+ under UNFCCC 10, via the Green Climate Fund, 2016;
- VI. The resolutions of the National REDD+ Commission (CONAREDD);
- VII. The State Policy for Environmental Services of the State of Amazonas (LSA) Law No. 4.266/2015 and;
- VIII. State Plan for the Prevention and Control of Deforestation and Fires in Amazonas - PPCDQ-AM (2020-2022) - under discussion.

A State System for REDD+ in Amazonas (SisREDD+ Amazonas) is developing within the State Policy for Environmental Services of the State of Amazonas (LSA), specifically in its articles 14, 15, 16, 17 and 18, which deal with, respectively:

- 14: State Climate and Carbon Regulation Program and REDD+ Subprogram, including avoided deforestation and degradation as well as reforestation;
- 15: The state voluntary carbon target in accordance with the PPCD-AM and the emissions reductions contained within Federal Law nº. 12.187, from 2009, which is subject to prior review by the CEMAAM;
- 16: creation of financial and economic incentives for environmental conservation, REDD, sustainable forest management; establishment of the infrastructure and instruments required to measure, analyze and report (MRV) CO2 emissions as well as to value them; reinforce cooperation at the jurisdictional, municipal, state and federal levels; promote the distribution of benefits from environmental services which contribute to and are related to REDD; and to create, within 180 days, the State REDD+ Plan based on nationally and internationally recognized concepts and that ensure the capacity for measurement, quantification, verification, registration and transparency, as well as the monitoring of the reduction of carbon emissions from deforestation and forest degradation;
- 17: Establishes the criteria for registration of UREDD+s obtained during periods prior to the creation of the REDD+ Subprogram;
- 18: Establishes the connection between the criteria established by Complementary Law n.53/2007 regarding the allocation of resources obtained through the UREDD+s specifically for State Conservation Units.

The main markets which REDD+ in Amazonas State will be able to access (FAS 2020), as is the case generally, stand out as (FAS 2020):

- 1) Voluntary carbon market (through private investments - such as companies or private funds);
- 2) Payment by results mechanisms (such as the REDD Program for Early Movers/KfW, REM);
- 3) Bilateral agreements (such as with the Government of California);
- 4) CORSIA (the "International Civil Aviation Emissions Reduction and Offset Scheme");

- 5) Green Climate Fund, UNFCCC (in principle, access must occur via the Federal Government – MMA).

Regarding the regulated market (items 2 and 3, above) it is interesting to note that, despite advances in global international frameworks such as the Paris Agreement, the regulation of associated market mechanisms (as defined by Article 6 of the Paris Agreement) is still pending a series of definitions and will still take considerable time to begin to operate. In addition to the lack of regulation of Art. 41 of the forest code (law for the protection of native vegetation) (FAS 2020).

Whether the subject be the regulated or the voluntary carbon (which concerns the present project most, currently), access to international and national REDD+ markets may occur through various avenues, such as:

- Through the state government (via the State Environmental Secretariat SEMA) or through local REDD+ projects and initiatives (via local actors), which follow state guidelines and/or attest to the quality of activities and procedures adopted through certifications by recognized international standards, such as Verra/VCS (FAS 2020);
- Via national and international REDD+ resources based on REDD+, to be procured by the State Government (represented by SEMA), the former of which is undoubtedly the actor with the greatest potential for raising such funds. As the Governing Body for State Environmental Policy, SEMA would seek strategic partnerships with subnational governments (such as the state of California, USA) or with international financial agents (such as the German bank KfW) for the transaction of generated and allocated REDD+ units for SisREDD+ Amazonas;
- Regarding local REDD+ projects and initiatives, which is what primarily concerns the present project: Private REDD+ projects and/or coordinated by local communities will be a fundamental part of SisREDD+ Amazonas. SisREDD+ may encourage the structuring of private initiatives that have the means (human and financial resources) to structure of REDD+ projects, which involve: alignment and consultation actions with affected communities, development of an action plan and formal project design documents (eg PDD - Project Design Document), validation of the project against standards recognized by SisREDD+ and national fundraising and international organizations, via REDD+. Additionally, individual (private) projects will have to go through processes of registration and registration of the emission reductions generated, with SisREDD+, avoiding any risk of double counting of credits and maintaining the transparency and integrity of the system (FAS 2020), which is already all integral to the functioning of VCS/ Verra REDD+ projects, and therefore will represent a harmonization of SisREDD+ and VCS projects.

Furthermore, we can identify, for all REDD+ markets, the following pending items, which would be required at minimum to unblock the market at the jurisdictional level, among other things:

- an integrated accounting and recording model for emission reductions, which could be a simplified and flexible system that allows new actors to participate in the REDD+ mechanism in an integrated manner with state accounting.

In case a regional JNR REDD framework comes into effect, the pathway for accessing it is expected to be as follows (FAS 2020):

- I. REDD+ projects to qualify and register under the Governing Body (LSA Article 12);
- II. Executing agents deliver documentation for project registration (ex: Management Plan);
- III. Management Agency analyses documents and registration of the project, and establishes the initial number of Environmental Services Units applicable to the land area;
- IV. Environmental Services Units are registered in the Registration System by the Management Agency (LSA Art. 19);
- V. Executing agents carry out the development of REDD+ projects and certify under standards approved by the Governing Body.

To this extent, the Evergreen REDD+ is maintaining an ongoing conversation with SisREDD+, SEMA and PPCD-AM in order to integrate as soon as possible with jurisdictional programs, and for Carbonext to continue to be a leader in the domain of JNR REDD+.

1.12 Project Location

The Evergreen REDD+ Project (hereafter “the project”) is situated in Apuí municipality in the State of Amazonas, in the Southern Amazon. The municipality is located around 1,000 km from Manaus, Amazonas State capital. The Project Area belongs to Ituxi Administração e Participação Ltda (represented by Ricardo Stoppe Junior), and Renan Vitoriano Boehm, and is covered 100% by native vegetation, totaling 130,554.8 ha. The northern project boundary lies approximately 20 km from the city of Apuí, the western boundary is close to, or at points touching, the Aripuanã River, and the eastern boundary is flanked by the unofficial local road, the Estrada da Coruja, and is within some 20 km of the Acari river. The full contour coordinates of the project area are available upon request.

The primary means of access to the project is via road, the main one is leaving southwards from the city of Apuí, Amazonas State, on the Estrada da Coruja, in the State of Mato Grosso (MT). This journey must be done by 4x4 and is only feasible during the dry season (from May to September). The second option is by road and then by boat, taking the boat the Trans-Amazonian Highway (BR-230) from Apuí towards Vila do Carmo, AM until reaching the Aripuanã River, and then southwards by boat for 100km, at which point the river meets the project’s Southwest corner. However, this river has several waterfalls, making it difficult to reach the area during the dry season.

In accordance with VCS requirements, stipulated in Approved VCS Methodology VM0007, version 1.6, the project area may only include areas composed of “forest” for a minimum of ten years prior to the project start date. Therefore, satellite images between 2010 and 2019, were analyzed and classified. The areas within the property that were defined as forest in 2010 and that remained so in 2019 were used to define the project area. Through this methodology, 121.098 hectares were excluded from the PA.

Areas of deforestation were excluded from the project area, specifically: 47.2 ha deforested by roads.

The original Project Area displayed areas of overlap, summing to 51,861.5 hectares, with public conservation areas (“UCs”) – all part of the Southern Amazon Mosaic – which were discounted from the final PA area, as follows:

- 23,998.8 hectares of the original PA overlapped with the Jatuarana National Forest (or “FLONA”); and
- 15,811.8 hectares overlapped with the Aripuanã wild harvesting Reserve (or “RESEX”)
- 12,051.0 overlapped with the Sucunduri National Forest (or “FLONA”).

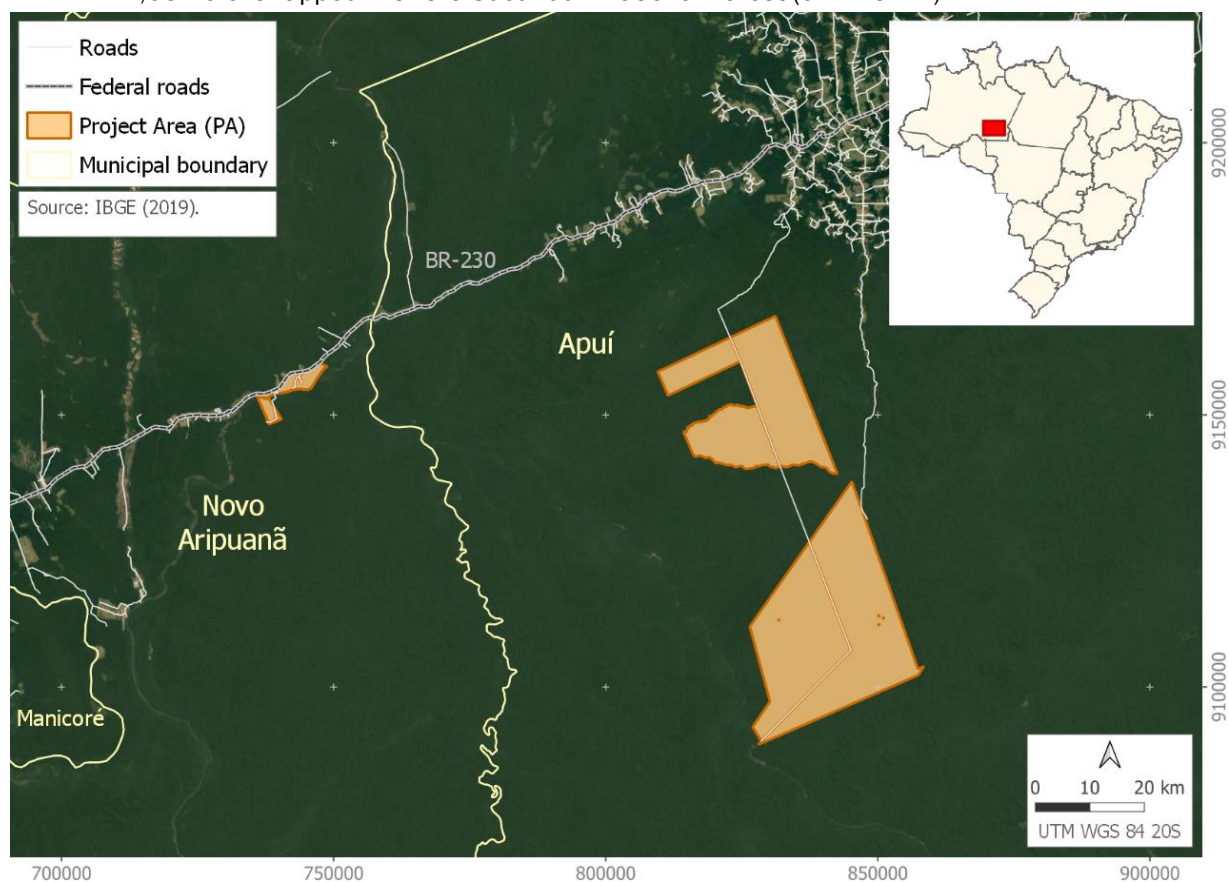


Figure 5. The Evergreen REDD+ Project Area

The Project Area is subdivided into five properties, as detailed in the table and figure below:

Table 6: Breakdown of properties in the Project Area

Property Name	Ownership	Total Property Area (ha)	PA Area (ha)	Percentage PA area composition (%)
Boa Lembrança	Milenio Empreendimentos	2,476.8711	2,411.6	1.8

São Damião		Milenio Empreendimentos	1,044.3787	1,037.4	0.8
Fazenda Alvorada		Ituxi Administração e Participação Ltda	132,354.3918	80,911.4	62.0
Fazenda Buiuçú	Buiuçú remanescente	Ituxi Administração e Participação Ltda	39,212.2888	32,227.2	24.7
	Aroeira	Ituxi Administração e Participação Ltda	13,970.5146	13,967.0	10.7
Total			189,058.45	130,554.80	100%

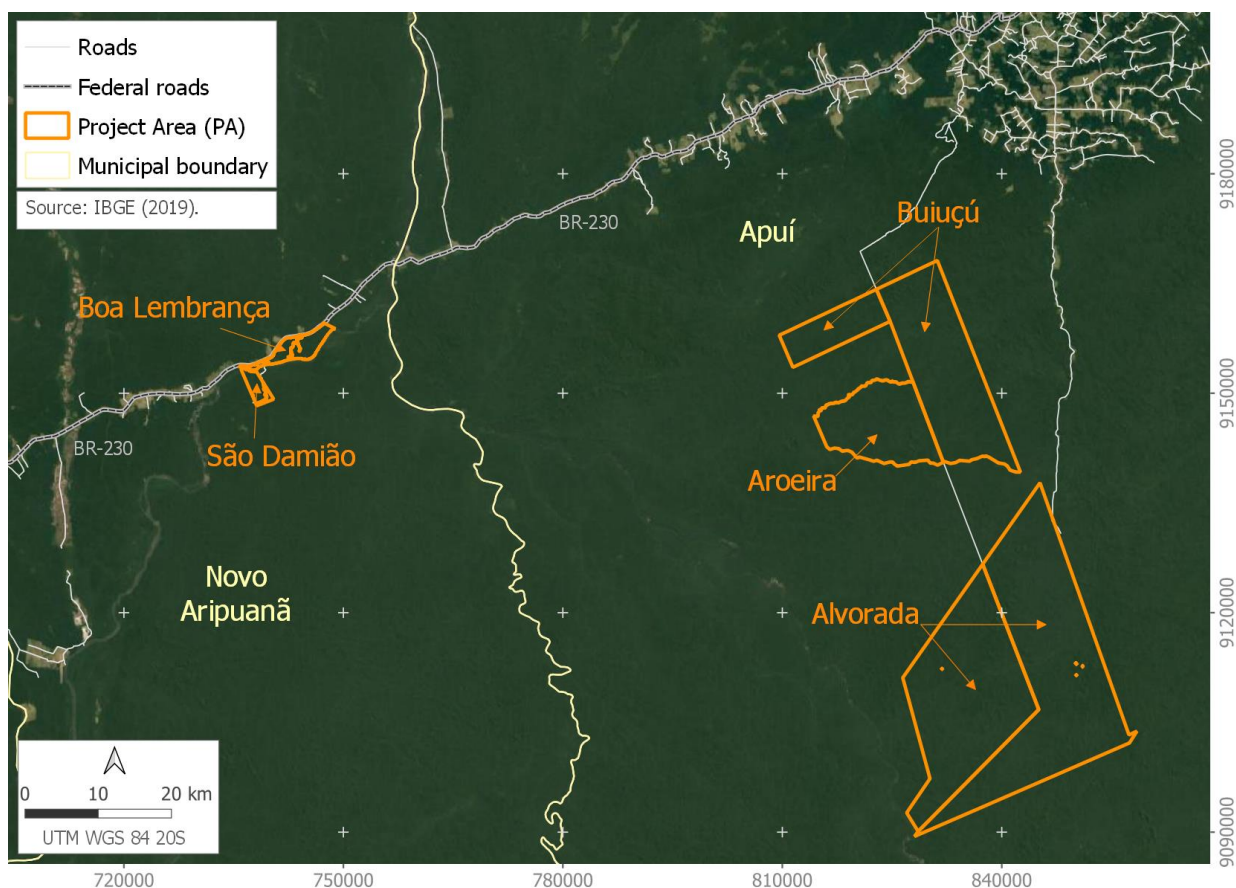


Figure 6. Location of each of the properties within the project area

The latitude and longitude coordinates of the project areas, along with Figures to identify the coordinates in each of the properties, are presented below.

Table 7. Latitude and Longitude of Project Zones 1 – 5

Property Name	Id	Latitude	Longitude
Alvorada	1	-8.0311	-60.0385

Alvorada	2	-8.2270	-60.0226
Alvorada	3	-8.0949	-59.7479
Alvorada	4	-7.7891	-59.8703
Buiuçu	5	-7.6090	-60.1945
Buiuçu	6	-7.5154	-59.9994
Buiuçu	7	-7.7761	-59.8946
Aroeira	8	-7.7464	-60.1348
Boa Lembrança	9	-7.5971	-60.7585
Boa Lembrança	10	-7.6043	-60.7440
Sao Damião	11	-7.6577	-60.8417
Sao Damião	12	-7.6917	-60.8202
Sao Damião	13	-7.6999	-60.8411
Boa Lembrança	14	-7.6504	-60.8630

Geographic coordinates Datum WGS 84



Figure 7. The Alvorada property and location of coordinates 1 – 5



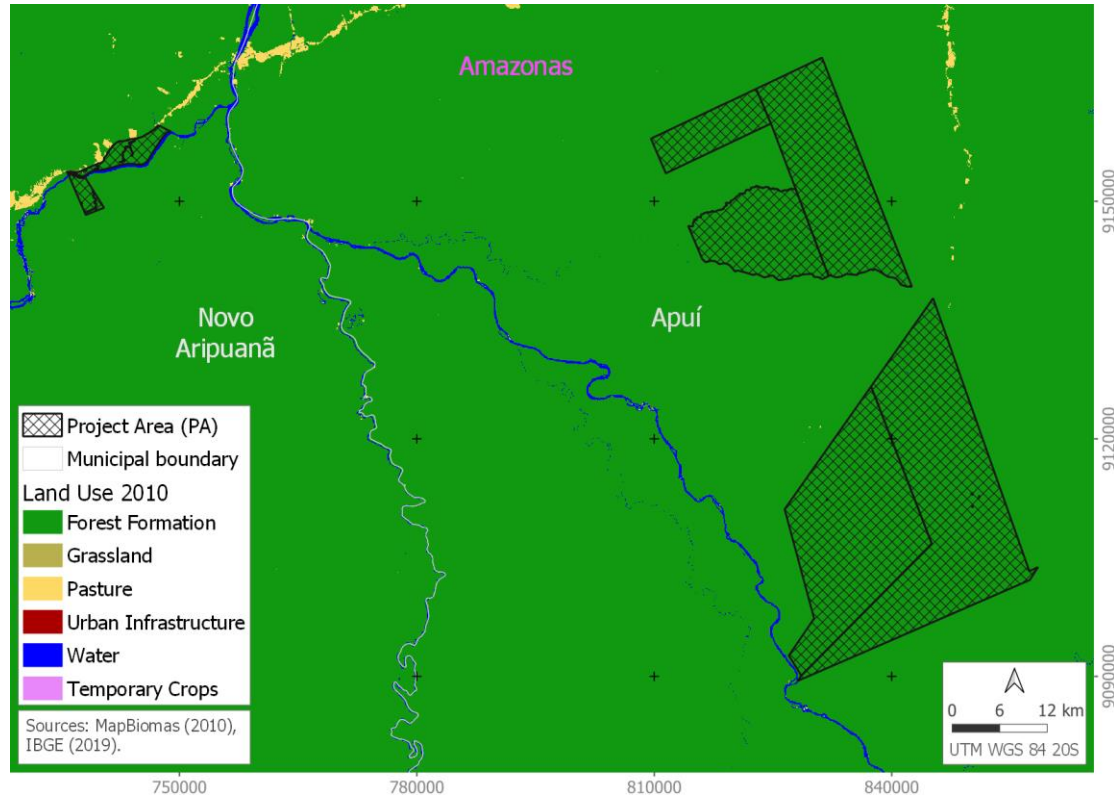
Figure 8. The Buiçu and Aroeira properties and coordinates 5 – 8



Figure 9. The São Damião and Boa Lembrança properties and coordinates 9 – 14

1.13 Conditions Prior to Project Initiation

In accordance with methodological requirements, the Evergreen REDD+ Project Area was entirely covered by native forest 10 years prior to project start (satellite image from 2010) and this forest cover was still entirely intact at project start date (satellite image from 2019¹³)



¹³ 2019 was utilized as the closest available Mapbiomas data to project start date, 2020 data will be available in Aug 2021

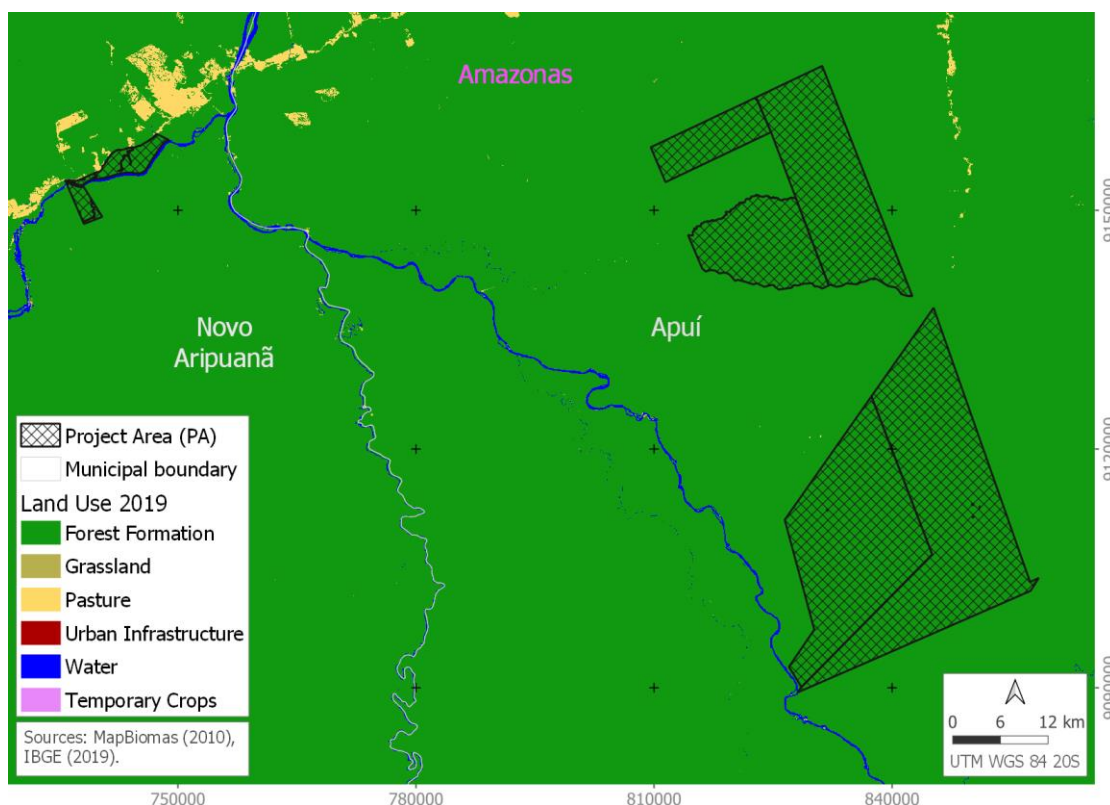


Figure 10. Forest cover in the PA, ten years prior to (2010), and at Project Start Date (2019) (Sources: Mapbiomas 2021¹⁴; IBGE 2019¹⁵)

Extensive, small-scale beef cattle farming is prevalent in the municipality, representing 51% of GDP (Carrero et al. 2015¹⁶) and is strongly linked to deforestation, pasture being the vastly predominant (>98%) post-deforestation land-use class. The details are further analyzed and argued under sections 3.4. (Baseline scenario) and 3.5 (Additionality) of the present PD. Cattle and pasture are therefore predominant both in terms of the conditions prior to the project, the baseline scenario, and the post-deforestation land-use of the present REDD project.

General characteristics of the Project Area

The Evergreen REDD+ Project has significant impacts on both climate change mitigation and biodiversity conservation at the regional level of Southern Amazonia. As further discussed in section 2.3 (Environmental Impact), the Evergreen REDD+ Project adds a further 7% to a 1,861,548.32 hectares group of State conservation areas called the Apuí Mosaic.

We can add to this six Federal Conservation Units (FLONAs, APAs, REBIOs, and a PARNA) in the region of the Project Area, which sum to 4,770,872 ha, also described in section 2.3. When we

¹⁴ Mapbiomas 2021: <https://mapbiomas.org/>

¹⁵ IBGE 2019: <https://portaldemapas.ibge.gov.br/porta1.php#homepage>

¹⁶ Carrero et al (2015): A Cadeia Produtiva de Carne Bovina no Amazonas

consider the Evergreen REDD+ Project within this context, its impacts are not only regional but national and international in its contribution to climate regulation in Brazil and South America.

As noted by research conducted by the nearby Boa Fé VCS Project¹⁷, the location of the project is strategic, as it helps to establish a barrier against the advancement of the Brazilian Arc of Deforestation from the south. The effects on biodiversity are described in terms of a Southern Amazon biodiversity corridor, created by conjoining with the many aforementioned protected areas in the region. Preserving such continuous forest environments makes an important contribution to regional fauna and flora biodiversity conservation.

Various specific aspects of the Project Area are described below.

Vegetation Cover

The project area is 100% covered by native Amazonian vegetation. To confirm the types of forest present, the SIG analysis via Mapbiomas¹⁸ was complemented with BDIA¹⁹ and IBGE sources²⁰. Four vegetation types were found in the area, which are described below, along with their respective proportions of the PA's total area, as follows in the table below, and also in the vegetation cover sub-section of 3.3 Project Boundary.

Table 8. Vegetation types within the Project Area

Vegetation type	Area (ha)	% of the Project Area
Submontane dense tropical rainforest	66,756.94	51%
Submontane open tropical forest	59,523.59	46%
Alluvial dense tropical rainforest	2,571.98	2%
Lowland dense tropical rainforest	1,693.12	1%
TOTAL	130,554.60	100%

However, only the two predominant vegetation types representing 97% of the total, were taken into account in GHG calculations, for purposes of efficiency and conservativeness: Submontane dense tropical rainforest; and Submontane open tropical forest:

Submontane Dense Tropical Rainforest (code "Ds"): according to the IBGE (2008), the submontane formation is located over areas whose altimetric quotas are between 100 and 600 meters, generally corresponding to older or crystalline terrains. Its trees rarely exceed 30 meters in height, forming a uniform vegetation cover, occasionally interrupted by taller emerging trees. Regarding the carbon pools of this type of forest, the same

¹⁷ Source VCS (2021): <https://registry.verra.org/app/projectDetail/VCS/2482>

¹⁸ Source Mapbiomas: <https://mapbiomas.org/>

¹⁹ Source Banco de informações ambientais (BDIA): <https://bdiaweb.ibge.gov.br/>

²⁰ IBGE 2019: <https://portaldemapas.ibge.gov.br/portal.php#homepage>

scientific references (Fearnside et al. 2013²¹; Barni et al. 2016²²) have sourced biomass data for the project estimations, resulting in 679.0 and 696.6 tCO₂.ha⁻¹, respectively. For ex-ante calculation purposes, the project proponent assumed the average of these references (i.e., 687.8 tCO₂.ha⁻¹; CV%: 1.8%), equivalent to 399 t.ha.

Submontane Open Tropical Forest (code “As”): As described in the “Management Plan - Jurueña National Park” (2011)²³, this forest type is marked by the spaced arrangement of trees, which allows the passage of light, favoring the development of vines, palm trees, and sometimes bamboo, which characterizes and differentiates the variations of this vegetation type. Biomass estimates for this kind of forest are presented in Fearnside et al. (2013)²⁴ and Barni et al. (2016)²⁵, whose figures converted to carbon stocks result in 708.3 and 680.9 tCO₂.ha⁻¹, respectively. For ex-ante calculation purposes, the project proponent assumed the average of these references (i.e., 694.6 tCO₂.ha⁻¹; CV%: 2.8%), equivalent to 403 t.ha.

Climate

The project region falls entirely within a Tropical monsoon climate area – type (“Am”) of the Köppen climate classification system (KÖPPEN, W.; GEIGER, R, 1928). The characteristics of such regions include:

- no winter season;
- high average annual rainfall, averaging > 2,100 mm/year;
- a monsoon season associated with heavy rains during the summer, with monthly rainfall possibly >400 mm;
- relative humidity usually above 80%;
- The driest months have average rainfall <60mm;
- little monthly or annual variation in temperature, ranging between 23 °C and 25 °C as a monthly average, and minimum temperatures always >18 °C.

The rainfall ranges in the Project Area and Reference Region are shown in the figure below:

²¹ <https://revista.ufrr.br/agroambiente/article/viewFile/971/1026>; page 98 (accessed in 05/05/2021)

²² http://philip.inpa.gov.br/publ_livres/mss%20and%20in%20press/Barni_et_al-biomassa_florestal_em_Roraima_PORTUGUES_2016.07.19.pdf; page 19 (Table 3) (accessed in 05/05/2021)

²³ <https://www.icmbio.gov.br/portal/images/stories/imgs-unidades-coservacao/Encarte3.pdf> (accessed in 05/05/2021)

²⁴ <https://revista.ufrr.br/agroambiente/article/viewFile/971/1026>; page 98 (accessed in 05/05/2021)

²⁵ http://philip.inpa.gov.br/publ_livres/mss%20and%20in%20press/Barni_et_al-biomassa_florestal_em_Roraima_PORTUGUES_2016.07.19.pdf; page 19 (Table 3) (accessed in 05/05/2021)

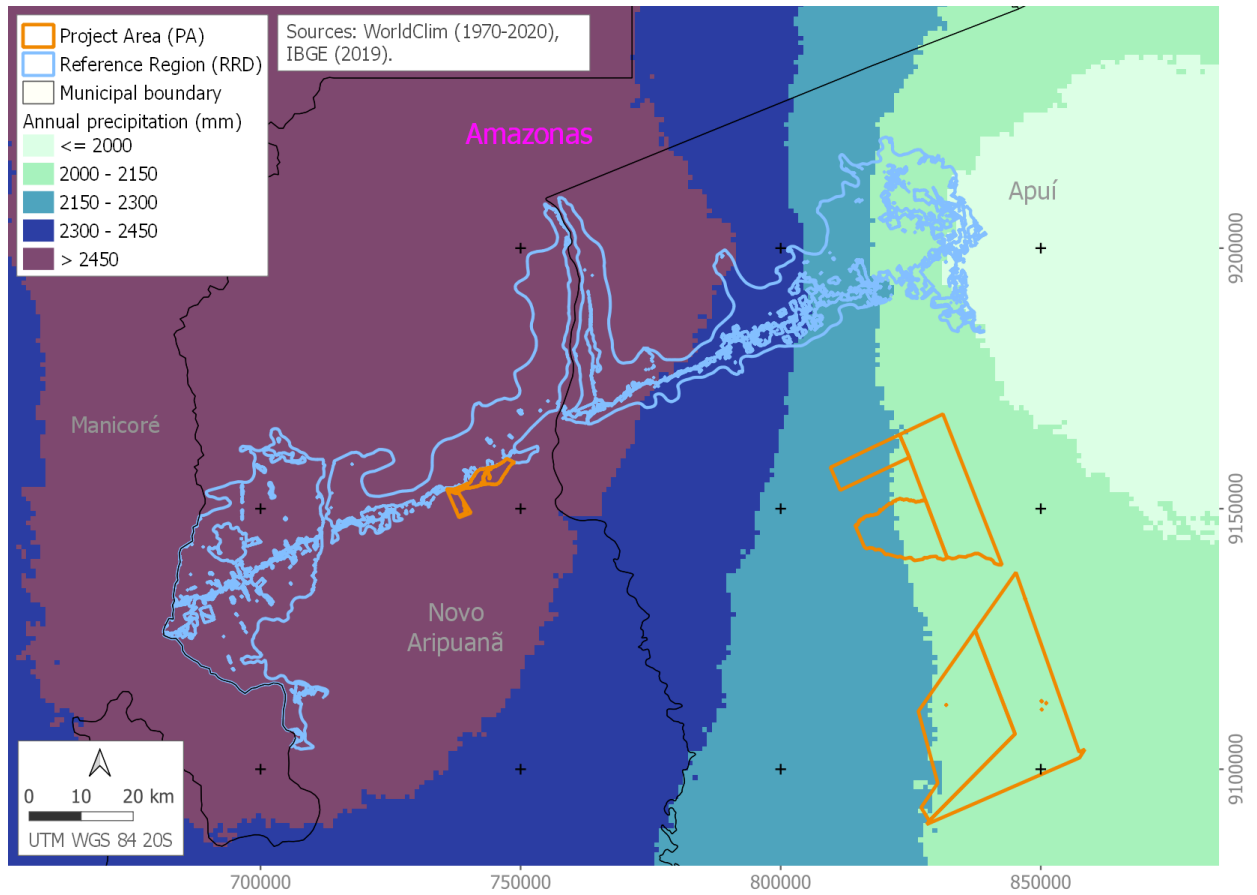


Figure 11. Rainfall ranges in the Project Area and Reference Region

Hydrography

In addition, the Project Area is located within the Madeira River sub-basin of the Tapajós-Madeira watershed. The Figure below also shows the waterways and watersheds in the reference region. It can be noted that most rivers in the region are oriented in the south-north direction.

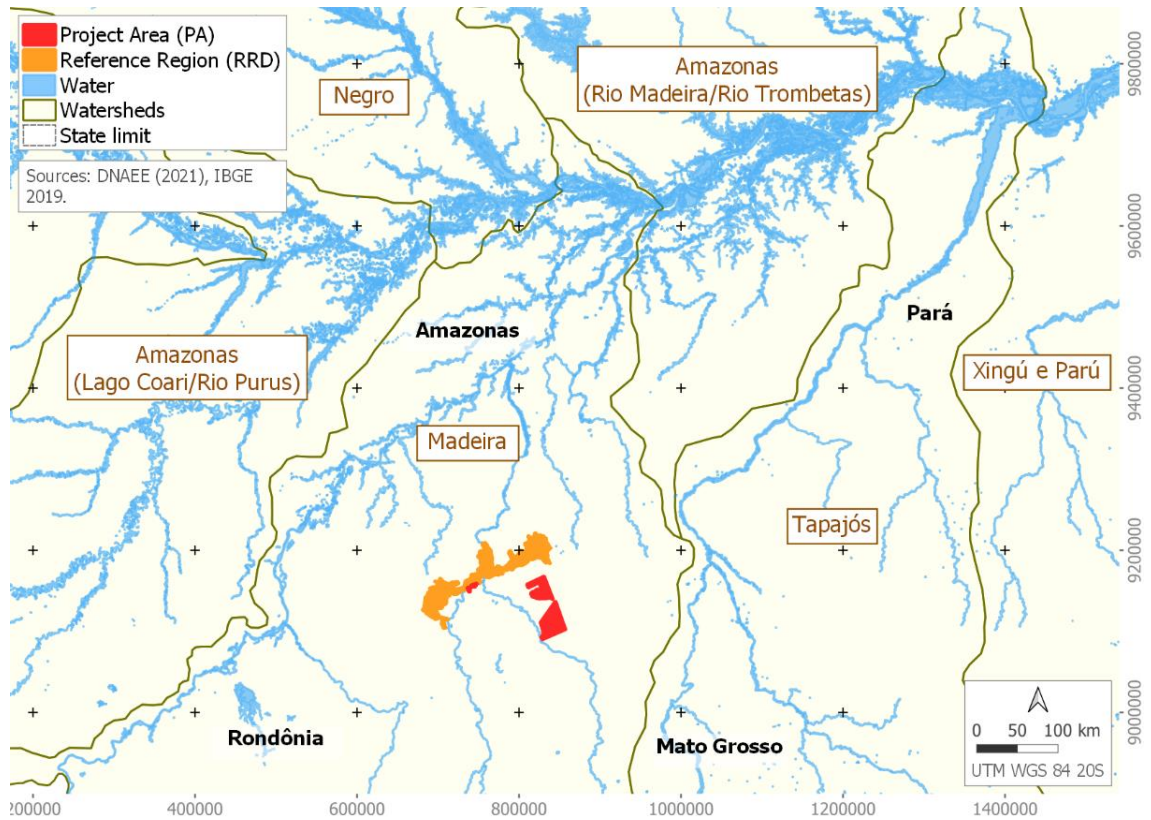


Figure 12. Location of the Project Area and RRD Reference Region within the Madeira sub-basin of the Tapajós-Madeira watershed

Altitude

The range of altitudes found within the PA is between between 0 m and 500 m, as presented in the figure below.

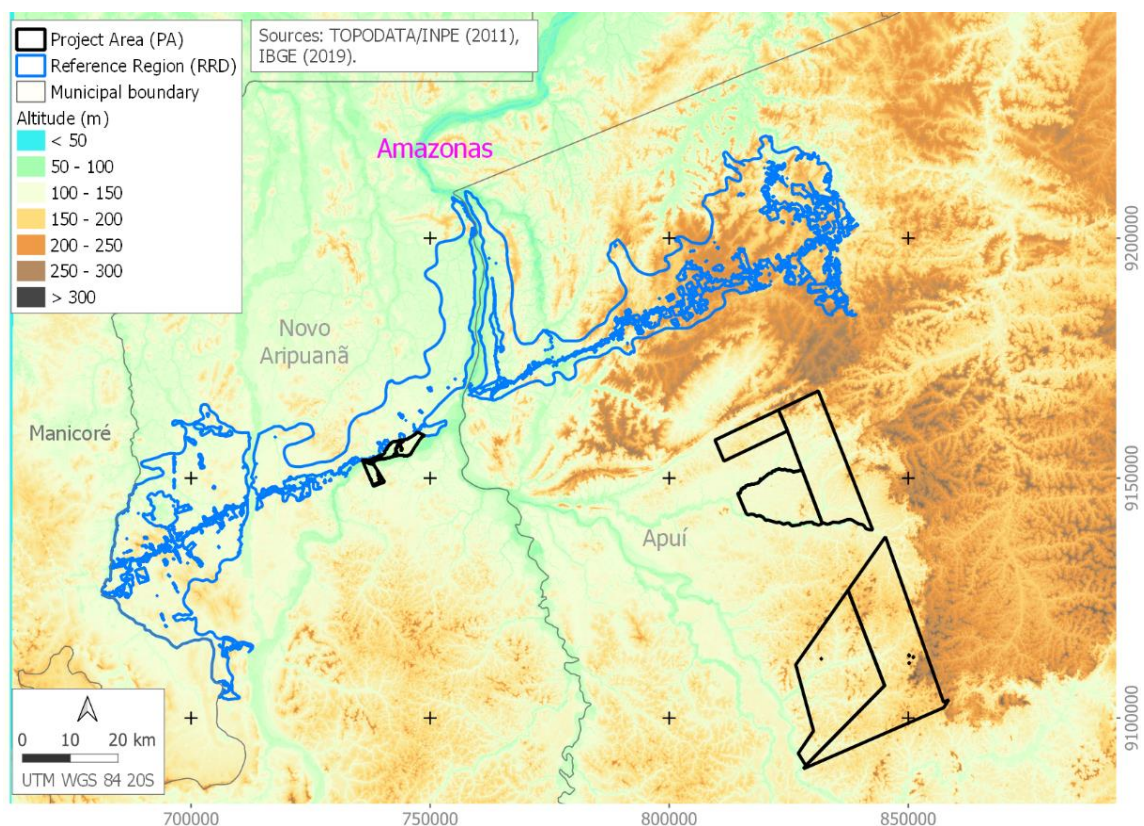


Figure 13. Altitude range in the Project Area and RRD Reference Region

Slope

The relief of the majority of the PA is flat to mildly hilly, with 88% of the area classified as under 15% slope. The figure in the slope sub-section of Section 3.3 displays the slope map of the Project Area and RRD. It is notable that almost all of the project area has little or no slope, with only 12% falling within a slope class above 15%.

Soil Types

According to the Brazilian Soil Classification System (SiBCS, 2006)²⁶ the Project Area contains three different soil types:

Table 9. Breakdown of soil types in the Project Area

PA		
Soil types	Area (ha)	Area (%)
(LAd) Yellow Latosols	32,639	25.8%
(LVAd) Red-yellow Latosols	6	0.01%
(PVe) Red-Yellow Argisol	97,916	74.2%
Total	130,554.80	100%

²⁶ Source: http://geoinfo.cnps.embrapa.br/layers/geonode%3Abrasilsolos_5m_20201104

The predominant soil types within the project area, as summarized in the table above, are red-yellow agrisols and yellow latosols, from the oxisols group within the aluminum-iron complex. The general characteristics, with respect to land-uses, of these two types of soil are:

- (LAd) Yellow Latosols²⁷ offer favourable conditions for water retention and permeability, being commonly used intensively for sugar cane and pasturelands, as well as, on a smaller scale, for manioc, pineapple, coconut and citrus fruits, and eucalyptus reforestation. In Amazonia their primary use is for pasturelands.
- (PVe) Red-Yellow Argisol²⁸ are predominantly used for sugar cane, various types of fruit growing, planted pasturelands, manioc and certain passion fruit and yam crops.

Therefore, both predominant soil types in the PA are favourable to the potential implementation of the baseline land-use of cattle ranching. The map of soil types is found under “soil types” in section 3.3.

Socio-economic conditions

The following socioeconomic analysis considers the municipalities which comprise the reference region: Novo Aripuanã (54% of the RRD) and Apuí (46% of the RRD), in the State of Amazonas.

The municipality of Apuí is located in the south of the state of Amazonas on the banks of the Transamazônica Highway (BR-230), and its population is mostly made up of families that migrated to the region occupying the Rio Juma Settlement Project (PA Rio Juma) in 1970²⁹.

These families depend directly on family agriculture for their livelihood and income, however, they face low production and productivity due to the lack of technology and investments in infrastructure, logistics, technical assistance, training, supply of inputs and research.

In addition, most of these households have low investment capacity and are often unable to access rural credits due to lack of information or because they do not have land tenure documentation. This reality makes the pressure for the conversion of forest areas to increase.

Currently, the municipality is in second place in the ranking of the most deforested municipalities in Amazonas and is part of the so-called “arc of deforestation” in the Amazon. Deforestation in the region is mainly associated with extensive livestock production, with the replacement of native forests for low productivity pastures²⁹.

The municipality of Novo Aripuanã is located on the right bank of the Madeira River, at the mouth of the Aripuanã River. The AM-174 state road connects the municipality to neighboring Apuí, but

²⁷ Source Embrapa (accessed 17/08/21):

https://www.agencia.cnptia.embrapa.br/gestor/solos_tropicais/arvore/CONT000fzyjaywi02wx5ok0q43a0r58asu5l.html

²⁸ Source Embrapa (accessed 17/08/21):

https://www.agencia.cnptia.embrapa.br/gestor/territorio_mata_sul_pernambucana/arvore/CONT000gt7eon7k02wx7ha087a_pz2axe8nfr.html

²⁹ Source: <https://fas-amazonia.org/novosite/wp-content/uploads/2021/02/oport-desenv-de-pgm-de-pagamentos-apui-rev-05-1.pdf>

has low trafficability during the rain season (Carrero, 2013). The predominant land use in the municipality is subsistence agriculture and extractivism and livestock. With a small herd of cattle, the pasture areas are concentrated around the urban center, in the Acari Settlement Project (Projeto de Assentamento de Acari) and occasionally in large open pasture areas, which are remote and difficult to access²⁹. Extractivism comprises the exploitation of wood, Brazil nuts, copaiba oil and latex (Carrero, 2013).

An analysis of the Gross Domestic Product (GDP) in these municipalities³⁰ indicates that most of the wealth produced comes from agriculture/livestock and services sectors. The services are generally provided and depending on the agricultural sector. Figure 14 and Figure 15 below shows the GDP by sector in the two main municipalities of the reference region.

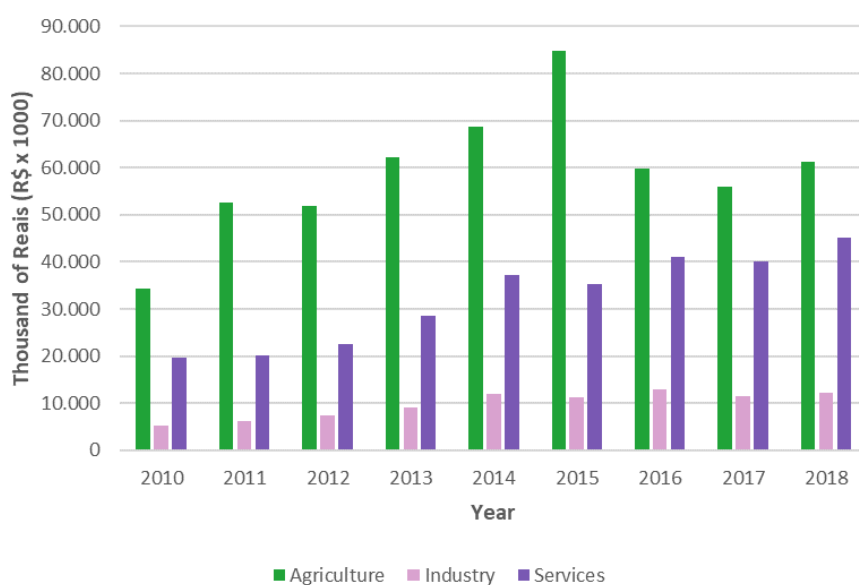


Figure 14. Gross domestic product by sector in the municipality of Apuí

³⁰ Source, The Brazilian Institute for Geography and Statistics (IBGE): <https://www.ibge.gov.br/>

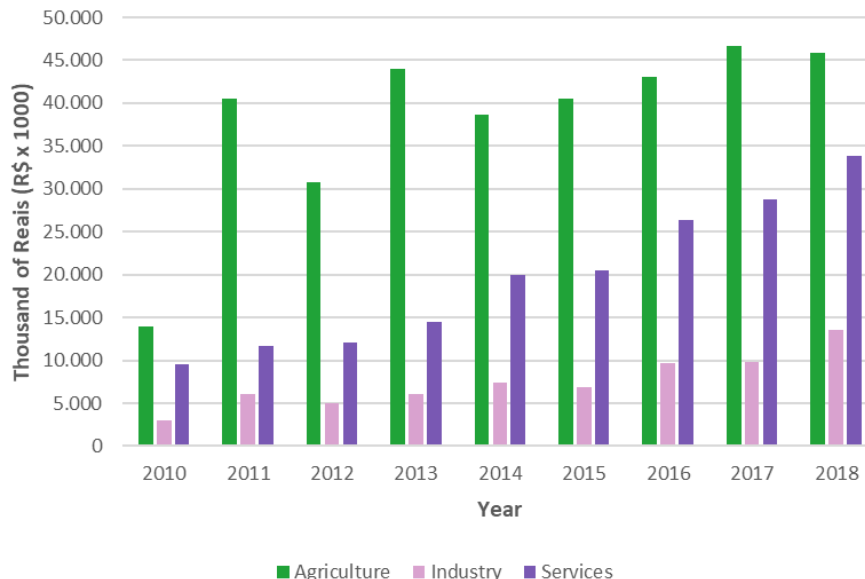


Figure 15. Gross Domestic Product by sector the municipality of Novo Aripuanã

In addition, analysis of the figure below shows that the main land use in the two municipalities that compose the reference region is livestock followed by fields (Mapbiomas, 2019). About 76% of the non-forest land use is livestock, around 350,800 ha, which shows that it is the main economic activity in the region.

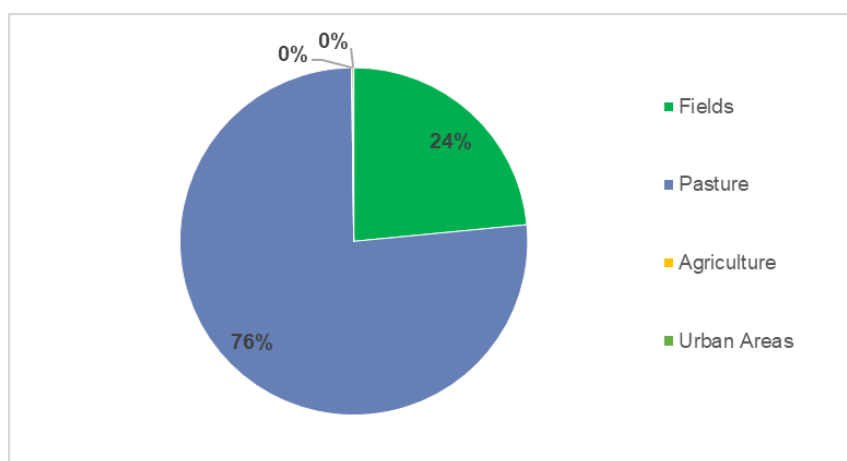


Figure 16: Land use in the two municipalities of the reference region. Source Mapbiomas (2019).

Traditional means of production, such as wild-harvesting and subsistence agriculture, are combined with livestock farming and agriculture activities resulting in growth of the regional economy and population,

but also in conflicts involving society at large and lands occupied by indigenous and traditional communities (IDESAM, 2011).

In addition, the predominant animal types in the two main municipalities of the reference region in 2017 were Cattle (69%), Chickens (24%), and Pigs (2,7%), composing 96,3% of the total. The Figure below shows the distribution of animal types within the reference region in 2017.

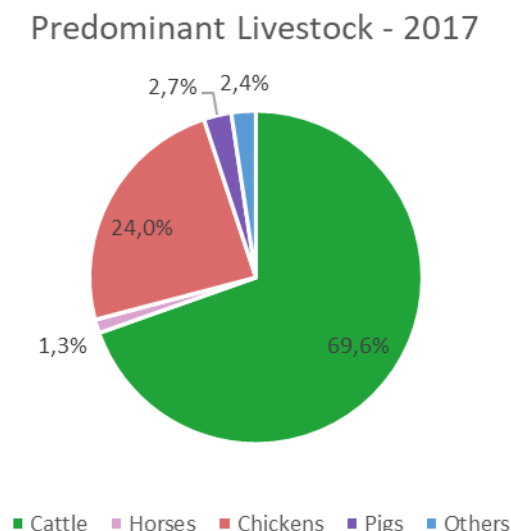


Figure 17. Animal types in the two municipalities of the reference region in 2017. Source: IBGE (2017)

The municipality of Apuí follows the Amazon trend of increasing livestock activity in recent years. Between 2004 and 2017, the herd in Apuí grew 50% – twelve times greater than the growth of the national herd and 2.5 times greater than the growth in Amazonas³¹³³.

In 2017, there were around 136,8 thousand heads of cattle within the municipality of Apuí, occupying an area of around 123 thousand hectares of pasturelands. These show an average stocking rate of 0.6 heads/ha, which demonstrate the low efficiency cattle ranching model in the region, mainly due to the low cost of the land.

Brazilian ranchers on average raise just over one head of cattle per hectare of land, but professionally managed pastures, with better grass production, can support three to five heads per hectare. Nevertheless, this situation is slowly getting better; over the past decade, pasture in the Amazon region has increased by 30% and the number of cattle has increased by 80% (Tollefson 2010).

In addition, timber logging is an important economic activity within the reference region. Usually, timber logging is the first driver of deforestation that reaches previously inaccessible forest lands, followed by land speculators or farmers in search of cheap land. It is a co-evolutionary process, that is, firstly the timber logging harvests all the species with commercial interest, then after clearing roads and settling in

³¹ Source: Agricultural Census IBGE 2017: <https://cidades.ibge.gov.br/brasil/am/apui/pesquisa/24/76693>

these areas, the deforestation continues in areas already explored and unexplored, and thus providing conditions for further expansion of logging and cattle (Razera 2005). The illegal logging (without authorization or sustainable management) was reported by residents as a major environmental problem and cause of conflicts in the region (IDESAM 2011).

As noted by Ecológica Assessoria (2021), firewood harvesting is also an important economic product within the reference region, mainly in Nova Aripuanã, representing more than 70% of the total wood harvested in this municipality. While wood harvesting represented by higher timber production was concentrated in the municipalities of Novo Aripuanã and Colniza, copaiba oil and resin from the trees of the genus *Copaifera* were predominant in Apuí.

Highway BR-230 is the main means by which offtake of most of the production is carried out and provides the link with Porto Velho, the capital of Rondônia State, which is the primary market for the livestock and agriculture market of Apuí. Some segments of the highway are still unpaved and are impassable during the rainy season between December and April, hindering and increasing the price of transport of people and merchandise (Carrero 2009). The figure below shows the main highways for product offtake in the project region.

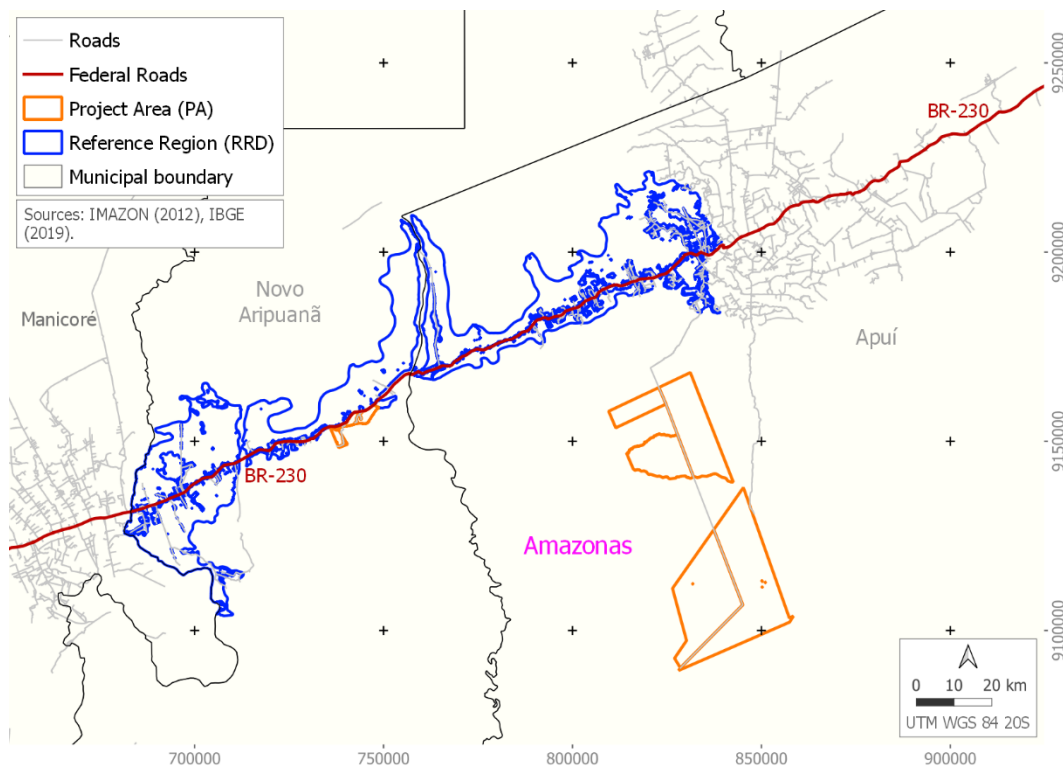


Figure 18. Main roads and highways present in the reference region

According to IDESAM (2011)³², the land ownership situation in Apuí is chaotic, presenting only 17.6% of titled land, a very low value if compared to other settlements in the Amazon. Thus, the failure to resolve the land tenure situation contributes to reducing options for legal productive activities, such as forestry, and continues to encourage the expansion of deforestation associated with livestock and land speculation in this region, where most of the deforested area of the municipality is concentrated, being primarily within the arc of deforestation, where the only available means of access to the rest of the country are located, according to Razera (2005).

Due to having a border with Mato Grosso State and being linked to Rondônia State via the Trans-Amazonian Highway, and as a function of the appreciation of land in these States, Apuí Municipality has seen great demand for land, as pointed out by Razera (2005), because it offers large areas with low prices, or land still considered to be “ownerless”.

Social conflict issues, primarily land conflict, are common in these regions because they lie at the frontiers of the arc of deforestation and contain a large quantity of unoccupied lands. The following activities are characteristic of the region: forced land settling by squatters or timber harvesters; illegal deforestation and gold, diamond and cassiterite mining present in many of Amazonia’s watersheds (SDS 2007).

Until the early 1960s, the region remained virtually wild and little known, but the construction of Brasília, inaugurated in 1960, and the opening of new roads such as the Belém-Brasília highway (BR-060), eventually attracted migrants from other regions of Brazil.

More recently, State policies such as the National Integration Program (NIP, or Programa de Integração Nacional, PIN, in Portuguese), created in 1970 with a view to colonizing the Amazon, led to the clearing of new roads in the region, allowing the implementation of colonization programs as an incentive to immigration, primarily in the South and Southeast of the country, creating a great social diversity in the region. The aim was to populate the region with small and medium-sized farmers able to diversify production, opening new markets and securing the territory of the Amazon. These communities, initially entirely rural

, grew and expanded into urban centers, driven mainly by the creation of the Trans-Amazonian Highway (BR-230) (IDESAM 2011).

The lack of alternatives in the frontier region has led many migrants to experiment with alternative income generation options. However, the lack of a resolution regarding land-tenure issues has contributed to reducing the number of legal production options, such as for example, sustainable forest management, and continues to promote deforestation associated with livestock farming and land speculation in this region which concentrates the largest deforested area in southern Amazonas State. According to research carried out by IDESAM, the region has suffered from an urgent need to carry out restructuring at a local

³² Instituto de Conservação e Desenvolvimento Sustentável do Amazonas (Idesam). Redução de Emissões do Desmatamento e Degradação Florestal (REDD+) Estudo De Oportunidades Para A Região Sul do Amazonas. 2011. Available at: https://idesam.org/publicacao/REDD_Estudo_de_Oportunidades_Sul_Amazonas.pdf . Last visit on: August 11th, 2021.

level, which needs investment in structure, equipment, and human resources to attend to the issues surrounding land-tenure (IDESAM 2011).

Thus, the population in the two municipalities of the reference region, Apuí and Novo Aripuanã, increased during the 2010– 2020 period, from 18,007 to 22,359 in the case of Apuí, and 21,451 to 26,046 in the case of Novo Aripuanã. Therefore, the average annual growth rates across the analyzed period for the main municipalities were 1.95% and 1.76% per year, respectively (IBGE 2020). This increase is indicative of the human pressure causing forest clearance in the region, given the demand for new lands, for subsistence and income generation.

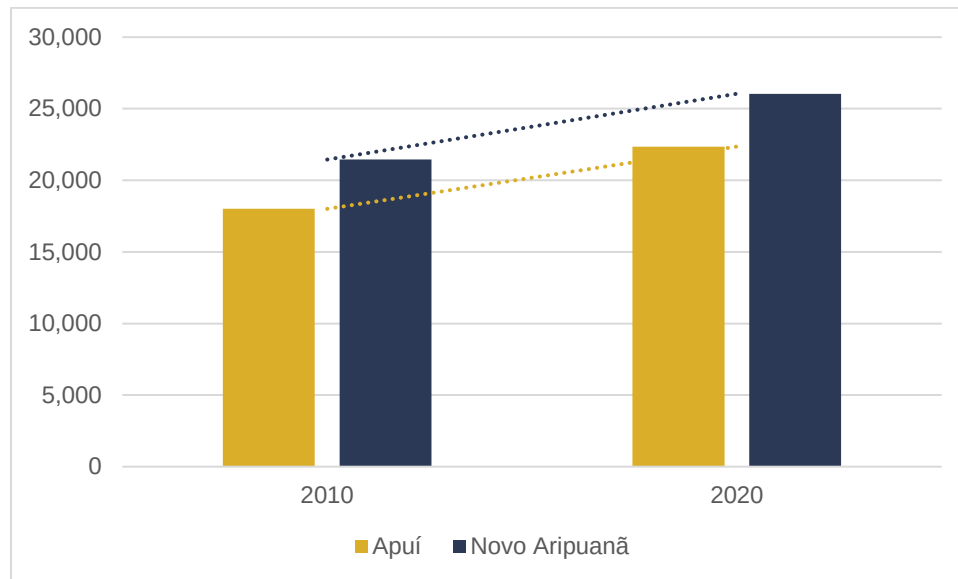


Figure 19. Population growth in the two municipalities of the reference region (Source: IBGE)³³

Biodiversity

Brazil harbors the greatest concentration of biodiversity on the planet. It has a great abundance of lifeforms, which translates to over 20% of the total species on earth, making Brazil the main nation among the 17 countries with the highest biodiversity levels globally, which contain over 70% of the planet's biodiversity³⁴

Brazil has the greatest flora species richness, with 45,835 species described. Furthermore, it contains over 7,000 known species of vertebrates consisting of 692 mammals and 1,026 amphibians, 744 reptiles, 1,901 birds and in the region of 3,000 fish species. It is estimated that between 96,660 and 129,840 of invertebrate species are known. estimated number of known species in Brazil is approximately 170 to 210 thousand, while the total number of species that the country harbors is

³³ Source, IBGE (accessed 13/07/21): <https://cidades.ibge.gov.br/brasil/am/apui/panorama> ; <https://cidades.ibge.gov.br/brasil/am/novo-aripuanã/panorama>

³⁴ Source: Brazilian Government Ministry for the Environment (Ministério do Meio Ambiente – MMA). The Brazilian Biodiversity. Available at: <https://antigo.mma.gov.br/biodiversidade/biodiversidade-brasileira.html>

approximately 1.8 million, putting the known proportion of biodiversity at a mere 11%. New species are described every day in Brazil (MMA – 2).

It is estimated then that approximately 10% of all the planet's biodiversity is found in the project region, including many threatened species and those which exist only in Amazonia, or endemic species (WWF Brasil, 2010).

Two aspects are important in relation to the biological context of the region: (1) biodiversity levels are high because it is a contact region between two biomes, which is at constant risk due to the proximity to the Brazilian arc of deforestation; and (2) at the same time, truly little is known about this region's biological diversity species (WWF Brasil, 2014 – 2).

The Project Area borders with and the Reference Region overlaps with Brazilian protected areas, which are part of the Southern Amazon Mosaic. This Mosaic is composed by around 40 National and State protected areas, totaling more than 7 million hectares (WWF 2010). This ecological corridor is especially important for biodiversity conservation, located in a region suffering from high deforestation pressure due to the expansion of agricultural and livestock activities towards the Amazon rainforest (SDS 2007). In addition, the Mosaic helps to maintain endemism, preserving these continuous forest environments (north-south forest connection) and ensuring the maintenance of gene flow of species, together with containing the advancement of invasive species from other environments. **Erro! Fonte de referência não encontrada.** below shows the protected areas and indigenous lands in the Evergreen REDD+ Project region.

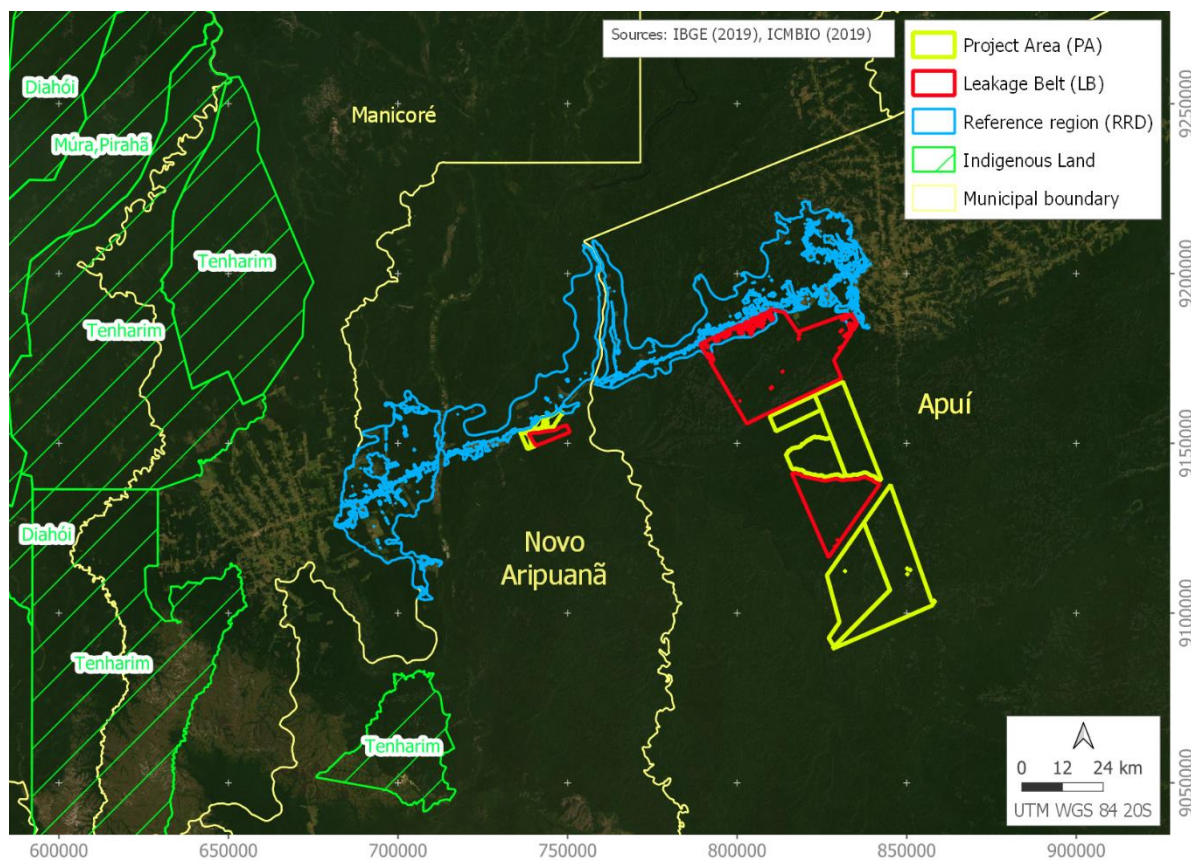


Figure 20 - Indigenous Territories in the Evergreen REDD+ Project region

1.14 Compliance with Laws, Statutes and Other Regulatory Frameworks

The following documents demonstrate compliance of the project with all relevant local, regional, and national laws, statutes, and regulatory frameworks.

The following definitions of the Brazilian Forest Code stand out as being relevant:

“III – Legal Reserve (LR): area located inside a rural estate, excluding the Area of Permanent Preservation, necessary for sustainable use of natural resources, conservation and recovering of ecological processes to conservation of biodiversity and to shelter and protection of native fauna and flora.

VI – Legal Amazon: the States of Acre, Pará, Amazonas, Roraima, Rondônia, Amapá and Mato Grosso, and the regions located to the North of parallel 13°S, in States of Tocantins and Goiás, and to the West of meridian 44°W, of the State of Maranhão.”

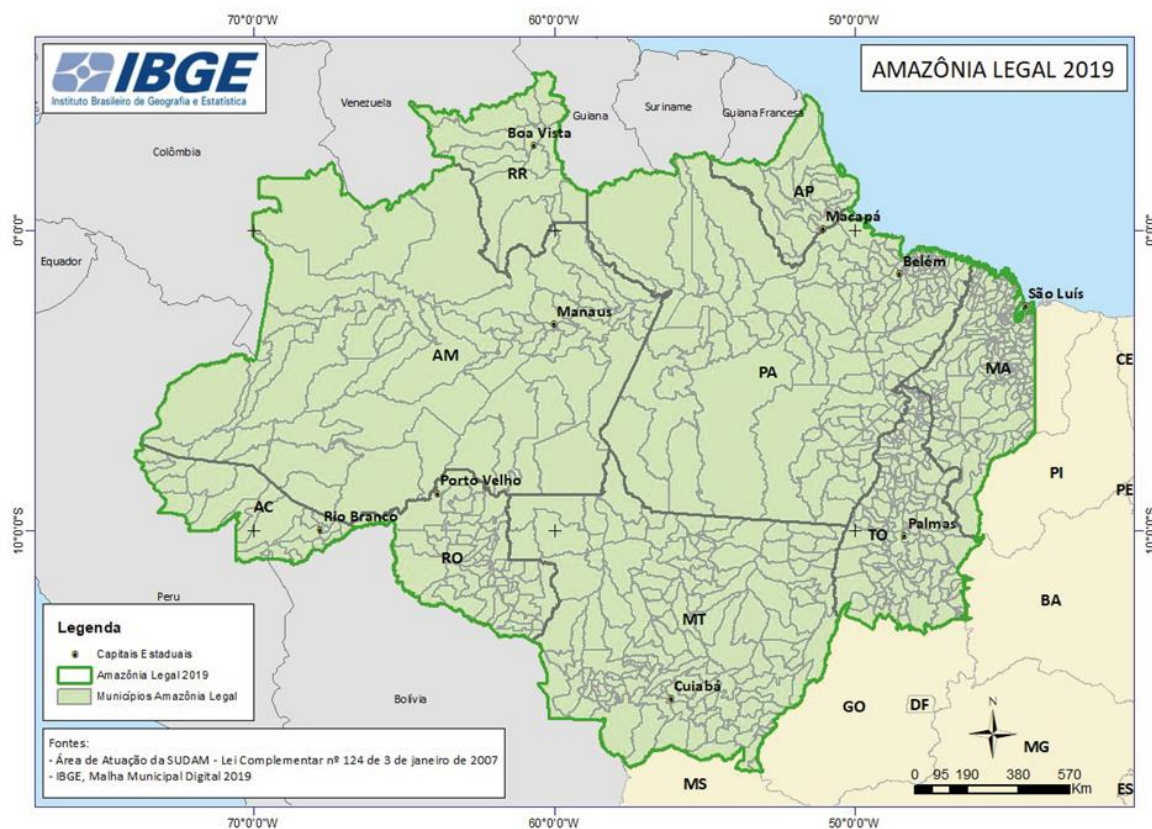


Figure 21. The Brazilian Legal Amazon States Acre (AC), Amapá (AP), Amazonas (AM), Maranhão (MA), Mato Grosso (MT), Pará (PA), Rondônia (RO), Roraima (RR), Tocantins (TO) (formerly North of Goiás). Source: IBGE (2019).

The Legal Reserve (LR) must be registered in property deed in the Real Estate Registry Office: its location must be officially known, and future landowners must know where it is located, its boundaries and frontiers. The LR can be located anywhere inside a rural estate. Brazilian Forest Code determines that, once allocated, the LR may not be changed even in cases of real estate transfer, subdivision of the land or area changes.

The LR allocation is a prerequisite to obtaining permission to exploit the native vegetation existing inside the rural estate. To obtain this Permit for Forestry Stewardship, the landowner must previously register the location of the LR in land property documents through the Real Estate Registry Office, before suppressing any kind of native vegetation.

According to Provisory Measure No. 2166-67 (Medida Provisória nº 2.166-67) of August 24, 2001:

“Article 16. The forests and other types of native vegetation, excepting those located in Areas of Permanent Preservation, as well as those not subject to the politics of restricted use or subject to specific legislation, are susceptible to suppression, as long as a portion of vegetation is preserved, as Legal Reserve, at a minimum:

I – eighty percent (80%), in rural estates located in forest zones located in the Legal Amazon.”

Thus, in compliance with Brazilian Forest Code, the farms have officially allocated 80% of their total area as LR.

Despite the legal provisions intended to preserve at least 80% of the Amazon Forest coverage, lack of law enforcement by local authorities along with public policies seeking to increase production levels and encourage land use for agricultural, bio energy and cattle breeding purposes created a scenario of almost complete disregard of the mandatory provisions of the Forest Code. High rates of criminality associated with land disputes usually jeopardize efforts concerning law enforcement improvement. In addition, to cover vast distances of areas with low demographic density makes tracking of illegal activities and land surveillance exceedingly difficult for the authorities. Accordingly, policies implemented to address illegal deforestation only by means of command-and-control approaches have proven to be ineffective so far (IPAM, 2011).

A Rural Settlement Project under the authority of the federal governing body, INCRA, called Projeto de Assentamento Extrativista (PAE) Aripuanã-Guariba is located in the same area as the main group of project properties: Fazenda Buiúçu, Aroeira, and Fazenda Alvorada. However, the property rights documents of the Fazenda Buiúçu and Alvorada predate by over 70 years the creation of the PAE, which was on 28th December 2005, as attested to by the Official Proceedings of the Federal Government³⁵. As detailed at audit under the category Property Rights Certificates, the initial date of establishment of the Seringal Buiúçu Property was 18/12/1931, of which the Aroeira property is a sub-section, and the initial establishment of Fazenda Alvorada was 17/05/1932.

A consultation of INCRA's land-tenure Management System (SIGEF)³⁶ confirmed, through an official INCRA Decision of Grant document³⁷ that properties with land titles predating the creation of the PAE are excluded from its area, and all property rights are duly granted to their owners. The Decision cites Law 6383/76³⁸ and specific fiscal court proceedings. Duly documented proof of all the above was provided at audit.

Furthermore, there were disputes, now closed, relating to disputed area, being a 12,294 hectare subsection, on which a neighboring private property, visible in the SIGEF database overlaps with the project's Aroeira and Buiúçu Remanescente properties. This represents less than 10% of the total Project Area, and the occurrence has been judicially resolved.

A police report was filed on 01/04/2021 by the Evergreen property owner Renan Vitoriano Boehm, against the owner of the invading property, controlled through a public limited company. Following the filing of the police report by the Evergreen project owner on 01/04/21, local judge issued a preliminary ruling on 22/04/21, in favor of the project area owners. Consultation of the

³⁵ Source: Diário oficial da União – Seção 1, Nº 249, quarta-feira, 28 de dezembro de 2005

³⁶ Source, SIGEF: <https://sigef.incra.gov.br/>

³⁷ Decisão de Deferimento (INCRA SR-15)

³⁸ Source, Presidency of The Republic: https://www.planalto.gov.br/ccivil_03/leis/l6383.htm

SIGEF INCRA site shows that the invading property now has its property registration cancelled. In addition, the owner of the invading property is currently incarcerated for numerous crimes land-grabbing³⁹. Evidence for all of the above was duly presented and explained at audit.

The information above allows us to conclude that there is no overlap of the Evergreen REDD+ project's properties with other areas, either private or public.

Given the frequent attempts to invade or enact a land grab on the Project Area, the project proponents use their best efforts to prevent property invasion and to remain in compliance with Brazilian Forest Code.

1.15 Participation under Other GHG Programs

1.15.1 Projects Registered (or seeking registration) under Other GHG Program(s)

Not applicable: the project is not engaged in any other emissions trading program and the host country has no binding limits on GHG emissions as yet. The project has not been registered, or is seeking registration under any other GHG programs.

1.15.2 Projects Rejected by Other GHG Programs

Not applicable: the project has not been rejected by any other GHG programs.

1.16 Other Forms of Credit

1.16.1 Emissions Trading Programs and Other Binding Limits

The project neither has nor intends to generate any other form of GHG-related environmental credit for GHG emission reductions or removals claimed under the VCS Program. The VCS Program has a central project database, which lists each approved project. The VCS Project Database is the central storehouse of information on all projects validated to VCS criteria and all Verified Carbon Units issued under the program. Every VCU can be tracked from issuance to retirement in the database, allowing buyers to ensure every credit is real, additional, permanent, independently verified, uniquely numbered and fully traceable online. This project has not been registered under any other credited activity, and no VCUs have been assigned to the project area so far. Thus, any possibility of double counting of credits is eliminated.

1.16.2 Other Forms of Environmental Credit

The project has not sought or received another form of GHG-related environmental credit, including renewable energy certificates.

³⁹ <https://g1.globo.com/ro/rondonia/noticia/2021/06/21/chaules-pozzebon-madeireiro-apontado-como-o-maior-desmatador-do-brasil-e-condenado-a-quase-100-anos-de-prisao.ghml> (accessed in 23/07/2021)

1.17 Additional Information Relevant to the Project

VCS Eligibility Criteria

Table 10: Decision Tree for Determining REDD Project Activity Type (Source: VM0007)

Is the forest land expected to be converted to non-forest land in the baseline case, or expected to be subject to authorized conversion to a managed tree plantation in the baseline case?			
YES		NO	
Is the land legally authorized and documented to be converted to non-forest or a managed tree plantation?		Is the forest in the baseline expected to degrade by fuelwood extraction or charcoal production?	
YES	NO	YES	NO
Avoiding planned deforestation/planned degradation	Avoiding unplanned deforestation	Avoiding forest degradation	Proposed project is not a VCS REDD+ activity currently covered by the methodology

Thus, the relevant baseline modules were the following:

BL-UP v3.3⁴⁰ – Estimation of baseline carbon stock changes and greenhouse gas emissions from unplanned deforestation and unplanned wetland degradation;

And

BL-PL v1.3 - Estimation of baseline carbon stock changes and greenhouse gas emissions from planned deforestation/forest degradation and planned wetland degradation.

The applicability conditions and criteria of these modules are discussed under section 3.2 Applicability of methodology.

Leakage Management

In accordance with VM0007 methodology, the Leakage Management Area is the same as the Leakage Belt (LB) area, and the latter is 100% forested at project start date (Module BL-UP_v3.3⁴¹). The LB's location is as specified in section 3.3 Project Boundary. Therefore the leakage management activities

⁴⁰ Source VCS (accessed 10/09/21): <https://verra.org/methodology/vm0007-redd-methodology-framework-redd-mf-v1-6/>

⁴¹ Accessed 02/09/21: <https://verra.org/methodology/vm0007-redd-methodology-framework-redd-mf-v1-6/>

take into account the activities reported by the forest-dwelling residents during the community stakeholder consultation (see section 2.2), specifically it addresses the activity of NTFP harvesting, which was universally reported as the primary activity by communities. It is important to note that the location of the Leakage Management areas – which border with the Buiucu, Aroeira and Alvorada properties – coincides with the location of the communities consulted as part of the community consultation (see section 2.2):

- I. Forest management courses: Courses on forest management methods will be offered to the internal workers for updating on techniques and practices and to train new employees. The standardization procedure for these trainings is available for auditing.
- II. Training on sustainable wild-harvesting: Since the main activity of the communities surrounding the PA is the collection of non-timber forest products, this course aims to promote better management practices for these workers.
- III. Training of fire brigades: training will be given to prepare fire brigade members, and in addition to the employees, the project's neighbours will be able to participate in the training event as well.
- IV. Surveillance activities designed to mitigate illegal logging and land occupation in the area will be achieved through the Evergreen REDD+ Project. By continuing to promote an increase in the number of REDD Projects in the region, whenever feasible, as well as sustainable forest management plans, the project aims to impact deforestation and degradation significantly. This process will be further consolidated through combined efforts with private and governmental entities, and NGOs. In this context, the project proponent will spearhead political mobilization of the regional forest sector and continue to reinforce the engagement of all sectors involved in deforestation issues, in the long term. The main condition for execution of this activity is the approval and validation of the Evergreen REDD+ Project, which will be a further important benchmark for engagement of all potential private landowners in the Apuí region.
- V. Potential Roll-out to Other Areas: Evergreen already being the project proponent's third REDD activity in the region, further areas with potential for REDD projects have already been identified around the project site, which will favour and encourage forest conservation by means of financial incentives obtained from credit sales and provide social and environmental benefits to local communities.
- VI. Combatting illegal land occupation: The local community will be strategic in monitoring illegal land occupation and potential illegal logging. Those who are interested in being trained and carrying out local monitoring will be included in the project, an activity which may also become a new source of income for local communities.
- VII. Support of SEMA – AM's activities (Secretaria de Estado do Meio Ambiente do Amazonas; Amazonas State Secretariat of Environment): SEMA will benefit from having, under its jurisdiction, a third example of an innovative REDD model – the first two being the

Fortaleza Ituxi REDD Project and the Unitor REDD project, in the process of validation and verification, also developed by Carbonext – that can be further replicated on other properties. It will continue to raise the public profile of the current administration, providing visibility and methodological advances in environmental preservation.

Although there is a risk of leakage, the proponents believe that the Project will have positive impacts on surrounding areas. This Project aims to be an example of the following technical and economic aspects, and stimulate other landowners to adhere to this Project concept:

- I. Sustainable management of forest resources generating success and profit;
- II. Additional return to forest management, due to REDD incentives, which can compensate avoiding deforestation for other activities;
- III. Positive example of sustainable real estate maintenance, in addition to profits with sustainable management plus REDD revenues.

By means of Project monitoring activities, satellite imaging, and social and governmental cooperation for monitoring the Project and its surroundings, the project proponent believes that the success of this business plan will generate an increased number of sustainably managed areas with REDD+.

Commercially Sensitive Information

No commercially sensitive information has been excluded from the public version of the project description.

Sustainable Development

The Evergreen REDD+ Project complies with the logic of the environmental priorities defined by the Brazilian Federal Administration, which, in the course of COP 14 Conference held in Poznan, Poland, in December 2008, declared a deforestation reduction goal of 70% by the year 2018, and following that, further goals of achieving zero illegal deforestation by 2030, and offsetting of greenhouse gas emissions originating from legal removal of vegetation. The latter are elements of the Brazilian NDC, which the country aims to adopt within the framework of the Paris Climate Accords (COP-21)⁴². In order to attain this goal, it will be necessary to join government initiatives with independent actions, such as that proposed under the present project, but it's not mandatory that the Evergreen project gives account for the Brazilian government about the actions taken on the national SDGs.

The map below shows the strategic zone for “Containment of the expansion fronts with protected areas and alternative uses”, which was established by the MacroZEE/AL (Macrozoneamento Ecológico-Econômico da Amazônia Legal; Ecological and Economic Macro-zoning of Amazon)

⁴² Source MMA (accessed 19/04/21): <http://redd.mma.gov.br/pt/redd-e-a-indc-brasileira>

from the Brazilian Ministry of Environment⁴³, which encompasses the Project Area. The MacroZEE/AL aims to establish strategic indications of occupation and use of land on a sustainable basis to guide, at the regional scale, the development and spatial distribution of public development policies, territorial and environmental planning, as well as the decisions of private agents. Due to its shield function for the heart forest protection, this territorial unit deserves strengthening policies. In this context, the Evergreen REDD+ Project aligns with the strategies set up by the MacroZEE/AL of the Brazilian Ministry of Environment.

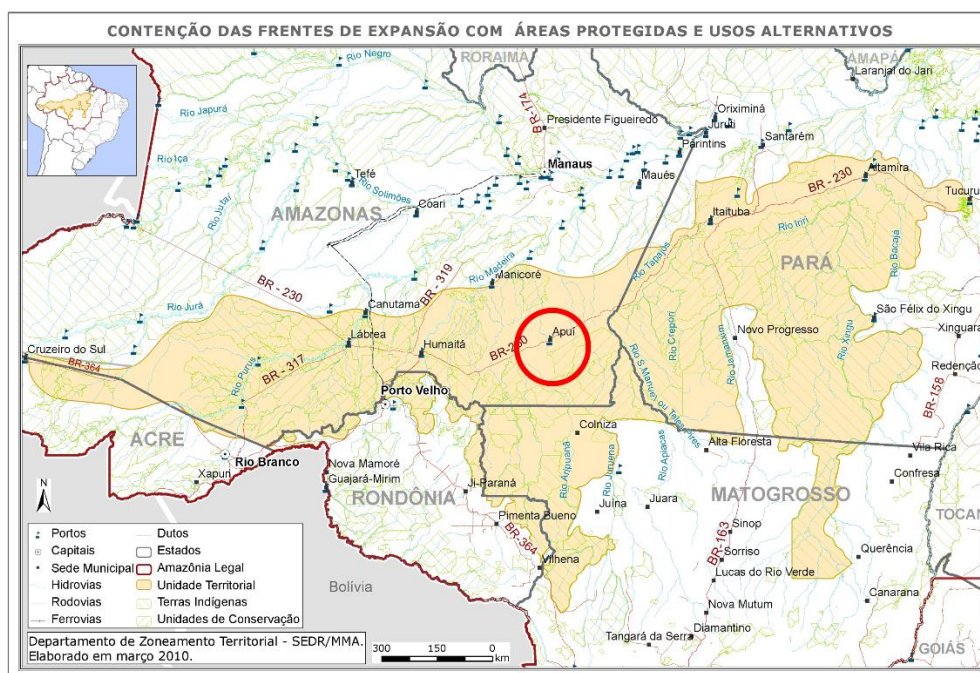


Figure 22. Containment of the expansion fronts with protected areas and alternative uses (Source: Brazilian Ministry of the Environment – MMA)

Due to the increase in deforestation in the Legal Amazon, the Action Plan for the Prevention and Control of Deforestation in the Legal Amazon (PPCDAM; Plano de Ação para a Prevenção e Controle do Desmatamento na Amazônia Legal) came into effect, starting mitigation and ongoing actions to reduce deforestation. The Evergreen REDD+ Project is in line with main PPCDAM premises⁴⁴.

At the international level, the Evergreen REDD+ Project complies with the logic of the environmental priorities defined by the Brazilian Federal Administration at COP 14 in December 2008, where a deforestation reduction goal of 70% by the year 2018 was declared, and following that, further goals of achieving zero illegal deforestation by 2030, and offsetting of greenhouse gas emissions originating from legal removal of vegetation. The latter are elements of the

⁴³ Source MMA (accessed 23/03/21): <https://antigo.mma.gov.br/component/k2/item/8200-figuras>

⁴⁴ Source Brazilian Government (accessed 19/08/2021): https://www.gov.br/agricultura/pt-br/acesso-a-informacao/acoes-e-programas/ppa/plano-plurianual-ppa-2016-2019-1/relatorio_avaliacao_programa_2050-mudanca_do_clima.pdf

Brazilian NDC, which the country aims to adopt more firmly within the framework of the Paris Climate Accords (COP-21)⁴⁵. To attain these goals, an essential component will be to ally government initiatives with independent actions such as that proposed under the present project.

Going into more detail, the Evergreen project is aligned with Brazil's commitments to the UN Sustainable Development Goals (SDGs). Firstly, on the environmental side, Brazil has made commitments to SDG 13 – “Take urgent action to combat climate change and its impacts” – aligning its national goals⁴⁶ with the UN's, for example UN goal 13.3⁴⁷:

- 13.3: Improve education, increase human and institutional awareness and capacity on climate change, its risks, mitigation, adaptation, impacts, and early warning systems

The project activities involving technical qualification, training in forest management, and community development in the form of participative workshops, aim to increase the collective understanding of climate change and the importance of the forest. This intervention at the small-scale level has broader objectives, for a collective transformation of cultural relations lifestyles of the local community and the economy, in its relation to the environment.

Regarding goal 13, the Evergreen REDD+ project involves the avoidance of conversion 44,818.5 hectares of forest over its lifespan and it is an essential activity for climate change mitigation.

Perhaps most importantly, the project is aligned with SDG 15 regarding Terrestrial Ecosystems, which was adopted into the Brazilian goals as follows: “15.1. By 2020, to conserve at least 30% of the Amazon, through systems of conservation units provided for in the Law on the National System of Conservation Units (SNUC), and other categories of officially protected areas such as Permanent Preservation Areas (APPs), Legal Reserves (RLs) and indigenous lands with native vegetation (...)”. The present project's direct conservation of APPs and RLs, as well as synergistic actions with the surrounding Conservation Units are strongly aligned with this national goal.

Brazilian SDG goal 15.2, regarding sustainable forest management, tree plantation and restoration of forests, which stipulates to “eliminate illegal deforestation in all Brazilian biomes by 2030, expand the area of forests under sustainable environmental management and recover 12 million hectares of degraded forests and other forms of native vegetation, in all biomes and preferably in Permanent Preservation Areas (APPs) and Legal Reserves (RLs) and, in areas of alternative land use, expand the planted forest area by 1.4 million hectares”, is directly supported by the Evergreen project's following activities:

- Monitoring of illegal land occupation, illegal logging, and illegal deforestation;
- Ultimate goals of avoided deforestation of 44,818.5 hectares (AUD) plus 26,470.8 (APD) hectares of Amazon rainforest over 30 years on private lands, preserving APPs and RLs.

⁴⁵ Source MMA (accessed 19/08/21): <http://redd.mma.gov.br/pt/redd-e-a-indc-brasileira>

⁴⁶ Source IPEA (accessed 23/07/21): <https://www.ipea.gov.br/ods/ods13.html>

⁴⁷ Source ODS Brasil (accessed 23/08/21): <https://odsbrasil.gov.br/>

On the socio-economic front, Brazil adopted “UN Goal 1: End poverty in all its forms everywhere”⁴⁸, “UN Goal 3: Ensure a healthy life and promote well-being for everyone, at all ages”, and “UN Goal 8: Promote inclusive and sustainable economic growth, employment and decent work for all”, and, with the most relevant Brazilian sub-goals to the project being:

- SDG 1.1: “By 2030, eradicate extreme poverty for all people everywhere, currently measured as people living on less than PPC\$3.20 a day”;
- SDG 1.2: “By 2030, reduce proportion of men, women and children of all ages living in monetary and non-monetary poverty by at least half, in all its dimensions, according to national definitions”;
- SDG 3.4: “By 2030, reduce premature mortality from non-communicable diseases by one third through prevention and treatment, and promote mental health and well-being”
- SDG 8.3: “Promote development with the generation of decent work; formalization; the growth of micro, small and medium companies; entrepreneurship and innovation”; and
- SDG 8.4: “Increase the efficiency of the use of global resources in consumption and production, and strive to decouple economic growth from environmental degradation, in accordance with the Action Plan for Sustainable Production and Consumption (PPCS).”

The project will create an average of 20 predicted permanent and temporary job posts per year, involving local people and community members, as well as relevant monitoring and indicators:

- Twelve forest monitors distributed across the 5 monitoring bases that will be constructed (SDG 1.1);
- Monitoring of equal opportunities relating to gender in the project indicators (SDG1.2)
- An average of eight team members for the future sustainable forest management areas, which are temporary positions, with an unpredictable number of total job vacancies for separate individuals (SDG 1.1);
- Furthermore, it is relevant to state that the creation of 20 predicted jobs, mentioned above, is also aligned with Brazilian SDG 8.3 in that, given the reality of the region, it will certainly involve the formalization of informal jobs.
- The organization of training events focusing on forest management and wild harvesting (SDG 8.3 and 8.4).

In relation to the SDG 3.4, workshops on health, well-being and nutrition will be given to employees and the community, aiming to raise awareness about non-communicable diseases and the importance of having healthy habits

Further Information

⁴⁸ Source UN (accessed 23/07/21): <https://www.un.org/sustainabledevelopment/poverty/>

No further information to disclose.

2. SAFEGUARDS

2.1 No Net Harm

The project activities do not cause any potential negative offsite stakeholder impacts. The project does not result in net negative impacts on the wellbeing of other stakeholder groups. A communication channel was established for stakeholders to express their concerns and to solve potential conflicts and grievances that arise during project planning and implementation.

Technical qualification, training in forest management, community development in the form of participative workshops may increase the collective understanding of climate change and the importance of the forest. This understanding is essential for each individual in the process of a collective transformation of cultural relations and of the lifestyle of the local community.

Furthermore, fire brigade teams will be trained, and a biomass inventory has already been conducted in a different REDD project owned and developed by the same project proponents.

Complementary monitoring of labour conditions will reduce several work safety risks, in addition to improving wellbeing of local workers: annually monitoring for health and security assessments, nutrition aspects, personal care and hygiene etc. All situations and occupations that might arise through the implementation of the project and pose a substantial risk to worker safety will be comprehensively assessed.

All relevant laws and regulations covering worker's rights will be periodically informed to workers, as part of community development sessions in the form of participative workshops. These workshops and training sessions will also cover subjects related to health and security, in a manner to reduce risks during the field activities.

2.2 Local Stakeholder Consultation

The Evergreen REDD+ project determined three methods of communication and availability of materials related to the Project:

E-mail: due to the pandemic, preference was given to contact by email with all stakeholders who had an e-mail contact available. A summary of the project was sent and the email "reddevergreencarbonext@carbonext.com.br" was informed, to which they could send questions and suggestions about the Project. Questions will be answered within 10 working days.

Virtual: documents related to the Project are available through virtual means on the VCS website and, as soon as possible (given audits and VCS timeframes) will be available on the Carbonext website.

Oral: this communication method was the primary method used for communication with communities living around the project area. Information about the Project will be conveyed orally through meetings with communities, including a collective presentation, and an individual questionnaire.

The project proponent conducted an assessment of the local stakeholders that are potentially impacted by the project. Local entities having some influence, activities and impact on the Reference Region were chosen through a process to identify them. Stakeholders chosen for local consultation also included potentially impacted communities and neighbours.

Institutional Public Consultation

The institutional public consultation began on June 18, 2021 and covered public agencies, institutions, associations and NGOs, with a total of 17 stakeholders being mapped:

- ADEMAP (Socioeconomic and Environmental Development Agency of the Municipality of Apuí)
- ADAF (Amazonas State Agricultural and Forestry Defense Agency)
- Aripuana-Guariba Agroextrativist Association
- Apuí Environment Secretary
- Apuí Administration Department
- Apuí City Hall
- CEUC - AM (State Center for Conservation Units)
- Department of Education, Culture and Sports of the Municipality of Apuí
- IDAM (Institute for Sustainable Agricultural and Forestry Development of the State of Amazonas)
- Idesam (Amazon Conservation and Sustainable Development Institute)
- IPAAM (Amazon Environmental Protection Institute)
- Jatuarana National Forest
- Secretary of Production of the Municipality of Apuí
- SEMA (State Secretariat for the Environment of Amazonas)
- Sucunduri State Forest
- RESEX Aripuanã (Aripuanã Extractive Reserves)
- UFAM (Federal University of The Amazon)

These stakeholders were contacted by email and received a project summary as described above for this method of communication.

So far, only Idesam has replied, raising certain issues about the Project's coordinates, the Project's integration with the REDD+ State System and the baseline deforestation projection. Carbonext responded promptly within 5 days and Idesam stated that the answers were satisfactory and enlightening. Questions received and their answers will be stored in a data room and will be available for audit.

Community Public Consultation

As stated in the methodology, local communities and families, neighbouring communities and workers were mapped for the community public consultation (Figure 23). For this survey, a sampling based on the Non-permanence analysis has been adopted, meeting the following criteria:

- i) minimum of 50% of stakeholders inside the Project Area, however there are no one living within the project area.
- ii) minimum of 20% of stakeholders relying on the Project Area have been consulted within a distance of 20 km of project boundaries;

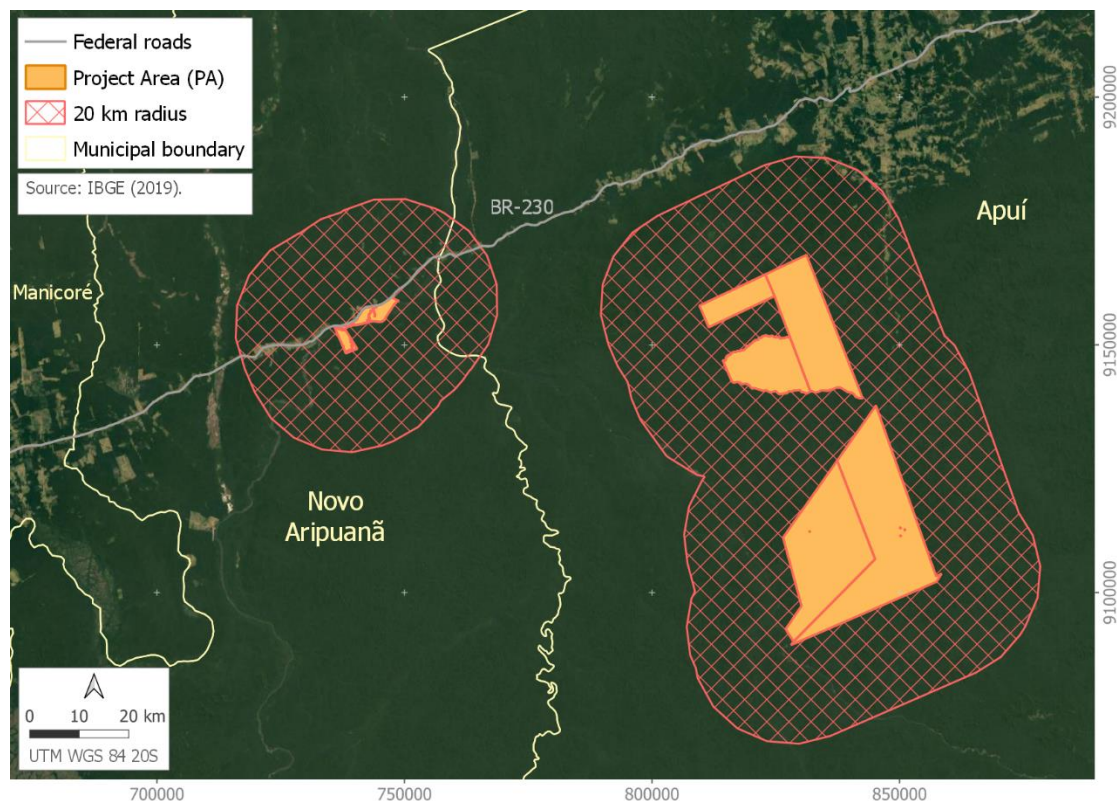


Figure 23. The Project Area and 20km radius within which the neighbors were mapped

As described in sub-item “Community Public Consultation” below, the survey allowed the project proponent to assess the following stakeholders’ characteristics (required in VCS standard 4.1, item 3.16.11): i) legal or customary tenure/access rights to territories and resources, including collective and/or conflicting rights, held by local stakeholders; ii) a description of the social, economic and cultural diversity within local stakeholder groups and the differences and interactions between the stakeholder groups; iii) potential changes in the makeup of local stakeholders over time; iv) the expected changes in well-being and other stakeholder characteristics under the baseline scenario, including changes to ecosystem services identified as important to local stakeholders (i.e., generally associated with the conservation of non-timber products species vs deforestation); v) the location of communities, local stakeholders and areas outside the project area that are predicted to be impacted by the project; vi) the location of territories and resources which local stakeholders own or to which they have customary access; vii) identify likely natural and human-induced risks to local stakeholder well-being expected during the project lifetime and outline measures needed to mitigate these risks (required in VCS standard 4.1, item 3.16.12); viii) identify the risks for local stakeholders to participate in the project (required in VCS standard 4.1, item 3.16.13); and ix) identify any allegations or complaints on discrimination or sexual harassment (required in VCS standard 4.1, item 3.16.14).

As required in VCS standard 4.1, item 3.16.17, for the “Local stakeholder consultation”, a comprehensive project summary was actively presented to the communities and other stakeholders in Portuguese in the field, by two project agents. For the “Institutional Consultation”, in turn, the government organs and other institutions were contacted by e-mail. In both consultation modalities, the project proponent communicated in a didactic way: i) the project design and implementation, including the results of monitoring; ii) the risks, costs and benefits the project may bring to local stakeholders; iii) all relevant laws and regulations covering workers’ rights in the host country; iv) the process of VCS Program validation and verification and the validation/verification body’s site visit.

Between July 15 – 17, 2021, project representatives visited neighbors and communities in person to explain the characteristics of the Evergreen REDD+ project. During the visits, three documents were collected:

i. Declaration of Consent with the Project: those consulted declare that they received a visit from a project representative, that they are aware of the objectives and which properties belong to

the project area. They also declare that they agree and gave their free consent for the realization of the Evergreen REDD+ Project.

ii. Customary Resource Use Survey: Questionnaire applied to neighbors and communities to fully understand community natural resource use and management activities within the Project Area.

iii. Awareness of Communication Channels: respondents declare that they have received information about the communication channels, to be used for complaints and questions regarding the Project.

All statements are duly stored and available during the audit.

During the public consultation, 50 residents within the 20km radius of the project were interviewed, corresponding to 20,2% of local residents, considering the adults that live on the rural area and depends on forest resources as a source of income (IBGE 2010a)⁴⁹ (IBGE 2010b)⁵⁰ (DataSUS 2012)⁵¹.

The interviewees are all essentially wild harvesters who rely on forest areas to collect oils, fruits (açaí) and nuts. The groups interviewed were positive about the Evergreen REDD+ project, because the proponents of the project will register them and help to found an association. The creation of this association is important because it allows families in the community to benefit from public policies accessible only to producers legally registered in an association. These are programs promoted, for example, through the Fund for Social Promotion and Poverty Eradication (FPS) and the federal policies of minimum prices for nuts and açaí by the National Supply Company (Conab). Establishing an association strengthens the community and makes them less dependent on middlemen who retain most of the profits by having logistical dominance and more access to local traders and buyers of products⁵².

The wild harvesters reported that due to the growing deforestation pressures in the Apuí region, they need to travel greater distances into the forest to be able to collect non-timber forest products. Therefore, they expect that the conservation of the Evergreen area and increased monitoring, it will contribute to the preservation of the forest resources they exploit.

Through the interview and the Customary Resource Use Survey, it was possible to analyze some social and economic characteristics of these communities:

⁴⁹ IBGE (2010a) Census of forest workers in the municipality of Apuí
<https://cidades.ibge.gov.br/brasil/am/apui/pesquisa/23/22957?detalhes=true>

⁵⁰ IBGE (2010b) Census of rural residents: <https://censo2010.ibge.gov.br/sinopse/index.php?uf=13&dados=12>

⁵¹ DataSus (2012): Census of adult population in the municipality of Apuí TabNet Win32 3.0: População Residente - Amazonas (datasus.gov.br)

⁵² IDESAM (2019) <https://idesam.org/conteudo/noticias/familias-produtoras-de-oleos-vegetais-reativam-associacao-em-busca-de-novos-mercados-e-preco-justo/>

- As shown in the Figure 24, 54% were communities from Apuí and 46% from Novo Aripuanã.
- All residents interviewed work harvesting non-timber forest products close to the project area (Figure 25). The most harvested products are Nuts (32%), Açaí (28%), Copaiba Oil (21%) and Andiroba Oil (18%). None claimed to harvest wood or own cattle close to the Project Area.
- In relation to gender distribution of the participants, 60% were identified as male and 40% female (Figure 26).
- Regarding the main needs of the region, the most mentioned topics were: Roads (23%), Health Access (21%), Internet (20%), Education (19%) and Energy distribution (17%), as shown in the Figure 27.

Figure 24. Distribution by municipality of participants in the public consultation

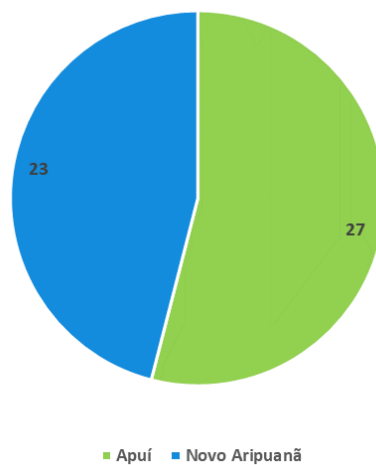


Figure 25. Non-timber products harvested by the communities

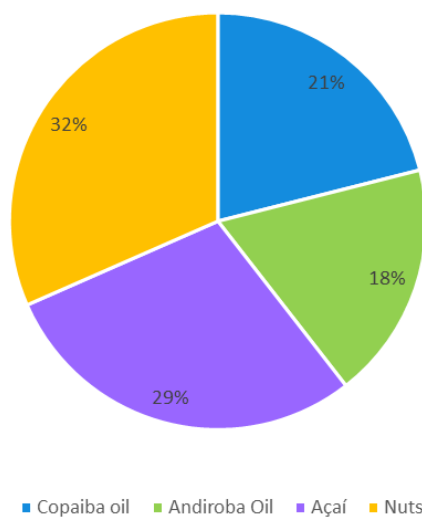


Figure 26. Gender distribution of the participants

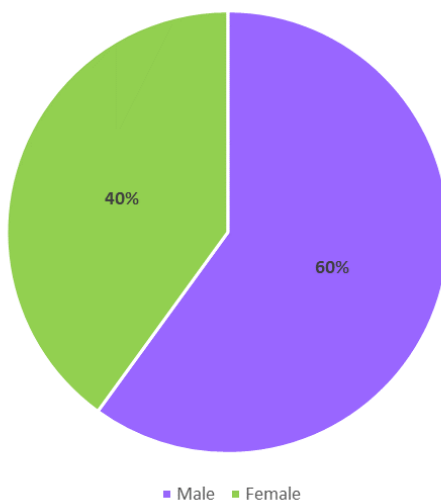
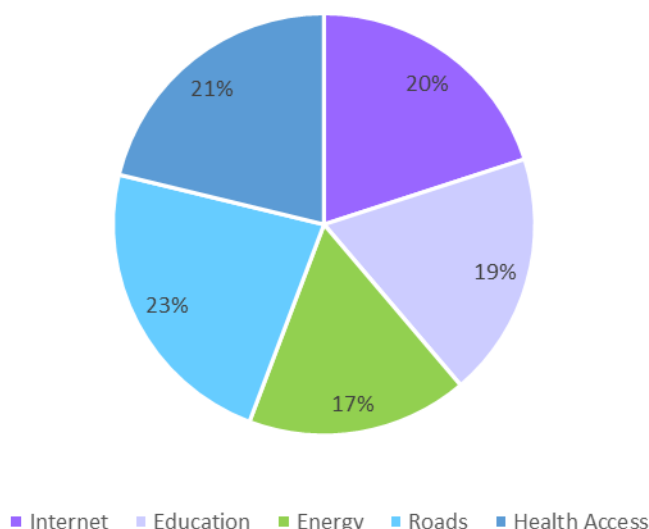


Figure 27. Main needs of the communities interviewed



This information is relevant so that the activities that will be developed within the property can benefit them in a way that contributes to the social and economic development of the region. Furthermore, it is important to point out that wild harvesters will continue to have access to the project area to collect non-forest products. The wild harvesters are known to the proponents and they will be registered, in order to differentiate them from illegal invaders.

Communication channel

The project proponent understands that stakeholders want and need to be involved in project design, implementation, monitoring and evaluation throughout the project lifetime. Therefore, complying with VCS Standard 4.1 (item 3.16.18), a communication channel was established for stakeholders to continually express their concerns and to solve eventual conflicts and grievances that arise during project planning, implementation, and monitoring. The main communication channel is the project's own email (reddevergreencarbonext@carbonext.com.br), which is managed by the Carbonext team.

Besides that, there are communities leaders who are responsible for collecting doubts and complaints from the communities and passing them on to the project's proponents. This communication can be done via phone call or face-to-face visits, as the proponents are often in the areas and make themselves accessible for conversations.

It is expected that these communication channels will be a mechanism to ensure that the project proponent and all other entities involved in project design and implementation are not involved in or complicit in any form of discrimination or harassment with respect to the project. All denouncements will be available to stakeholders and auditors. In case of conflicts, the project proponent and stakeholders will be free to propose and take any appropriate corrective action. This is the formalized grievance redress procedure that will be used throughout the project lifetime to address disputes with stakeholders, which may arise during project planning and implementation.

The process for receiving, hearing, responding to and attempting to resolve Grievances will be performed within a reasonable time period. It is expected that each grievance is responded in a delay of 7 days, proposing and/or taking corrective actions. This Feedback and Grievance Redress Procedure has three stages (VCS Standard 4.1; item 3.16.18):

1. The Project Proponent shall attempt to amicably resolve all grievances and provide a written response to the grievances in a manner that is culturally appropriate. (Action must be taken in 7 days);
2. Any grievances that are not resolved by amicable negotiations shall be referred to mediation by a neutral third party. (Action must be taken in 30 days);
3. Any grievances that are not resolved through mediation shall be referred either to a) arbitration, to the extent allowed by the laws of the relevant jurisdiction or b) competent courts in the relevant jurisdiction, without prejudice to a party's ability to submit the grievance to a competent supranational adjudicatory body, if any. (The time to accomplish this stage is dependent on local jurisdiction delays.)

2.3 Environmental Impact

The project's environmental impacts can be summarized as follows:

- A predicted total Avoided Unplanned Deforestation (AUD) area of 44,818.5 ha, over the project lifetime;
- A total avoided Planned Deforestation (APD) area of 26,470.88 hectares from 2022 to 2027;
- Forest conservation practices will be disseminated as a means to increase the value of standing forests.

Biodiversity including high conservation value species will not be negatively affected, since this project activity does not foresee the implementation of planting activities, so there is no risk of introducing invasive and exotic species into the Project Area.

The project's broader climate, community and biodiversity objectives are comprehensively described in Section 1.11., under the sub-heading "Project's major climate, community and biodiversity objectives", as well as section 1.17's sub-section on Sustainable Development, which presents the alignment of the project's goals with overarching State, National and International goals.

For this reason, this section will explore the biodiversity value and flora and fauna species of interest within the Project Area, which will be considerably benefitted by the preservation of 130,554.80 hectares of forest habitat, which the Evergreen REDD+ Project aims to achieve.

Biodiversity in the Project Area: description of importance

According to the literature available, it can be concluded that fauna biodiversity inside the Project Area is of highly significant value. In 2005⁵³, the Brazilian Ministry of Environment established the conservation bloc known as the Apuí Mosaic ("Mosaico do Apuí")⁵⁴, as part of the national plan to create an Ecological Corridor of the Southern Amazon ("Corredor Ecológico da Amazônia Meridional), which includes nine Conservation Units ("CUs"), all of which are high priority for conservation and protect a total of 2.46 million hectares.

Table 11. Apuí Mosaic's Conservation Units and their respective distances to the PA

Conservation Unit	Area (ha)	Distance to PA (KM)*
Manicoré State Forest	83.381,03	73
Guariba State Park	72.296,33	76
Aripuanã State Forest	336.040,06	16
Sustainable Development Reserve Aripuanã	224.290,81	0
Sucunduri State Forest	492.905,27	0
Sucunduri State Park	808.312,18	13
Apuí State Forest	185.946,16	92
Sustainable Development Reserve Bararati	113.606,43	142
Guariba Extractive Reserve	150.465,32	40
TOTAL	2.467.243,59	

* The shortest straight-line distance between the boundaries of the PA and the CU was considered

Of these CUs we can identify four that border the south of the project area: Sustainable Development Reserve Aripuanã, Sucunduri State Forest, Aripuanã State Forest, Sucunduri State Park. These CUs have a sum area of 1,861,548.32 hectares, therefore the project area will add

⁵³ Source: https://www.funbio.org.br/wp-content/uploads/2018/01/TdR_2016.0519.00038-1_site.pdf

⁵⁴ Source Instituto Socioambiental (accessed 11/08/21): <https://uc.socioambiental.org/pt-br/arp/5043>

a further 7% to the conservation bloc, making an important contribution to the Apuí Mosaic. The aims of the latter⁵⁵, we can note, are entirely aligned with those of the Evergreen REDD+ project as they all have to do with Sustainable Development and environmental conservation.

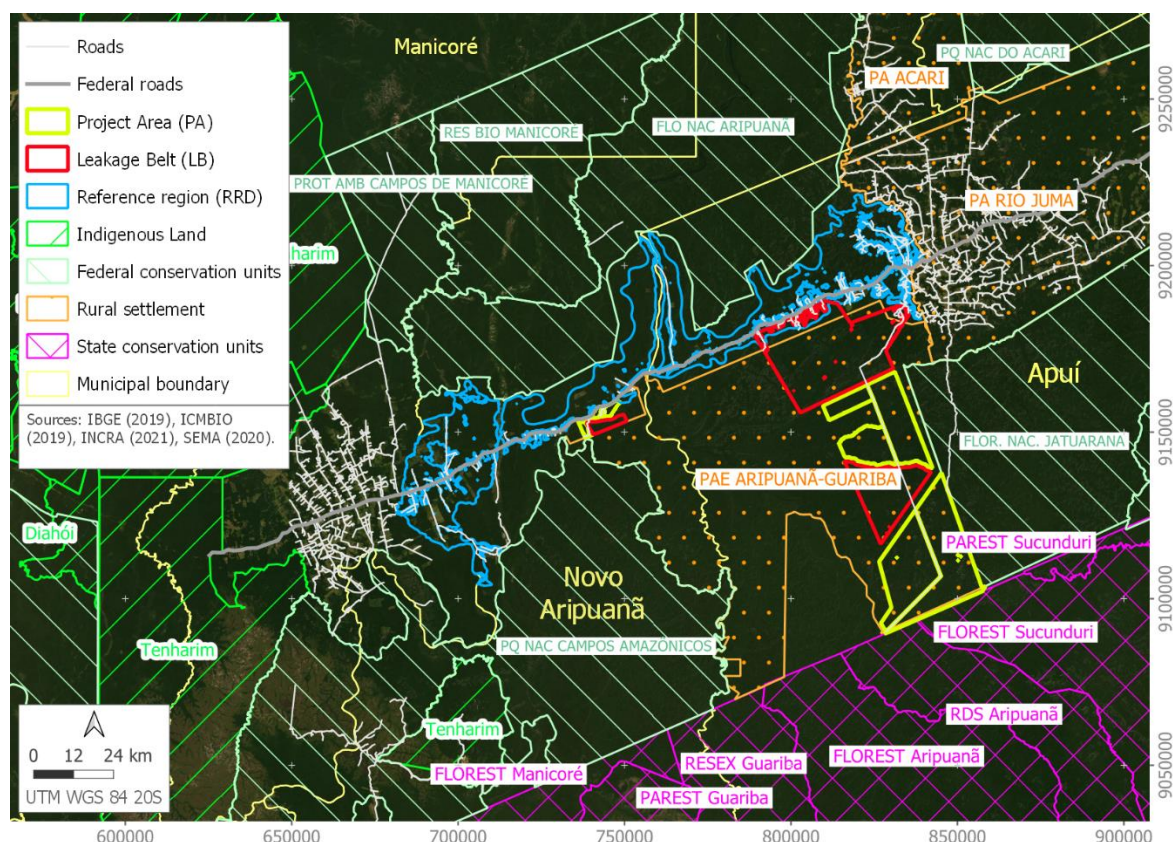


Figure 28. Brazilian Conservation Units in the vicinity of the project area

In addition to the Conservation Units that make up the Apuí Mosaic, the project is close to other conservation units that make up the Southern Amazon Ecological Corridor, which plays an important role in conserving local biodiversity and prevent the advance of deforestation.

Table 12. Other Conservation Units close to the project area

Conservation Unit	Area (ha)	Distance to PA (KM)*
Jatuarana National Forest	580.201,00	0
Campos Amazônicos National Park	961.320,00	0
Aripuanã National Forest	751.295,11	12
Juruena National Park	1.957.000,00	49
Manicoré Biological Reserve	359.063,00	31
Campos de Manicoré Environmental Protection Area	151.993,00	60
TOTAL	4.760.872,11	

⁵⁵ Source ICMBio (accessed 19/07/21): <https://www.icmbio.gov.br/portal/images/stories/imgs-unidades-coservacao/Encarte1.pdf>

* The shortest straight-line distance between the boundaries of the PA and the CU was considered

The National Forest (“FLONA”) of Jatuarana, which borders directly to the East of the main Project Area group is not part of the Apuí Mosaic, but forms a crucial transition zone, and it is important to note its high level of degradation and destruction present there. It was described as the local organization CI Florestas⁵⁶ as “a landscape of destruction, with large, fenced land parcels, buildings and pastures as far as the eye can see, large areas burned or degraded by mining and extensive improvised side roads in the middle of the forest”. The project area’s well conserved forests might be assumed by the Apuí Mosaic’s management plan. In poorly studied areas, such as the Apuí Mosaic, it is common to find endemic species, especially in peculiar environments such as mountain ranges, rocky outcrops and waterlogged areas, which in itself makes the Mosaic deserving of high priority of conservation⁵⁷.

WWF⁵⁸ described the interconnected species richness and ancient geological formations of the nearby PAREST of Sucunduri, in the following glowing terms: “It is in Sucunduri State Park that the oldest geological domains of the Apuí mosaic are located, formed by Proterozoic and Paleozoic rocks. This factor generates a different configuration in the local relief, marked by the presence of plateaus between the Amazon depression (...)”

“The region between the Aripuanã and Juruena rivers (...) forms the so-called Domo do Sucunduri. Its unique geological characteristic explains the large number of (...) waterfalls (...)”.

The richness of endemic species in these places may also have its causes related to the biogeographic transition, as well as its environmental heterogeneity.”

During the visit to the region, the team from the Juruena-Apuí expedition will be able to find in the forests of the Sucunduri Park more than 500 species of birds (some endemic), 14 different species of primates and rare species of amphibians, such as *Anolis phyllorhinu*. In flora, the species that stand out are: mahogany, cedar, copaiba, andiroba, chestnut and rosewood. Large majority threatened by its high economic value”.

A study of the biodiversity was conducted by Rio Negro Agroflorestal Ltda. (2020) in the Fortaleza Ituxi REDD Project. Although this area is located approximately 650 km away to the East, it is within the same biome, and has similar vegetation, ecosystem, and biodiversity characteristics, allowing us to use it as a primary data source relating to the biodiversity of the Evergreen REDD+ Project. Therefore it allows us to gain a good indication of the fauna likely to be found in the Project Area, meanwhile Evergreen REDD’s own fauna and flora inventory is scheduled within the monitoring plan within a five year time frame.

Between the 11th and 24th of July 2020, the survey of vertebrate fauna found 302 species of amphibians, reptiles, birds and mammals, taking into account only the direct records made using

⁵⁶ Source CIflorestas (accessed 19/07/21): <http://www.ciflorestas.com.br/conteudo.php?a=impressao&id=206>

⁵⁷ Source Amazonas State Government (accessed 16/08/2021): <https://www.terrabrasil.org.br/ecotecadigital/images/abook/pdf/1sem2015/Abril/39-Plano%20de%20Gestao.pdf>

⁵⁸ Source WWF (accessed 19/07/21): <https://www.wwf.org.br/?2880/>

the sampling method of active search via transects and opportunistic sightings. Of these, two species are not terrestrial, the Amazon River Dolphin (*Inia geoffrensis*) and the Neotropical otter (*Lontra longicaudis*), classified as aquatic and semi-aquatic mammals, respectively. 152 species from the aforementioned taxonomic groups were recorded (see table below).

Table 13. Species richness and sightings

Taxonomic Group	Transects		General	
	S	N	S	N
Reptiles and Amphibians	10	11	21	42
Birds	129	520	253	2148
Mammals	13	67	28	230
TOTAL	152	598	302	2420

*S: Species richness

*N: Number of sightings

Reptiles and amphibians: The ten species of amphibians documented were all of the order *Anura* (frogs and toads). As for reptiles, 16 species of the order *Squamata* (snake lizards), one species of the order *Testudine* or *Chelonia* (tortoises and turtles) and two species of the *Crocodylia* class (alligators) were found.

The sighted turtle species is found predominantly in the waters of the Iquiri and Ituxi Rivers. Known locally as “tracajá”, the Yellow-spotted River Turtle (*Podocnemis unifilis*) is considered Vulnerable (VU) by the IUCN (IUCN 2020)⁵⁹, and Near-threatened (NT) in the national classification (ICMBio 2018).

⁵⁹ Source IUCN Red List (accessed 24/03/21): <https://www.iucnredlist.org/species/17825/97397562>



Figure 29. Yellow-spotted River Turtle (*Podocnemis unifilis*), classified as Vulnerable (VU) sighted in the neighbouring Fortaleza Ituxi REDD Project (image: Rio Negro Agroflorestal Ltda., 2020)

Birds: 250 species of birds were documented during the study, belonging to 23 orders and 59 families (Piacentini et al. 2015, as cited in Rio Negro Agroflorestal Ltda. 2020). The most common order was *Passeriformes* (at 128 species, representing more than 50% of the documented species), followed by *Piciformes* (16 species), and finally *Acciptriformes*, *Apodiformes*, and *Psittaciformes* (the latter three with ten registered species each). The families with the highest number of species recorded were *Thamnophilidae* (25 species), followed by *Tyrannidae* (20 species), and finally *Dendrocolaptidae* and *Thraupidae* (each with 13 species).

Among the documented bird species, four are classified within threatened categories according to the IUCN (2020): The Great Tinamou (*Tinamus major*), and the Orange-cheeked Parrot (*Pyrilia barrabandi*) are considered Near-threatened (NT); while the Channel-billed Toucan (*Ramphastos vitellinus*) is considered vulnerable (Vulnerable –VU); and the Green-thighed Parrot (*Pionites leucogaster*) is considered Endangered (EN).

Two migratory species were recorded, the Solitary Sandpiper (*Tringa solitaria*), from the northern hemisphere, and the Common Vermillion Flycatcher (*Pyrocephalus rubinus*), a migrator from the south to the Amazon.

In addition, specialist species which require environments with certain ecological characteristics were recorded, such as: the Manu Antbird (*Cercomacra manu*), which is probably the first record for the State of Amazonas; the Large-headed Flat bill (*Ramphotrigon megacephalum*), which exclusively inhabit bamboo groves (Kratter 1997, as cited in Rio Negro Agroflorestral Ltda. 2020); and the Humaita Antbird (*Myrmelastes humaythae*), which is associated with floodplains and white water streams and endemic to the Purus-Madeira Region (del Hoyo et al. 2020, , as cited in Rio Negro Agroflorestral Ltda. 2020). These records and the presence of several types of habitats and microhabitats (tropical ombrophylous forests, floodplains, rapids, rocky outcrops, bamboo forests, among others), denotes the presence of a complex variety of environments and highlights the need for a more detailed sampling of birdlife in the region.



Figure 30. Red-billed Toucan (*Ramphastos tucanus*), classified as Vulnerable (VU), sighted in the neighbouring Fortaleza Ituxi REDD Project (image: Rio Negro Agroflorestral Ltda., 2020)

Mammals:

40 species of mammals were documented, belonging to 10 orders and 21 families. Of the 12 existing mammalian orders, individuals of the orders *Didelphimorphia*, *Cingulata*, *Pilosa*, *Primates*, *Chiroptera*, *Carnivora*, *Artiodactyla*, *Cetacea* and *Rodentia* were registered during the survey. The most common order found was *Primates* (12 species), followed by *Carnivora* (7 species), *Artiodactyla* (6 species), *Cingulata* and *Rodentia* (both with 4 species), and finally *Pilosa* (3 species). The families with the largest number of registered species were *Dasypodidae* (4

species) and *Cervidae* (4 species), followed by *Felidae*, *Callitrichidae*, *Cebidae*, and *Atelidae*, (3 species each). The last three belong to the order *Primates*, which encompasses all monkeys in the New World, with their diversity in Brazil being one of the largest globally: 139 taxa (species and subspecies), 5 families and 19 genera have been documented in Brazil (SBP, 2013).

Among the registered mammal species, the following are in threat categories according to the IUCN (2020): the Amazon River Dolphin (*Inia geoffrensis*) is considered Endangered –(EN); the Giant Armadillo (*Prionomys maximus*); Lowland Tapir (*Tapirus terrestris*); White-lipped Peccary (*Tayassu pecari*); and Peruvian Woolly Monkey (*Lagothrix cana cana*) are considered Vulnerable (VU). Meanwhile, Neotropical Otter (*Lontra longicaudis*), and Jaguar (*Panthera onca*) are considered Near Threatened (NT). From secondary literature sources, we can add four more species to this list: Giant Otter (*Pteronura brasiliensis*) (EN), Black-faced Spider Monkey (*Ateles chamek*) (EN); Giant anteater (*Myrmecophaga tridactyla*) (VU); and Pampas Deer (*Ozotoceros bezoarticus*) (NT).

According to the Brazilian national list of extinction threat (ICMBio 2018; table 4.2), 12 of the registered species (primary and secondary data) are in some threat category, with ten being Vulnerable (VU) and two Endangered (EN). A species of marsupial *Didelphis imperfecta*, the Guianan White-eared Opossum, known locally only as *mucura*, was sighted in the sampling area. It is little-known in the Amazon region, and there are no known sightings close to the study area, thus suggesting the possibility of this being a record of range expansion for this species.



Figure 31. An Amazon River Dolphin (*Inia Geoffrensis*), classified as Endangered (VU), sighted in the neighbouring Fortaleza Ituxi REDD Project (image: Rio Negro Agroflorestral Ltda., 2020)

To look at the species accumulation curves presented by the study (Rio Negro Agroflorestal Ltda., 2020), both the data from active sampling through transects, and general data including opportunistic sightings, show a slight tendency towards stabilization and do not reach an asymptote. This further corroborates the urgent need for continued fauna population survey efforts in the project region, as they are likely to reveal further species of interest, a possibility reinforced by species richness indicators (i.e. bootstrap and jackknife) presented by the Rio Negro Agroflorestal Ltda (2020) study.

2.4 Public Comments

Over the 22/07/2021 to 22/08/2021 period, the Evergreen REDD+ Project PD was published on the Verra website for public comment. No comment has been received.

2.5 AFOLU-Specific Safeguards

As described detailed in the section 2.2, between July 15 and 17, 2021, project representatives visited neighbors and communities in person to explain the characteristics of the Evergreen REDD+ project. During the public consultation, 50 residents within the 20km radius of the project were interviewed, corresponding to 20,2% of local residents. No one was living within the project area.

A questionnaire was applied to neighbors and communities to fully understand community natural resource use, management activities and possible conflicts within the Project Area. The interviews are essentially wild harvesters that relies on forest areas to collect oils, fruits (açaí) and nuts. None of them reported any conflicts or concerns about the project and they were positive with the implementation of the project, as an association will be formed and they will be registered, which will strengthen them and allow them access to credit lines for investments. The wild harvesters will continue to have access to the project area to collect non-forest products. They are known to the proponents and they will be registered, in order to differentiate them from illegal invaders.

All interviewees signed a knowledge and consent form regarding the implementation of the Evergreen REDD+ project.

During the public consultation, they were informed about the communication channels for any doubts and complaints. As detailed in the section 2.2, the main means of communication are the project email (reddevergreencarbonext@carbonext.com.br) and telephone contact with the

proponents. Community leaders have direct contact with the proponents, and they are constantly visiting the area and are available for conversations.

The process for receiving, hearing, responding to and attempting to resolve Grievances will be performed within a reasonable time period. It is expected that each grievance is responded in a delay of 7 days, proposing and/or taking corrective actions.

1. The Project Proponent shall attempt to amicably resolve all grievances and provide a written response to the grievances in a manner that is culturally appropriate. (Action must be taken in 7 days);
2. Any grievances that are not resolved by amicable negotiations shall be referred to mediation by a neutral third party. (Action must be taken in 30 days);
3. Any grievances that are not resolved through mediation shall be referred either to a) arbitration, to the extent allowed by the laws of the relevant jurisdiction or b) competent courts in the relevant jurisdiction, without prejudice to a party's ability to submit the grievance to a competent supranational adjudicatory body, if any. (The time to accomplish this stage is dependent on local jurisdiction delays.)

3. APPLICATION OF METHODOLOGY

3.1 Title and Reference of Methodology

Approved VCS Methodology VM0007 "REDD+ Methodology Framework (REDD+ MF)", Version 1.6, 08 September 2020. At: https://verra.org/wp-content/uploads/2020/09/VM0007-REDDMF_v1.6.pdf (last visited 18/05/2021).

Approved VCS Module VMD0015 "Methods for monitoring of GHG emissions and removals in REDD and CIW projects (M-REDD)" Version 2.2, 08 September 2020. At: <https://verra.org/wp-content/uploads/2020/09/VMD0015-M-REDD-v2.2.pdf> (last visited 30/09/2021).

Carbon pool modules:

VMD0001 "Estimation of carbon stocks in the above- and belowground biomass in live tree and non-tree pools" (CP-AB), v1.1

VMD0005 "Estimation of carbon stocks in the long-term wood products pool" (CP-W), v1.1

Baseline module:

VMD0006 Estimation of baseline carbon stock changes and greenhouse gas emissions from planned deforestation/forest degradation and planned wetland degradation (BL-PL), v1.3

VMD0007 "Estimation of baseline carbon stock changes and greenhouse gas emissions from unplanned deforestation and unplanned wetland degradation" (BL-UP), v3.3

Leakage modules:

VMD0009 Estimation of emissions from activity shifting for avoided planned deforestation/forest degradation and avoided planned wetland degradation (LK-ASP), v1.3

VMD0010 Estimation of emissions from activity shifting for avoiding unplanned deforestation and avoiding unplanned wetland degradation (LK-ASU), v1.2

VMD0011 “Estimation of emissions from market-effects” (LK-ME), v1.1

Miscellaneous Modules:

VMD0013 Estimation of greenhouse gas emissions from biomass and peat burning (E-BPB), v1.2

VMD0016 Methods for stratification of the project area (X-STR), v1.2

VMD0017 Estimation of uncertainty for REDD project activities (X-UNC), v2.2

Tools:

Combined tool to identify the baseline scenario and demonstrate additionality in A/R CDM project activities (T-ADD), Version 01, 19 Oct 2007 At:

<https://cdm.unfccc.int/methodologies/ARmethodologies/tools/ar-am-tool-02-v1.pdf> (last visited 15/07/21)

CDM – Executive Board “Tool for testing significance of GHG emissions in A/R CDM project activities (Version 01)” EB 31. At:

<https://cdm.unfccc.int/methodologies/ARmethodologies/tools/ar-am-tool-04-v1.pdf> (last visited 14/09/2021).

AFOLU “Non-Permanence Risk Tool” VCS Version 4, Procedural Document, 19 September 2019, v4.0. At: <http://www.v-c-s.org/program-documents> (last visited 18/05/2021).

3.2 Applicability of Methodology

The VM0007 REDD+ Methodology Framework is applicable to both Avoided Unplanned Deforestation (AUD) and Avoided Planned Deforestation (APD) project types, both of which apply to this project, and which fall under the AFOLU project category “REDD” as defined in the VCS AFOLU Guidance document. This methodology is a compilation of modules and tools that together define the project activity and necessary methodological steps. By choosing the appropriate modules, a project-specific methodology can be constructed.

All Project Activities:

No land areas are registered under the CDM or under any other GHG program (both voluntary and compliance-oriented). Therefore, no area must be excluded from the project area.

All REDD Activity Types:

This REDD activity is applicable due to the following conditions:

- Land in the project area has qualified as forest for at least the 10 years prior to the project start date.
- Baseline deforestation in the project area fall within the categories of Unplanned deforestation (VCS category AUDD) and Planned deforestation/degradation (VCS category APD).
- Leakage avoidance activities do not include: i) Agricultural lands that are flooded to increase production (e.g., rice paddy); ii) Intensifying livestock production through use of feed-lots and/or manure lagoons.

Avoiding Unplanned Deforestation:

This avoiding unplanned deforestation activities are applicable, as the baseline agents of deforestation: i) clear the land for tree harvesting and ranching; ii) have no documented and uncontested legal right to deforest the land for these purposes; and (iii) are either residents in the reference region for deforestation or immigrants.

In the baseline scenario of this avoiding unplanned deforestation project activity, post deforestation land use does not constitute reforestation (i.e., pasture is the final land use).

Avoiding Planned Deforestation/Degradation:

This avoiding planned deforestation activity is applicable, considering that conversion of forest lands to a deforested condition is legally permitted until the 20% limit relative to the total property area, as described in “1.4 Compliance with Laws, Statutes and Other Regulatory Frameworks”.

The selected modules, along with their VCS site descriptions and applicability conditions, are detailed below, showing their correspondence to the project-specific conditions:

Carbon pool modules:

VMD0001 “Estimation of carbon stocks in the above- and belowground biomass in live tree and non-tree pools” (CP-AB), v1.1: “This module allows for ex ante estimation of carbon stocks in above- and belowground tree and non-tree woody biomass in the baseline case (for both pre- and post-deforestation stocks) and project case and for ex post estimation of change in carbon stocks in above- and belowground tree biomass in the project case”. This module is applicable to all

forest types and age classes. Inclusion of the aboveground tree biomass pool as part of the project boundary is mandatory as per the framework module REDD-MF.

VMD0005 “Estimation of carbon stocks in the long-term wood products pool” (CP-W), v1.1: “This module allows for ex-ante estimation of carbon stocks in the long-term wood products pool in the baseline case. Carbon stocks treated here are those stocks remaining in wood products after 100 years; the bulk of emissions associated with timber harvest, processing and waste, and eventual product retirement occur within this timeframe, and this module employs the simplifying assumption that the proportion remaining after 100 years is effectively ‘permanent’”. This module is applicable to all cases where wood is harvested for conversion to wood products for commercial markets, for all forest types and age classes. This module is applicable in the baseline, as the wood products pool is included as part of the project boundary as per applicability criteria in the framework module REDD-MF, specifically:

- i. Timber harvest occurs prior to or in the process of deforestation, and timber is destined for commercial markets;
- ii. The wood products pool is determined to be significant (using T-SIG).

Baseline module:

VMD0006 Estimation of baseline carbon stock changes and greenhouse gas emissions from planned deforestation/forest degradation and planned wetland degradation (BL-PL), v1.3: “This module allows for estimating carbon stock changes and GHG emissions related to planned deforestation, planned forest degradation and planned wetland degradation in the baseline scenario.

The module was revised on 8 September 2020 by Restore America’s Estuaries and Silvestrum Climate Associates to expand its applicability to activities on tidal wetlands.”

The module is applicable for estimating the baseline emissions on forest lands (usually privately or government owned) that are legally authorized and documented to be converted to non-forest land. Where, pre-project, unsustainable fuelwood collection is occurring within the project boundaries Modules BL-DFW and LK-DFW must be used to determine potential leakage.

VMD0007 “Estimation of baseline carbon stock changes and greenhouse gas emissions from unplanned deforestation and unplanned wetland degradation” (BL-UP), v3.3: “This module allows for estimating carbon stock changes and GHG emissions related to unplanned deforestation and unplanned wetland degradation in the baseline scenario. Forest degradation is not considered.

This module was assessed and approved as part of VM0007.

The module was revised on 31 July 2012 by The Field Museum to improve uncertainty estimates in the baseline scenario and allow for new modeling approaches (version 3.0). The revision assessment reports are available on the VMD0017 (X-UNC) page.

The module was revised on 8 September 2011 by The Field Museum to add population as an option for estimating the baseline deforestation rate (version 2.0).

The module was revised on 8 September 2020 by Restore America's Estuaries and Silvestrum Climate Associates to expand its applicability to activities on tidal wetlands."

The applicability conditions of the module state that "The module is applicable for estimating baseline emissions from unplanned deforestation (conversion of forest land to non-forest land in the baseline case). The following conditions must be met to apply this module. The forest landscape configuration can be mosaic, transition, or frontier.

The module must be applied to all project activities where the baseline agents of deforestation:

- (i) clear the land for settlements, crop production (agriculturalist), ranching or aquaculture, where such clearing for crop production, ranching or aquaculture does not amount to large scale industrial agri/aquaculture activities;"
- (ii) "have no documented and uncontested legal right to deforest the land for these purposes; and"
- (iii) "are either resident in the region (reference region—cf. Section 1 below) or immigrants."

The applicability conditions of this module are met in that:

- the landscape configuration is transition, as discussed in section 3.3;
- the baseline agents of deforestation clear the land for ranching (see section 3.4 Baseline scenario);
- their practices are predominantly illegal and not within their legal rights, as argued in section 3.5 Additionality, under Scenario 3.

Leakage modules:

VMD0009 Estimation of emissions from activity shifting for avoided planned deforestation/forest degradation and avoided planned wetland degradation (LK-ASP), v1.3:

This module allows for estimating GHG emissions caused by the activity shifting leakage of planned deforestation carbon projects.

The module is applicable for estimating the leakage emissions due to activity shifting from forest lands that are legally authorized and documented to be converted to non-forest land, including activity shifting to forested wetland that is drained or degraded because of project implementation. The module is also applicable for estimating the leakage emissions due to activity shifting from non-forested wetlands that are legally authorized and documented to be converted and degraded. Under these situations, displacement of baseline activities can be controlled and measured directly by monitoring the baseline deforestation or wetland degradation agents or class of agents.

This tool must be used for projects in areas where planned deforestation happens on forested wetlands, regardless of the absence of wetland within the project boundaries.

The module is mandatory if Module BL-PL has been used to define the baseline, and the applicability conditions in Module BL-PL must be complied with in full.

VMD0010 Estimation of emissions from activity shifting for avoiding unplanned deforestation and avoiding unplanned wetland degradation (LK-ASU), v1.2:

This Module provides methods for estimating emissions from displacement of unplanned deforestation (leakage due to activity shifting). This Module is applicable for estimating carbon stock changes and greenhouse gas emissions related to the displacement of activities that cause deforestation of lands outside the Project Area due to the avoided unplanned deforestation in the Project Area. Activities subject to potential displacement are: conversion of forest land to grazing lands, crop lands, and other land uses. The module is mandatory if BL-UP has been used to define the baseline and the applicability criteria in BL-UP must be complied with in full.

VMD0011 “Estimation of emissions from market-effects” (LK-ME), v1.1:

“This module allows for estimating GHG emissions caused by the market-effects leakage related to extraction of wood for timber, fuelwood or charcoal in the baseline for carbon projects”.

This module is applicable for calculating market-effects leakage from REDD projects that are anticipated to reduce levels of wood harvest substantially and permanently. When REDD project activities result in reductions in wood harvest, it is likely that production could shift to other areas of the country to compensate for the reduction.

As referenced in the Framework (REDD-MF) the module is mandatory where:

- The process of deforestation involves timber harvesting for commercial markets⁶⁰.
- The baseline is calculated using BL-DFW AND fuel wood or charcoal is harvested for commercial markets.

In all other circumstances the module shall not be used.

When REDD project activities result in reductions in wood harvest, it is likely that production could shift to other areas of the country to compensate for the reduction. The module is mandatory where the process of deforestation involves timber harvesting for commercial markets (Commercial markets are here defined as sale of products to end users and public and private companies with sales conducted distant (>50 km) from the project area).

Miscellaneous Modules:

VMD0013 Estimation of greenhouse gas emissions from biomass and peat burning (E-BPB), v1.2:

⁶⁰ Commercial markets here defined as sale of products to end users and public and private companies with sales conducted distant (>50km) from the project area

This module provides a step-wise approach for estimating greenhouse emissions from biomass and peat burning. This module is applicable to REDD project activities with emissions from biomass burning

In the baseline scenario, fire is used to clear the land, and emissions of CO₂, N₂O and CH₄ result. Where used in the baseline, accounting must occur under both the baseline and with project scenarios in both the project area and in the leakage belt. Where fires occur ex-post in areas that coincide with areas deforested or degraded in the baseline case, the module shall be used to account greenhouse gas emissions.

VMD0016 Methods for stratification of the project area (X-STR), v1.2:

This module provides guidance on stratifying the project area into discrete, relatively homogeneous units to improve accuracy and precision of carbon stock and carbon stock change estimates.

Any module referencing strata i shall be used in combination with this module. Strata are only used for pre-deforestation forest classes and are the same in baseline and project cases. Post-deforestation (conversion) land-uses are not stratified, instead using average post-deforestation stock values (e.g., “Simple Conservative” or “Historical Area-weighted” approaches per BL-UP).

VMD0017 Estimation of uncertainty for REDD project activities (X-UNC), v2.2:

This module allows for estimating uncertainty in baseline estimations and in estimations of with-project sequestration, emissions and leakage. This module is mandatory when using methodology REDD+ MF. It is applicable for estimating the uncertainty of estimates of emissions and removals of CO₂-e generated from REDD and WRC project activities. The module focuses on the following sources of uncertainty:

- Determination of rates of deforestation and degradation;
- Uncertainty associated with estimation of stocks in carbon pools and changes in carbon stocks;
- Uncertainty associated with estimation of peat emissions;
- Uncertainty in assessment of project emissions.

Where an uncertainty value is not known or cannot be simply calculated, a project must justify that it is using an indisputably conservative number and an uncertainty of 0% may be used for this component.

Guidance on uncertainty – a precision target of a 95% confidence interval half-width equal to or less than 15% of the recorded value must be targeted. This is especially important in terms of project planning for measurement of carbon stocks; sufficient measurement plots should be included to achieve this precision level across the measured stocks.

Tools:

VT0001 “Tool for the Demonstration and Assessment of Additionality in VCS Agriculture, Forestry and Other Land Use (AFOLU) Project Activities” (T-ADD), v3.0.

This tool is applicable when AFOLU activities on the land within the proposed project boundary do not lead to violation of any applicable law even if the law is not enforced. The use of this tool to determine additionality requires the baseline methodology to provide for a stepwise approach justifying the determination of the most plausible baseline scenario.

Tool for testing significance of GHG emissions in A/R CDM project activities

This tool facilitates the determination of which GHG emissions by sources, possible decreases in carbon pools, and leakage emissions are insignificant for a particular CDM A/R project activity.

The tool shall be used in the application of an A/R CDM approved methodology to an A/R CDM project activity:

- a) To determine which decreases in carbon pools and increases in emissions of the greenhouse gases measured in CO₂ equivalents that result from the implementation of the A/R project activity, are insignificant and can be neglected.
- b) To ensure that it is valid to neglect decreases in carbon pools and increases in GHG emissions by sources stated as being insignificant in the applicability conditions of an A/R CDM methodology.

The above modules and tools are applicable because they meet the applicability conditions of the modules as set out below:

Table 14: Applicability Conditions and Justifications for the REDD Methodology Framework Module.

Applicability Condition	Justification
Land in the project area has qualified as forest at least 10 years before the project start date.	The project area complies with this condition as mentioned in Section 1.13, with complete forest cover demonstrated for the years 2010 and 2020
The project area can include forested wetlands (such as bottomland forests, floodplain forests, mangrove forests) as long as they do not grow on peat. Peat shall be defined as organic soils with at least 65% organic matter and a minimum thickness of 50 cm. If the project area includes forested wetlands growing on peat (e.g. peat swamp forests), this methodology is not applicable.	As demonstrated in Figure 38, no organic soils (or peatlands) exist within the project area.

Project proponents must be able to show control over the project area and ownership of carbon rights for the project area at the time of verification.	As demonstrated in Section 1.7 Table 9, the project proponents have clear, uncontested title to both property rights and the carbon rights.
Baseline deforestation and baseline forest degradation in the project area fall within one or more of the following categories: Unplanned deforestation (VCS category AUDD); Planned deforestation (VCS category APD); Degradation through extraction of wood for fuel (fuelwood and charcoal production) (VCS category AUDD).	Baseline deforestation in the project area falls within APD and AUD: - APD category, as the agent of deforestation is the project proponent; - AUD category: deforestation agents are cattle ranchers, timber harvesters and infrastructure.
Baselines shall be renewed every 10 years from the project start date.	The baseline will be renewed in November 2030.
All land areas registered under the CDM or under any other carbon trading scheme (both voluntary and compliance-orientated) must be transparently reported and excluded from the project area. The exclusion of land in the project area from any other carbon trading scheme shall be monitored over time and reported in the monitoring reports.	The Evergreen Project REDD+ is not registered in any carbon trading scheme or program.
If land is not being converted to an alternative use but will be allowed to naturally regrow (i.e. temporarily unstocked), this framework shall not be used.	Forest clearing in the baseline is followed by establishment of pasture, which prevents forest regrowth.
Leakage avoidance activities shall not include: Agricultural lands that are flooded to increase production (e.g. paddy rice); Intensifying livestock production through use of “feed-lots” and/or manure lagoons.	Leakage avoidance activities do not include flooding agricultural land or creating feed-lots or manure lagoons.

Table 15: VMD0006 Estimation of Baseline Carbon Stock Changes and Greenhouse Gas Emissions from Planned Deforestation and Planned Degradation”

Applicability Condition	Justification
The module is applicable for estimating the baseline emissions on forest lands (usually privately or government owned) that are legally authorized and documented to be converted to non-forest land.	The proponents have requested to IPAAM permission to clear up to 20% of the Alvorada propriety, according to the legal limit prescribed in the Brazilian Forest Code. In addition, the landowner has a plan to deforest in the next few years, which will not be executed in case of success in obtaining VCUs.

Where, pre-project, unsustainable fuelwood collection is occurring within the project boundaries modules BL-DFW and LK-DFW shall be used to determine potential leakage.	No fuelwood collection has been conducted within the project area. This statement can also be confirmed through the public consultation carried out with the community, as none of the interviewees mentioned collecting wood for fuelwood or any other activity.
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Table 16: “VMD0007 Estimation of Baseline Carbon Stock Changes and Greenhouse Gas Emissions from Unplanned Deforestation”

Applicability Condition	Justification
Baseline agents of deforestation shall: (i) clear the land for settlements, crop production (agriculturalist) or ranching, where such clearing for crop production or ranching does not amount to large scale industrial agriculture activities; (ii) have no documented and uncontested legal right to deforest the land for these purposes; and (iii) are either resident in the reference region or immigrants. Under any other condition this framework shall not be used.	The baseline agents of deforestation clear the land for ranching as final land use. These land squatters have no legal right to use or deforest the land. These agents of deforestation are from nearby communities or immigrants looking for land to illegally harvest wood and convert the land for pasture.
Where, pre-project, unsustainable fuelwood collection is occurring within the project boundaries modules BL-DFW and LK-DFW shall be used to determine potential leakage.	No fuelwood collection has been conducted within the project area. This statement can also be confirmed through the public consultation carried out with the community, and none of the interviewees mentioned collecting wood for charcoal or any other activity.

Table 17: VMD0009 Estimation of emissions from activity shifting for avoided planned deforestation/forest degradation and avoided planned wetland degradation (LK -ASP), v1.3

Applicability Condition	Justification
The module is applicable for estimating the leakage emissions due to activity shifting from forest lands that are legally authorized and documented to be converted to non-forest land, including activity shifting to forested wetland that is drained or degraded as a consequence of project implementation.	The proponents have the official request and the plan to deforest 20% of the Alvorada propriety.
This tool must be used for projects in areas where planned deforestation happens on forested wetlands, regardless of the absence of wetland within the project boundaries.	There are no forested wetlands within the project area.

The module is mandatory if Module BL-PL has been used to define the baseline, and the applicability conditions in Module BL-PL must be complied with in full.	Module BL-PL was applied and all the conditions were complied with, as mentioned in Table 15.
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Table 18: VT0001 “Tool for the Demonstration and Assessment of Additionality in VCS Agriculture, Forestry and Other Land Use (AFOLU) Project Activities” (T-ADD), v3.0.

Applicability Condition	Justification
AFOLU activities the same or similar to the proposed project activity on the land within the proposed project boundary performed with or without being registered as the VCS AFOLU project shall not lead to violation of any applicable law even if the law is not enforced	As stated in the section 1.14, the project is in compliance with all relevant laws, statutes, and regulatory frameworks.
The use of this tool to determine additionality requires the baseline methodology to provide for a stepwise approach justifying the determination of the most plausible baseline scenario. Project proponent(s) proposing new baseline methodologies shall ensure consistency between the determination of a baseline scenario and the determination of additionality of a project activity.	The approach to define the baseline scenario using this tool was described in the section 3.4.

3.3 Project Boundary

The project area is composed of five properties, of which the geodetic coordinates of the Project Area, are as follows, applying the Latitude/Longitude coordinate system. The complete set of coordinates, is available upon request:

Table 19: Main geodetic coordinates of the Project Area

Property Name	Id	Latitude	Longitude
Alvorada	1	-8.0311	-60.0385
Alvorada	2	-8.2270	-60.0226
Alvorada	3	-8.0949	-59.7479
Alvorada	4	-7.7891	-59.8703
Buiuçu	5	-7.6090	-60.1945
Buiuçu	6	-7.5154	-59.9994
Buiuçu	7	-7.7761	-59.8946
Aroeira	8	-7.7464	-60.1348
Boa Lembrança	9	-7.5971	-60.7585
Boa Lembrança	10	-7.6043	-60.7440

Sao Damião	11	-7.6577	-60.8417
Sao Damião	12	-7.6917	-60.8202
Sao Damião	13	-7.6999	-60.8411
Boa Lembrança	14	-7.6504	-60.8630

Geographic coordinates Datum WGS 84





Figure 32. Project boundaries and coordinate points

The areas of the Project Area – defined in accordance with the methodology’s rules – as well as the Reference Region and the Leakage Belt are displayed in the Table below:

Table 20. Project Area, Leakage Belt, and Reference Region forest areas

Name	Net Forest Area (ha)
Project Area	130,554.80
Leakage Belt	120,089.87
Reference Region (RRL)	321,979.86
Reference Region (RRD)	262,661.56

The VM0007 Methodology includes the six carbon pools listed in the table below, indicating whether they were included or excluded within the proposed AUD and APD project activity, as well as their respective justifications.

Source	Gas	Included?	Justification/Explanation
Baseline Biomass burning	CO ₂	Excluded	Excluded as recommended by the applied methodology. Counted as carbon stock change.

Source		Gas	Included?	Justification/Explanation
Project		CH ₄	Included	Included as non-CO ₂ emissions from biomass burning in the baseline scenario, according to the methodology.
		N ₂ O	Included	Included as non-CO ₂ emissions from biomass burning in the baseline scenario, according to the methodology.
		Other	Excluded	No other GHG gases were considered in this project activity.
		CO ₂	Excluded	Not a significant source
	Livestock emissions	CH ₄	Excluded	Excluded for simplification. This is conservative.
		N ₂ O	Excluded	Excluded for simplification. This is conservative.
		Other	Excluded	No other GHG gases were considered in this project activity.
	Biomass burning	CO ₂	Excluded	No biomass burning increase is predicted to occur in the project scenario compared to the baseline case. Therefore, considered insignificant.
		CH ₄	Included	Included as non-CO ₂ emissions from biomass burning in the project scenario, according to the methodology.
		N ₂ O	Included	Included as non-CO ₂ emissions from biomass burning in the project scenario, according to the methodology.
		Other	Excluded	No other GHG gases were considered in this project activity.
	Livestock emissions	CO ₂	Excluded	Not a significant source.
		CH ₄	Excluded	No livestock agriculture increase is predicted to occur in the project scenario compared to the baseline case. Therefore, considered insignificant.
		N ₂ O	Excluded	As above.
		Other	Excluded	No other GHG gases were considered in this project activity.

The map in the figure below showing the following project regions:

- PA – the Project Area (yellow);
- RRD – Reference region for projecting rate of deforestation (blue);
- LB – and leakage belt (red).

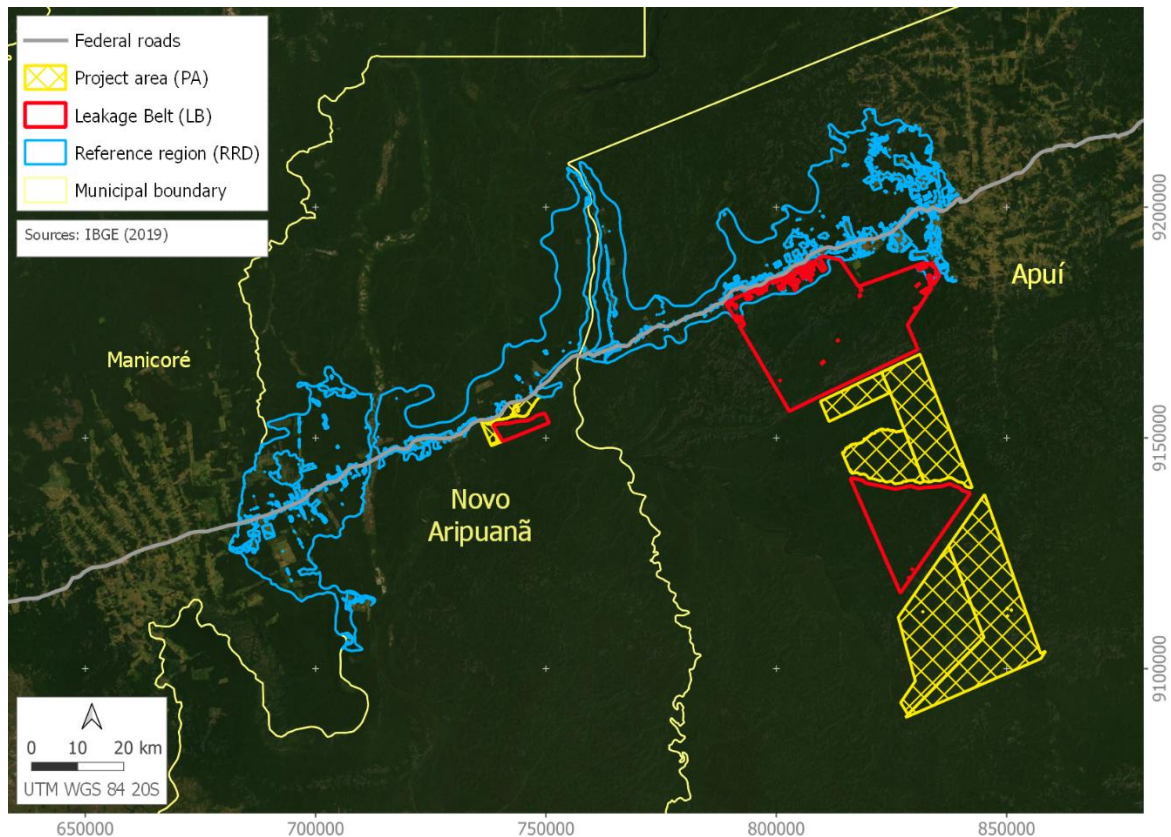


Figure 33. Project area boundaries: PA; RRD; LB

Regarding the RRL – Reference region for projecting location of deforestation – in accordance with step 3.0.b of the VMD0007-BL-UP_v3.3 module, a RRL is only required when location analysis is required or elected.

Due to being a transition configuration, location analysis is not required as the following requirement is met:

“≥25% of the project geographic boundary is within 50 m of land that has been anthropogenically deforested within the 10 years prior to the project start date.”

Analysis reveals that a 50m buffer surrounding the PA, which is in contact with land anthropogenically deforested within the 10 years prior to the PSD, touches 37% of the PA boundary, as displayed in the figure below:

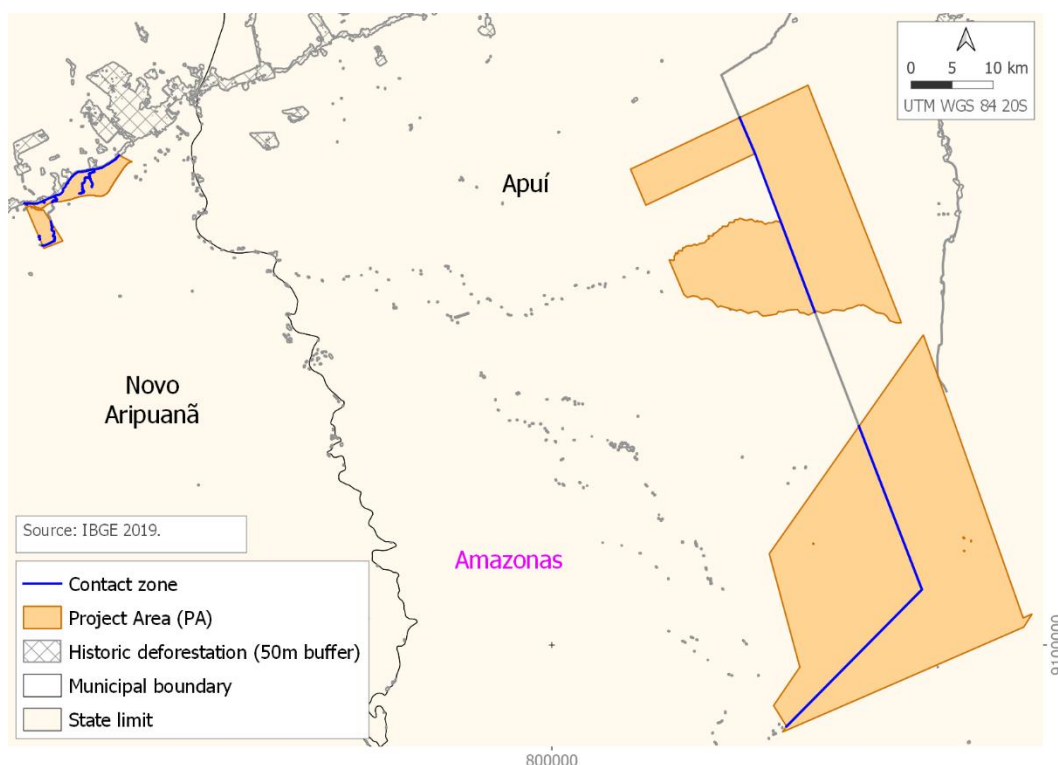


Figure 34. Transition configuration – distance between the project boundary and anthropogenically deforested land ≤ 10 years prior to the project start date

Similarity analysis between Reference Region and Project Area

In accordance with VM0007 methodology, module VMD0007-BL-UP_v3.3, the following criteria were taken into account in the analysis of similarity between the RRD Reference Region and the Project Area. Firstly the agents of deforestation were addressed and secondly the Landscape factors. Regarding the latter, according to the VM0007 methodology, the similarity must be of at least 80% in each of these variables for the PA definition requirements to be met:

Agents of deforestation

It was determined that the main agent of deforestation in the RRD at the start of the historical reference period was the same as those expected to cause deforestation in the Project Area during the project term. As noted in PD section 3.4, in the entire RRD at the beginning of the historical reference period (2012), post-deforestation land-use is 98.93% pastureland for cattle ranching. And the primary and sole considered agent of deforestation over the PA is cattle ranching, being the primary force of deforestation in the municipality of Apuí, as in the PA itself, as argued in section 3.4, and backed up by literature (Carrero et al. 2015). Thus, the active agent of deforestation in both the RRD at the start of the historical reference period, and that expected to cause deforestation in the Project Area during the project term is 100% cattle ranching., thus fulfilling the ($\pm 20\%$) methodological requirement.

Forest classes

According to the classification of Brazilian vegetation carried out by IBGE⁶¹, both the Project Area and the RRD are entirely covered by native Amazonian vegetation, falling into four categories of vegetation type. These are described in the table and figure below, along with their corresponding above- and below-ground absolute and per hectare biomass values.

Table 21. Vegetation types in the Project Area and RRD Reference Region

Project Area			
Forest class	Area (ha)	Proportion (%)	Biomass (Ag + Bg) (t/ha)
Submontane dense tropical rainforest	66,756.94	51%	399.1 ⁶³ 62
Submontane open tropical forest	59,523.59	46%	403.0 ⁶² 63
Alluvial dense tropical rainforest	2,571.98	2%	404.0 ⁶³
Lowland dense tropical rainforest	1,693.12	1%	339.8 ⁶⁴
TOTAL	130,554.60	100%	400,4*
RRD - Reference Region			
Forest class	Area (ha)	Proportion (%)	Biomass (Ag + Bg) (t/ha)
Submontane dense tropical rainforest	99,404.75	38%	399.1 ⁶³ 62
Submontane open tropical forest	53,375.73	20%	403.0 ⁶² 63
Alluvial dense tropical rainforest	0.00	0%	404.0 ⁶³
Lowland dense tropical rainforest	109,881.08	42%	339.8 ⁶⁴
TOTAL	130,554.60	100%	375,0*

* Weighted biomass according to the proportion of each type of forest class

⁶¹ Source IBGE (2012): Manual Técnico da Vegetação Brasileira <https://www.terrabrasil.org.br/ecotecadigital/pdf/manual-tecnico-da-vegetacao-brasileira.pdf>

⁶² Fearnside et al (2013) <https://revista.ufrr.br/agroambiente/article/viewFile/971/1026>

⁶³ Barni et al (2016): http://philip.inpa.gov.br/publ_livres/mss%20and%20in%20press/Barni_et_al-biomassa_florestal_em_Roraima_PORTUGUES_2016.07.19.pdf

⁶⁴ Higuchi (2015): <https://acervodigital.ufpr.br/bitstream/handle/1884/41822/R%20-%20T%20%20FRANCISCO%20GASPARETTO%20HIGUCHI.pdf?sequence=1&isAllowed=y>

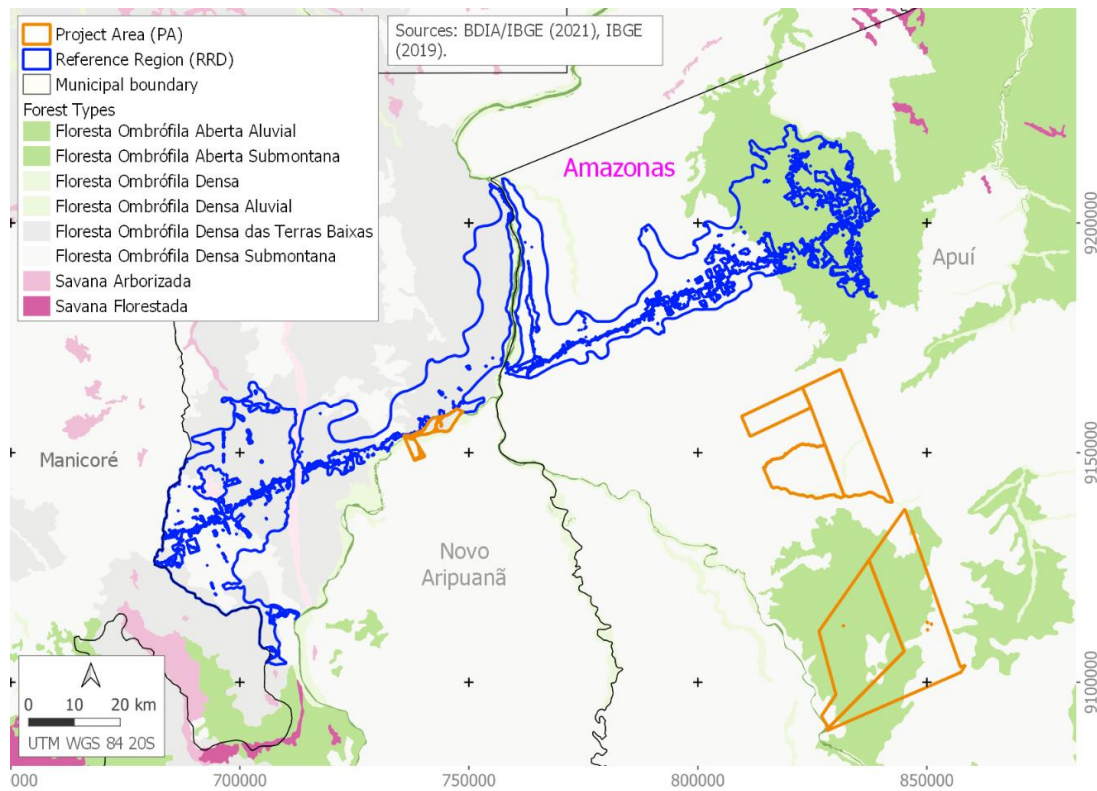


Figure 35. Vegetation cover in the Project Area and RRD Reference Region

While there are differences in the proportions of each vegetation types, all four forest classes are represented in both the RRD and the PA. Furthermore, the above- and below-ground per-hectare biomass values of the four categories sum, in the PA, to 400,34 t/ha, and in the RRD to 374,6 t/ha, representing a difference of 6%. Therefore, the methodological criterion of similarity is met in this regard.

Elevation

As noted in section 1.13, altitude variation in the PA and reference regions is relatively low, 100% of the two areas lying between 0 m and 500 m, therefore there is a 100% match regarding this variable.

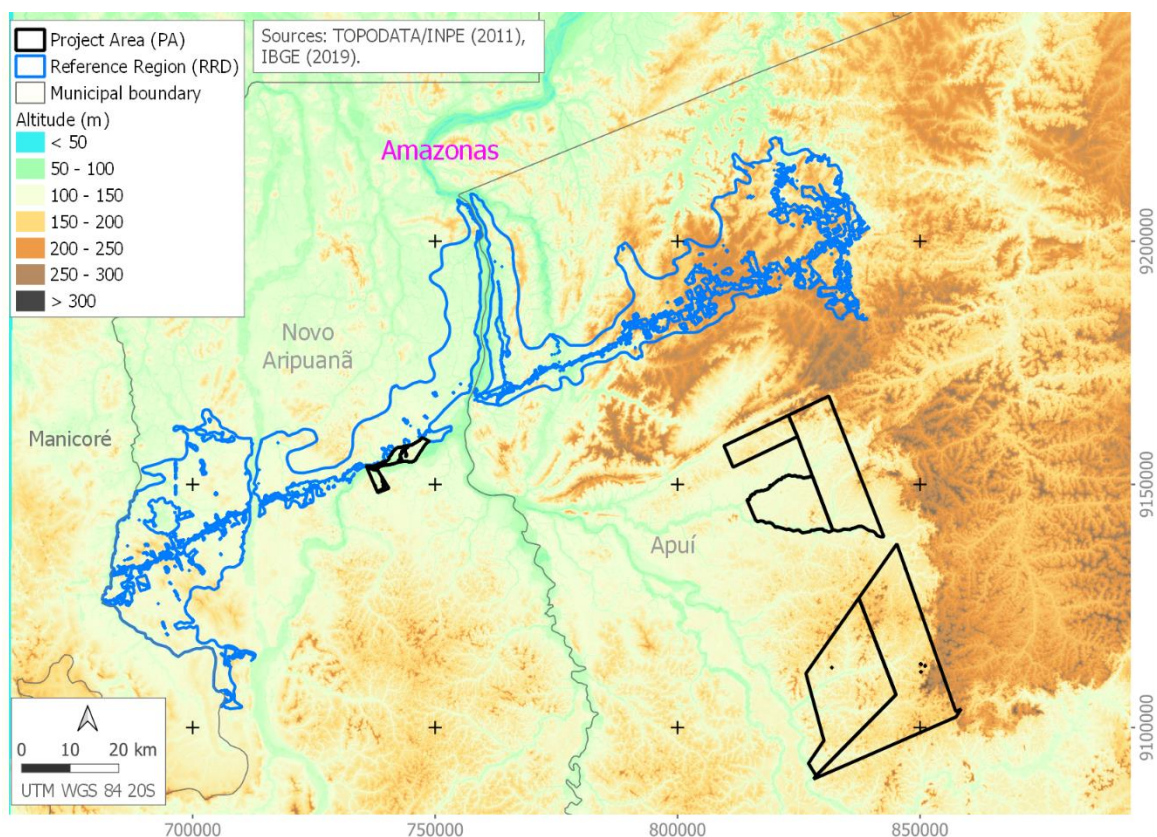


Figure 36. Elevation range in the Project Area and RRD Reference Region

Slope

The relief of the majority of both the PA and the RRD is flat to mildly hilly, with 94% of the RRD and 88% of the PA classified as under 15% slope. The figure below shows displays the slope map of the project area, in which it is notable that almost all the project area has a little or no slope, with only 12% having a slope class above 15%.

Table 22. Slope class distribution in the RRD and PA

RRD		
Slope class	Area (ha)	Area (%)
< 15%	246,857	94%
>15 %	15,804	6%
Total	262,662	100%
PA		
Slope class	Area (ha)	Area (%)
< 15%	114,517	88%
>15 %	16,037	12%
Total	130,555	100%

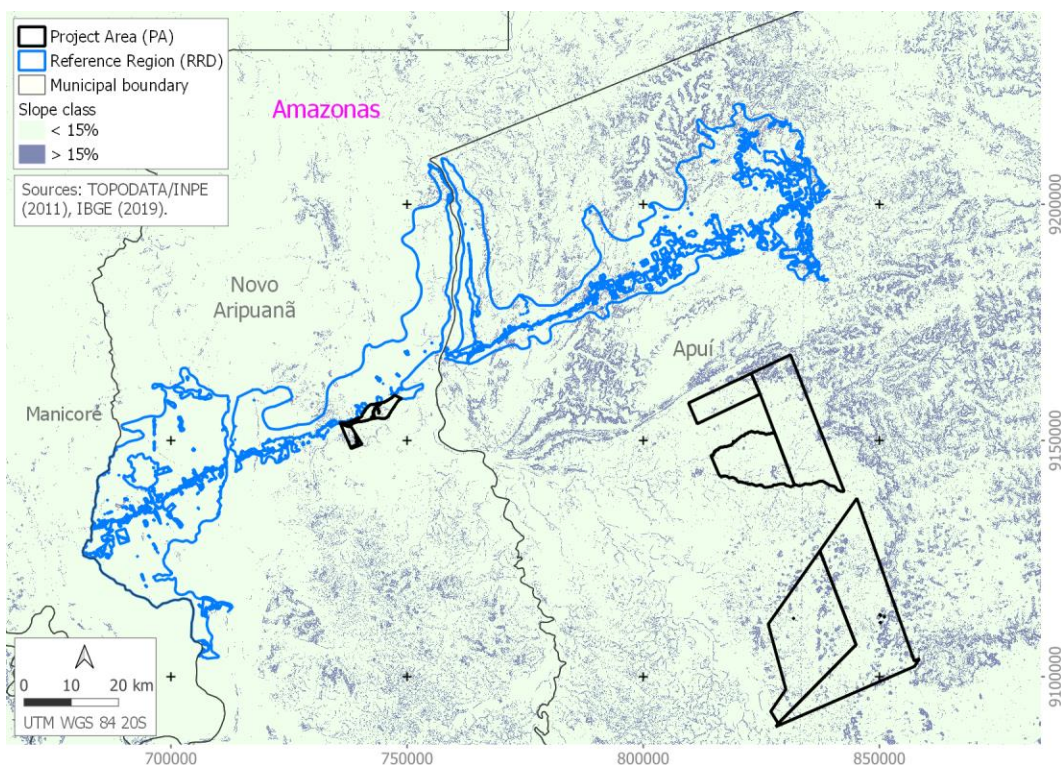


Figure 37. Slope classes in the Project Area and RRD Reference Region

Soil Types

Analysis of both the RRD and the Project Area, according to the Brazilian Soil Classification System (SiBCS, 2006)⁶⁵, contains three different soil types, shown in the table and figure below:

Table 23. Soil types in the RRD and Project Area

PA		
Soil types	Area (ha)	Area (%)
(LAd) Yellow Latosols	32,639	25.8%
(LVAd) Red-yellow Latosols	6	0.01%
(PVAe) Red-Yellow Argisol	97,916	74.2%
Total	130,554.80	100%
RRD - Reference Region		
Soil types	Area (ha)	Area (%)
(LAd) Yellow Latosols	189,612	72.19%
(PVAe) Red-Yellow Argisol	73,050	27.81%
Total	262,661.56	100%

⁶⁵ Source: http://geoinfo.cnps.embrapa.br/layers/geonode%3Aabrasil_solos_5m_20201104

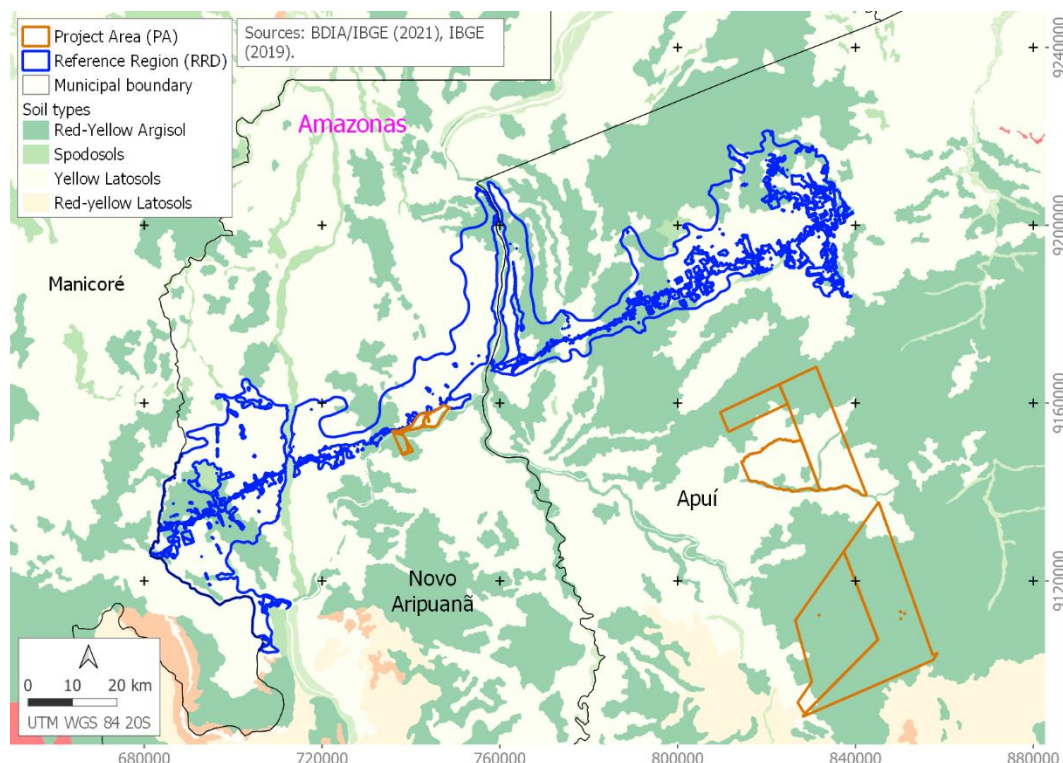


Figure 38. Soil types in the Project Area and RRD Reference Region

The general characteristics, with respect to land-uses, of each type of soil are:

- (LAd) Yellow Latosols⁶⁶ offer favourable conditions for water retention and permeability, being commonly used intensively for sugar cane and pasturelands, and, on a smaller scale, for manioc, pineapple, coconut and citrus fruits, and eucalyptus reforestation. In Amazonia their primary use is for pasturelands.
- (LVAd) Red-yellow Latosols⁶⁷ are commonly used for cattle farming, given that they often have limitations regarding their chemistry and their ability to allow development of systems.
- (PVAe) Red-Yellow Argisol⁶⁸ are predominantly used for sugar cane, various types of fruit growing, planted pasturelands, manioc and certain passion fruit and yam crops.

The predominant soil types within the Project Area are, then, red-yellow argisols (74.2%) along with yellow latosols (25.8%); while in the RRD yellow latosols predominate (72%), with (LVAd) red-yellow latosols also present (28%).

⁶⁶ Source Embrapa (accessed 17/08/21):

https://www.agencia.cnptia.embrapa.br/gestor/solos_tropicais/arvore/CONT000fzyjaywi02wx5ok0q43a0r58asu5l.html

⁶⁷Source Embrapa (accessed 17/08/21):

https://www.agencia.cnptia.embrapa.br/gestor/solos_tropicais/arvore/CONT000g05ip3qr02wx5ok0q43a0r3t5vjo4.html

⁶⁸ Source Embrapa (accessed 17/08/21):

https://www.agencia.cnptia.embrapa.br/gestor/territorio_mata_sul_pernambucana/arvore/CONT000gt7eon7k02wx7ha087apz2axe8nfr.html

To this extent, the predominant types of soil in both the PA and RRD are noted by Embrapa sources to be favorable to the implementation of pasturelands. Therefore, it is concluded that, with respect to the variable soil types, both the PA and RRD are equally conducive to the primary baseline land-use of cattle farming, and therefore fulfil similarity in that respect.

Transportation networks and human infrastructure

The VMD0007 BL-UP module states that infrastructure such as roads, navigable rivers and settlements, that increase the likelihood of deforestation and that exist historically in the RRD must be directly comparable to those that are expected to exist within the project area during the project term. The analysis of difference between the PA and RRD (depicted and quantified in the figure and table below) was conducted in terms road density (m/km²) resulting in a difference of 14%, thus falling within the maximum difference of $\pm 20\%$ permitted by the methodology.

The density of rivers in the RRD is 52% the density in the Project Area (RRD: 0,0038 km/ha; PA: 0,0073 km/ha) which therefore is less dense in the PA, which is in accordance with VM0007 (BL-UP_v3.3 module) criteria: “Where navigable rivers are present in the project area, navigable river/stream density(m/km²) for the RRD is the same, less than, or does not exceed by more than 20% that of the project area.

Table 24. Road density analysis between the RRD and the PA

Area	km ²	Total length (m)	Density (m/km ²)
RRD	2,626.62	192,797.27	73.40
PA	1,305.55	82,734.25	63.37

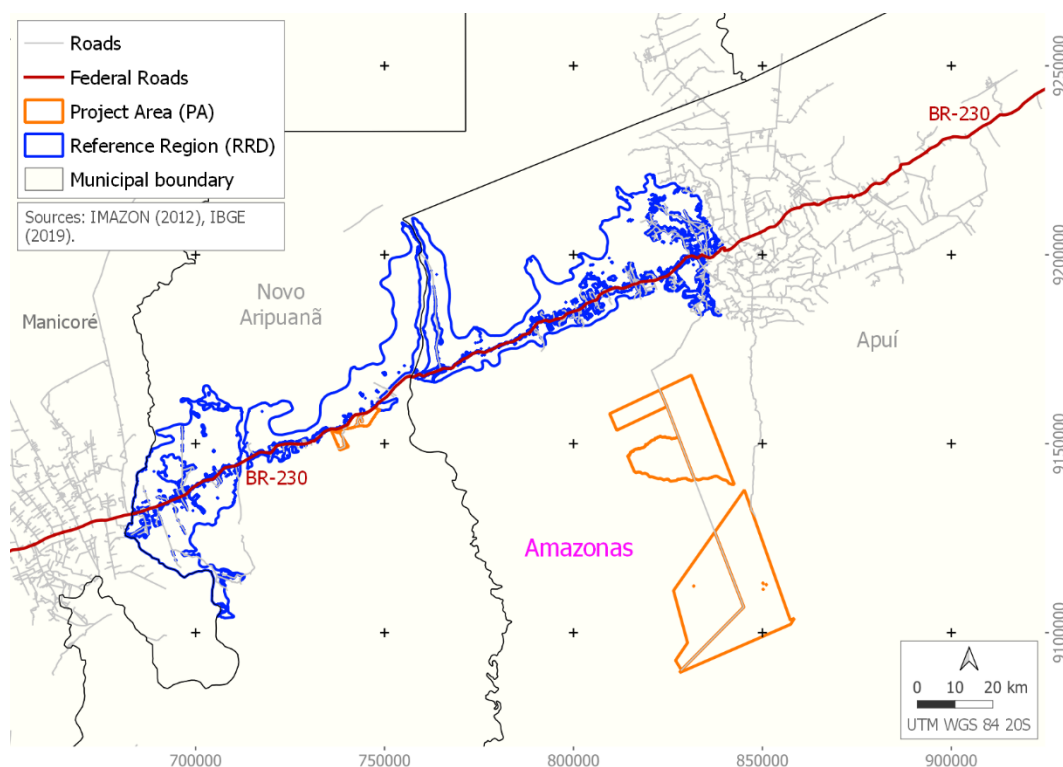


Figure 39. Road density in the Project Area and the RRD Reference Region

General Conclusion on Similarity between PA and RR

The Project Area and the RRD have been argued to be quantitatively $\pm 20\%$ similar, or otherwise qualitatively similar in important respects, regarding the factors determined by the VM0007 BL-UP methodology, specifically: agents of deforestation; forest types; elevation classes; slope classes; and soil types; and transportation networks and human infrastructure.

Spatial Boundaries – LEAKAGE BELT

Elevation

As noted in section 1.13, altitude variation in the PA and the Leakage Belt is relatively low, 100% of the two areas lying between 0 m and 500 m, therefore there is a 100% match regarding this variable.

Forest Type

According to the Classification of Brazilian carried out by IBGE⁶⁹, both the Project Area and the Leakage Belt are entirely covered by native Amazonian vegetation, falling into four categories of vegetation type. As shown in the table below, 51% of the PA and 77% of the LB are covered by Submontane dense tropical rainforest, followed by Submontane open tropical forest, 46% and 23%, respectively.

⁶⁹ Source IBGE (2012): <https://www.terrabrasilis.org.br/ecotecadigital/pdf/manual-tecnico-da-vegetacao-brasileira.pdf>

Table 25. Vegetation types in the Project Area and Leakage Belt

Project Area			
Forest class	Area (ha)	Proportion (%)	Biomass (Ag + Bg) (t/ha)
Submontane dense tropical rainforest	66,756.94	51%	399.1 ^{63 62}
Submontane open tropical forest	59,523.59	46%	403.0 ^{62 63}
Alluvial dense tropical rainforest	2,571.98	2%	404.0 ⁶³
Lowland dense tropical rainforest	1,693.12	1%	339.8 ⁶⁴
TOTAL	130,554.60	100%	400,4*
LB - Leakage Belt			
Forest class	Area (ha)	Proportion (%)	Biomass (Ag + Bg) (tCO2/ha)
Submontane dense tropical rainforest	92,494.68	77%	399.1 ^{63 62}
Submontane open tropical forest	27,363.13	23%	403.0 ^{62 63}
Alluvial dense tropical rainforest	232.05	0.2%	404.0 ⁶³
Lowland dense tropical rainforest	0.00	0%	339.8 ⁶⁴
TOTAL	120,089.87	100%	384,1*

* Weighted biomass according to the proportion of each type of forest class

Slope

The relief of the majority of both the PA and the Leakage Belt is flat to mildly hilly, with 88% of the PA and 89% of the LB classified as under 15% slope. Only 12% of the PA and 11% of the LB have a slope class above 15%.

Table 26. Slope class distribution in the Project Area and Leakage Belt

PA		
Slope class	Area (ha)	Area (%)
< 15%	114,517	88%
>15 %	16,037	12%
Total	130,555	100%
LB		
Slope class	Area (ha)	Area (%)
< 15%	106,817	89%
>15 %	13,273	11%

Total	120,090	100%
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Soil types

Analysis of both the Leakage Belt and the Project Area, according to the Brazilian Soil Classification System (SiBCS, 2006)⁷⁰, contains four different soil types:

Table 27. Soil types in the Project Area and Leakage Belt

PA		
Soil types	Area (ha)	Area (%)
(ESKg) Ferrihumiluvic Spodosol	0	0%
(LAd) Yellow Latosols	33,675	25.8%
(LVAd) Red-yellow Latosols	8	0.01%
(PVAe) Red-Yellow Argisol	96,861	74.2%
Total	130,555	100%
LB		
Soil types	Area (ha)	Area (%)
(ESKg) Ferrihumiluvic Spodosol	166	0.1%
(LAd) Yellow Latosols	56,499	47.0%
(LVAd) Red-yellow Latosols	0	0%
(PVAe) Red-Yellow Argisol	63,425	52.8%
Total	120,090	100%

The general characteristics, with respect to land-uses, of each type of soil are:

- (ESKg) Ferrihumiluvic Spodosol⁷¹ have strong restriction to drainage. For agricultural purposes, they are used for the extraction of cashew and mangab trees, coconut from the bay, cassava and sweet potatoes. They are best suited for environmental preservation.
- (LAd) Yellow Latosols⁷² offer favourable conditions for water retention and permeability, being commonly used intensively for sugar cane and pasturelands, and, on a smaller scale, for manioc, pineapple, coconut and citrus fruits, and eucalyptus reforestation. In Amazonia their primary use is for pasturelands.

⁷⁰ Source: http://geoinfo.cnps.embrapa.br/layers/geonode%3ABrasil_solos_5m_20201104

⁷¹ Source Embrapa (accessed 17/08/21):

https://www.agencia.cnptia.embrapa.br/gestor/solos_tropicais/arvore/CONT000gn2222vs02wx5ok0liq1mq5moe5rv.html

⁷² Source Embrapa (accessed 17/08/21):

https://www.agencia.cnptia.embrapa.br/gestor/solos_tropicais/arvore/CONT000fzyjaywi02wx5ok0q43a0r58asu5l.html

- (LVAd) Red-yellow Latosols⁷³ are commonly used for cattle farming, given that they often have limitations regarding their chemistry and their ability to allow development of root systems.
- (PVAe) Red-Yellow Argisol⁷⁴ are predominantly used for sugar cane, various types of fruit growing, planted pasturelands, manioc and certain passion fruit and yam crops.

The predominant soil types within the Project Area and the Leakage Belt are the red-yellow argisols (74.2% and 52.8%, respectively), along with yellow latosols (25.8% and 47%, respectively).

To this extent, the predominant types of soil in both the PA and Leakage Belt are noted by Embrapa sources to be favorable to the implementation of pasturelands. Therefore, it is concluded that, with respect to the variable soil types, both the PA and Leakage Belt are equally conducive to the primary baseline land-use of cattle farming, and therefore fulfil similarity in that respect.

Road Density

The Project Area has a road density of 63.4 m/km², and the Leakage Belt of 50.9 m/km², resulting in a difference of 19.7%, which is inside the maximum difference of $\pm 20\%$ permitted by the VM0007 BL-UP.

Table 28. Road density in the Project Area and Leakage Belt

Roads	km2	Total Length (m)	Density (m/km2)
PA	1,306	82,734.3	63.4
LB	1,201	61,746.2	51.4

General Conclusion on Similarity between PA and LB

The Project Area and the LB have been argued to be quantitatively $\pm 20\%$ similar, or otherwise qualitatively similar in important respects, regarding the factors determined by the VM0007 BL-UP methodology, specifically: forest types; elevation classes; slope classes; soil types; and road density.

⁷³Source Embrapa (accessed 17/08/21):

https://www.agencia.cnptia.embrapa.br/gestor/solos_tropicais/arvore/CONT000g05ip3qr02wx5ok0q43a0r3t5vjo4.html

⁷⁴Source Embrapa (accessed 17/08/21):

https://www.agencia.cnptia.embrapa.br/gestor/territorio_mata_sul_pernambucana/arvore/CONT000gt7eon7k02wx7ha087a_pz2axe8nfr.html

3.4 Baseline Scenario

Forest land is expected to be converted to non-forest land in the baseline scenario, under two mechanisms, or components, of the baseline: Avoided Unplanned Deforestation (AUD) and Avoided Planned Deforestation (APD). The landowners cannot afford efforts and costs to keep long-term vigilance of the project boundaries to avoid unplanned land-use change from uncontrolled trespassing and deforestation, without carbon credit income.

The AUD baseline component involves a predicted 17,618 hectares of deforestation over the first 10 years of project lifetime, as further described below.

The APD component is regarding a 26,471 ha subsection (20%) of the Alvorada property, which has documented forest clearing plans. Under the latter, 20% of the property would be clear-cut in the baseline scenario, with wood to be sold on the timber and fuelwood markets, followed by transformation of deforested areas into pasturelands.

Given the context above, the project falls within the AFOLU REDD categories of both Avoided Unplanned Deforestation (AUD) and Avoided Planned Deforestation (APD).

AUD: Selection of the most probable baseline scenario for the project

Regarding the AUD component of the baseline, studies report that Apuí municipality has the second largest cattle herd size in Amazonas State, second only to Boca do Acre, and cattle ranching represented 51% of the municipal GDP at the time of the most recent government agricultural census (IBGE 2017⁷⁵; Carrero et al. 2015⁷⁶). The majority of Apuí's cattle producers are small to medium size, operating on areas from 100 – 200 ha, and apply extensive rearing techniques, with the main product being beef (950 beef out of 1,280 total producers = 74%).

This cattle production is strongly linked with illegal deforestation levels and deforestation. Idesam (2011⁷⁷) note, in connection with the local cattle farmer syndicate representing ~80% of Apuí's cattle farmers, that if their Legal Reserves had just 40% of their required areas, it would be sufficient to render cattle farming inviable. Further studies show the correlation between growth of cattle farming and the curve of deforestation in the municipality is significant over the present project's reference period (Carrero et al. 2015; and Figure 44). The Idesam study also notes that Apuí was, at the time, third ranked for the largest area net area deforested, at 190,000 hectares according to INPE (2014) sources, while today the trend continues, as it displays the tenth highest rate of deforestation, at 1.69% annual average.

In accordance with this correlation between cattle farming and deforestation, conclusive evidence emerges from analysis of the RRD Reference Region over the historical reference

⁷⁵ Source IBGE Censo Agropecuário [IBGE | Cidades@ | Brasil | Pesquisa | Censo Agropecuário | Características dos estabelecimentos](#)

⁷⁶ Carrero et al (2015): A Cadeia Produtiva de Carne Bovina no Amazonas

⁷⁷ Idesam (2011) REDD+ Estudo de Oportunidades para a Região Sul do Amazonas (accessed 13/08/21): https://idesam.org/publicacao/REDD_Estudo_de_Oportunidades_Sul_Amazonas.pdf

period, that pasturelands account for the vast majority of non-forest areas in 2012 (94.4%) as well in 2020 (98.9%), as presented in the figure and table below.

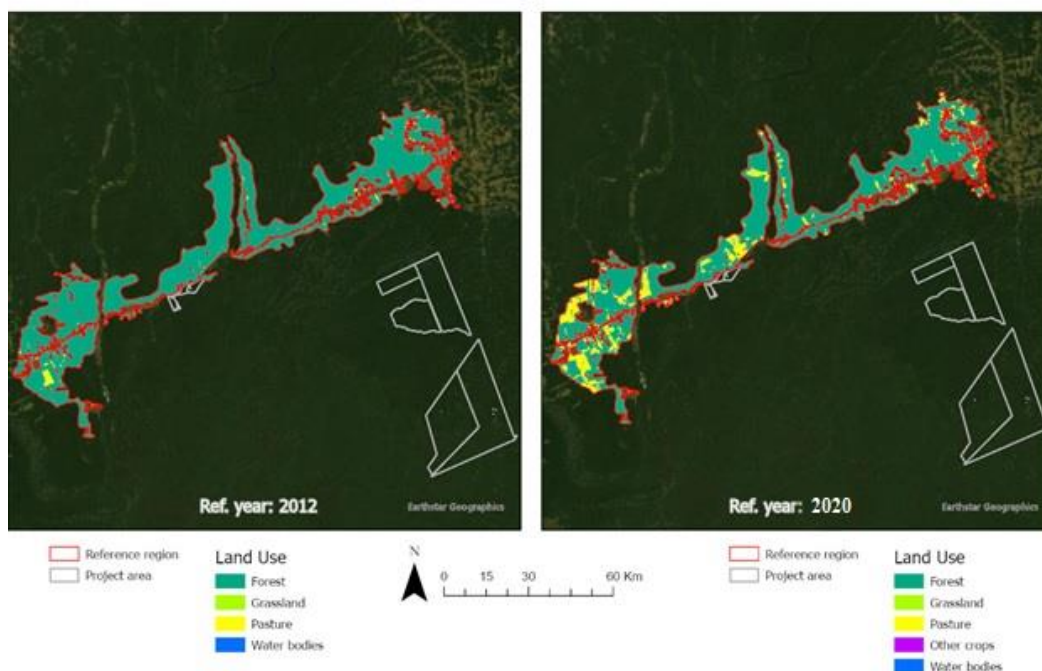


Figure 40: The predominance of pasturelands within non-forest areas in the RRD

Table 29. The predominance of pasturelands within non-forest areas in the RRD

2012				2020			
Land use		Area (ha)	Area (%)	Land use		Area (ha)	Area (%)
Forest		255,136.1		Forest		215,422.4	
Non forest	Grassland	414.6	5.6	Non forest	Grassland	319.9	0.7
	Pasture	7,042.8	94.4		Pasture	46,689.3	98.9
Water bodies		55.1		Other crops		214.8	0.5
				Water bodies		2.1	
Total		262,648.6		Total		262,648.6	

As the main deforestation agent in the region, cattle ranching (pasture) is expected to increase in the project region. This increase is inferred from official IBGE⁷⁸ data on cattle livestock in the municipality of Apuí: from 2010 to 2015, the herd size increased 16,4%, while from 2016 to 2019, the herd increased 19% (Figure 41). The municipality of Novo Aripuanã has a less

⁷⁸ Source IBGE: <https://sidra.ibge.gov.br/tabela/3939>

significant cattle herd size compared to Apuí, but it had a strong growth between 2010 and 2019, increasing the size of the cattle by 193%⁷⁸.

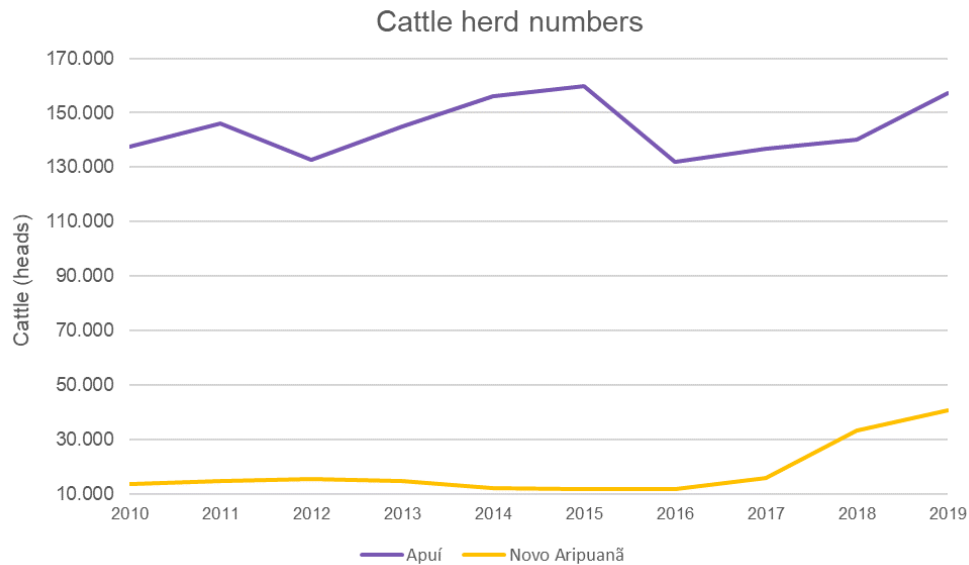


Figure 41. Historical growth of livestock numbers in the municipalities of Apuí and Novo Aripuanã, State of Amazonas (IBGE, 2021)

Given these dynamics, the herd size is expected to increase by up to 19% (187,369 heads) during the project lifetime (up to 2050) in Apuí (Figure 42) and up to 287% in Novo Aripuanã (Figure 43), according to statistical projections conducted with official IBGE data from the 10 years prior to the project start date. This significant pace of growth in cattle-related land uses will certainly impose considerable deforestation pressures in the future.

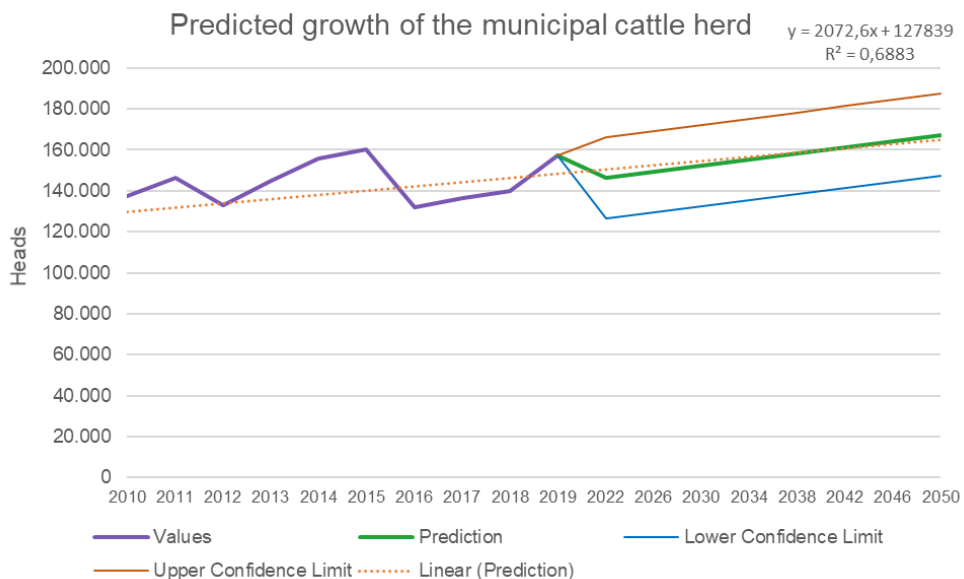


Figure 42 Projected growth of livestock numbers in the municipality of Apuí, State of Amazonas within project lifetime (adapted from IBGE, 2019)

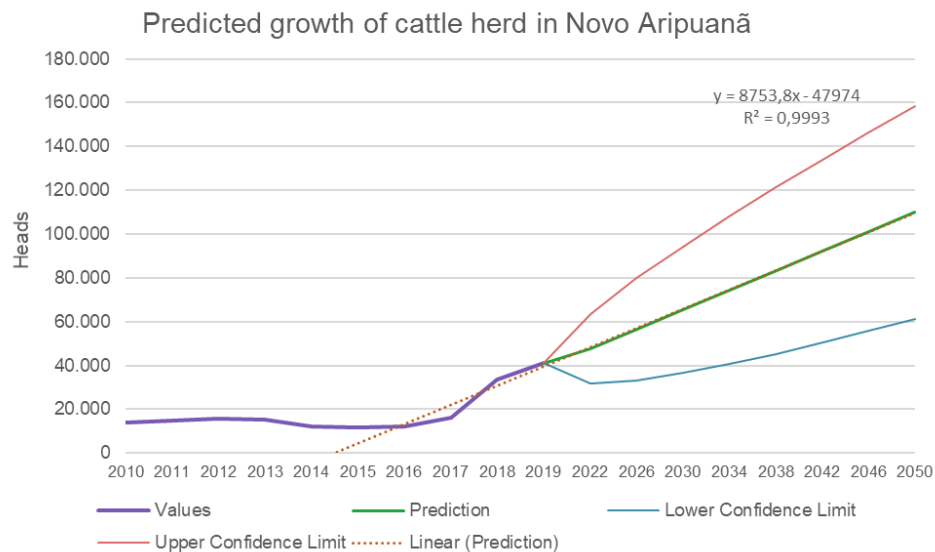


Figure 43. Projected growth of livestock numbers in the municipality of Novo Aripuanã, State of Amazonas within project lifetime (adapted from IBGE, 2019)

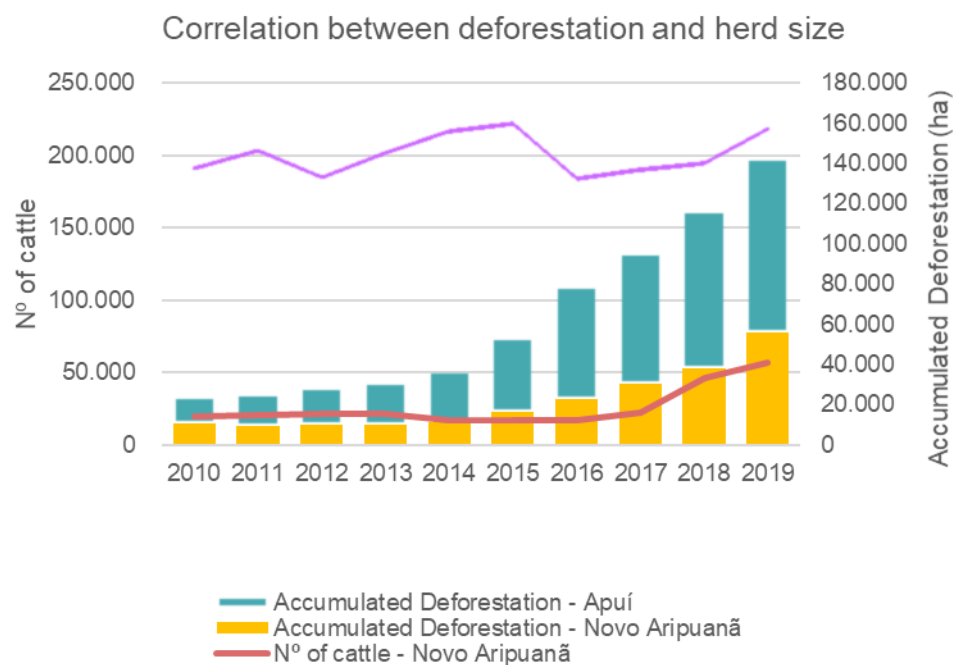


Figure 44. Correlation between the increase in the cattle herd and deforestation in the municipalities of Apuí and Novo Aripuanã. Sources: IBGE, 2019 and Mapbiomas Collection 5, 2020

Finally, Carrero et al. (2015) note that 71% of slaughterhouses in Apuí are illegal, arguing in favor of the illegality of the beef chain of production being generally.

Therefore low-technology beef cattle ranching is identified as the most probable baseline scenario, being the agent of deforestation and the post-deforestation land-use. The alternative, often overlapping, possible baseline land-uses are presented in Section 3.5., below.

Regarding the sustainable forest management component of the project activity, such activities are under considerable pressure from other economic activities conducted in areas surrounding the properties, related to land grabbing, illegal deforestation, and extensive cattle-raising, in addition to the difficulties inherent to the development of forestry stewardship, which is currently undergoing a crisis in Brazil.

As the landowners have received offers for land purchase over the historical reference period, and given the difficulties faced with sustainable forest management and land tenure at present, sale of land would be an alternative means to alleviate expenses relating to surveillance and legal assistance. In the latter case, it is highly probable that new landowners would subsequently prioritize activities involving deforestation and installation of the most common land uses in the region (i.e., pasture for cattle ranching).

Relatedly, there have been multiple events of trespassing over the historical reference period who constitute agents of deforestation.

These baseline land uses are further analyzed and justified in section 3.5 (Additionality) below.

Furthermore, there are several socio-political factors which strongly suggest deforestation rates in the Amazon can be expected to increase even more compared to the current ones. Among the main factors for increased deforestation after 2020, the following can be cited:

Trends in Brazilian legislation: several measures have contributed to slackening of environmental legislation in recent years, mainly under the Bolsonaro administration, with an emphasis on the following aspects:

Greater ease of obtaining “forest clearing authorizations”: An example can be observed in the state of Goiás, which reported a 1,100% increase in the number of permits for deforestation in 2020⁷⁹. The new environmental licensing in Goiás, plus technologies that facilitate the inspection work of the Secretariat of Environment and Sustainable Development (Semad), in addition to efforts in the analysis of applications, are responsible for increasing the numbers of deforestation permits in the State. According to data from Semad's Environmental Licensing Superintendency, there was a 673% increase of area deforested: 6.5 km² in 2019, to 43.8 km² in 2020. Thus, as occurred in the State of Goiás, the facilitation of the issuance of authorization for the removal of

⁷⁹ <https://www.meioambiente.go.gov.br/noticias/2089-emiss%C3%A3o-de-licen%C3%A7as-para-supress%C3%A3o-de-vegeta%C3%A7%C3%A3o-tem-aumento-de-1-100-in-a-year-in-goi%C3%A1s.html>

native vegetation can occur at any time in the Amazon Biome. Indeed, attempts at further facilitation have been sought recently (in 2020), as indicated under the next topic.

Granting of tacit (or automatic) environmental licensing, in case of delay of the environmental agency: The controversial automatic release of environmental permits and permits by completion of term, that is, after a period stipulated for the government agency to respond (120 days), was voted for on 29/04/2020, by a virtual plenary. Provisional Measure 915 originally referred to the so-called "Economic Freedom Law" edited by the government, but ended up bringing, within the texts, changes that directly affect the rite of environmental licensing throughout the country. The change could lead to the automatic authorization of forest suppression in the Amazon and Atlantic Forest enforced by delay, and without analysis of the environmental agency. This means that, once the 120-day period is expired, the request would be automatically granted with a "tacit license"⁸⁰. Fortunately, environmentalists have revised the Provisional Measure 915, to prevent deforestation licensing from being subject to expiration of term⁸¹.

Loosening legislation for timber exports: As reported by Reuters, over 2019 Brazil exported "thousands of cargoes of wood from an Amazonian port without authorization from the federal environmental agency, increasing the risk that they have been extracted from illegally deforested land". The rule change, which scraps IBAMA's authorization for most timber exports, came after five cargoes of wood arrived in US and European ports without these mandatory documents. Foreign authorities contacted Brazil to ask about the missing authorizations, with the head of Ibama in Pará then retroactively granting the authorizations. The problem, however, is much more widespread than just these five shipments. In Pará state, more than half of the roughly 3,000 officially registered shipments in the past year, containing an estimated 54,000 m³ of wood that left one port, was not officially authorized. Companies had requested authorizations from IBAMA for those shipments but exported them before the agency had time to respond. Furthermore, many shipments were exported without seeking IBAMA's approval. Shipments went to the US, the Netherlands, France, Germany, Belgium, and possibly other countries. Before the rules changed, IBAMA was required to authorize all wood exports before they leave port. Even so, most shipments continued to require the proper paperwork to be given the green light, however only a few would be randomly selected for physical inspection⁸². Arbitrarily, the president of IBAMA ensured that all future unauthorized exports of wood, previously classified as illegal, became legal: he took advantage of the lack of attention of the press to the topic during Carnival, at the end of February 2020, to quietly revoke a 2011 IBAMA policy that required an authorization from the agency before forest products could receive export licenses. From that date on, such permits would be required only for endangered tree species or in other special circumstances. Given the repeal, the floodgates were opened for large shipments of illegal timber from the Brazilian Amazon to go abroad⁸³. It was also revealed that in February 2020, loggers from Pará asked IBAMA to effect

⁸⁰ <https://www.correiobraziliense.com.br/app/noticia/brasil/2020/04/29/interna-brasil,849652/camara-pode-aprovar-hoje-licenciamento-ambiental-automatico.shtml>

⁸¹ <https://epbr.com.br/ambientalistas-alteram-mp-915-para-prevent-licensing-environmental-by-course-of-time/>

⁸² <https://www.businesslive.co.za/bd/world/americas/2020-03-04-brazil-may-be-exporting-illegally-deforested-wood/>

⁸³ <https://brasil.mongabay.com/2020/04/ao-afrouxar-leis-de-exportacao-brasil-permite-saida-de-madeira-illegal-da-amazonia/>

that rule change: the companies wanted to sell wood abroad presenting only the Document of Forest Origin (DFO, “DOF – Documento de Origem Florestal” in Portuguese), made by the companies themselves and that originally only served to allow the transport of the goods to the port. This change was immediately accepted by the president of Ibama⁸⁴.

Legislation favoring landgrabbers: An analysis conducted by IPAM (Environmental Research Institute of the Amazon) showed that 35% of deforestation in the Amazon between August 2018 and July 2019 was recorded in non-designated areas without information. Regarding land regularization, environmental NGOs warn about two ongoing projects. While, Bill 510/21 was being presented in the Senate, the vote on Bill 2633/20⁸⁵ was being considered in the House of Representatives. Both derive from the original text of Provisional Measure 910, known as “MP da Grilagem” (Landgrabbers’ Provisional Measure), which proposes to change the law to favor large occupants of recently invaded public lands. Bill 510/21 once again changes the deadline for public land invasions to be legalized (from 2011 to 2014) and allows large areas (up to 2500 hectares) to be processed without the need for inspection. Indeed, given that land-grabs of undesignated public lands is responsible for more than 1/3 of the deforestation in the country, it is to be expected that amnesty for landgrabbers and illegal deforesters would be an incentive to intensify this practice in the coming years. Bill 2633/20 has a loophole that would allow legalization, via bidding, of public areas invaded after the deadline for occupation provided for by law (i.e., 2014). Of the 49.8 million hectares of forests under state and federal responsibility, but not yet allocated to any category of use, 11.6 million hectares, or 23%, were irregularly declared as rural properties for private use, under the National System of Rural Environmental Registration (CAR). If the entire area registered to date as private property were legalized, 2.2 to 5.5 million hectares could be deforested in the coming years, according to the deforestation limits defined by the Forest Code and taking into account that deforestation is often beyond permitted limits. In recent years, grabbing of uncategorized public forests has increased: in 2019, this was the land category displaying the most forest felled in the Amazon, according to data from the deforestation alert system of INPE (National Institute of Space Research), Deter. The trend continued in 2020. The following are some of the conditions defined by Provisional Measure 910, for appropriation of public lands by individuals: i) the area must be registered in the Rural Environmental Registry (CAR, “Cadastro Ambiental Rural”): as it is known, any information can be inputted into the “CAR” system up until the present moment without any veracity checking, and ii) the claimant must be carrying out agricultural activities in the area (i.e., should preferably have deforested the area)⁸⁶. The Provisional Measure defines that, for areas meeting the requirements above and having up to 15 fiscal modules (i.e. up to 1,650 hectares), the title is to be granted without the need for inspection. Before the Provisional Measure, the exemption from inspection was granted to areas with up to four fiscal modules (i.e. with a maximum of 440 hectares). The exemption from inspection may allow large illegally deforested areas to be taken over by individuals. This is

⁸⁴ <https://g1.globo.com/natureza/noticia/2020/11/17/documentos-mostram-que-ibama-facilitou-exportacao-de-madeira-extraida-ilegalmente.shtml>

⁸⁵ <https://ipam.org.br/35-do-desmatamento-na-amazonia-e-grilagem-indica-analise-do-ipam/>

⁸⁶ <https://ipam.org.br/cientistas-mapeiam-grilagem-em-florestas-publicas-na-amazonia/#:~:text=O%20impacto%20da%20grilagem%20se,main%20g%C3%A1s%20effect%20estufa>

because the Provisional Measure prohibits the regularization only of areas that have been subject to fines or environmental embargoes, and not all environmental violations are known and fined by the government⁸⁷. Given that Boa Fe farm is surrounded by public lands and that cases of land-grabbing have been proven in the Reference Region, an abnormal increase in deforestation in that region is expected in the coming years. This is primarily because Brazilian legislation increasingly gives every indication that it is highly welcoming to acts of land-grabbing, by granting amnesty to landgrabbers and agents of illegal deforestation.

Increased demand for beef in the international market: China's demand for beef is still a reflection of swine flu, which has decimated between 40% and 60% of the country's pig stock (about one third of the world's pork production). In addition to this conjuncture, China also contributed to the growth of imports, since it was the only major world economy to record economic growth in 2020, even amid the coronavirus pandemic, and a more long-term factor, which is the gradual increase in income of the Chinese population, which results in progressively higher consumption of more expensive protein sources, such as beef. Analysts estimate that the price of beef should remain under pressure for the next few years, due to the livestock cycle: the low supply of oxen is not something that can quickly be solved, because cattle production is a multi-year cycle, given that production beginning today will deliver animals in two, three, or four years⁸⁸. In 2020, Brazil broke its beef export record, with more than 2 million tons sold (8% more than in 2019). For 2021, the projection indicates an increase of 5% on the 2020 values⁸⁹, indicating a strong increasing export trend for the coming years. Beef exports have continued to increase, growing by almost 7% in 2020 and close to 8% in 2021, increasing by more than 15% in the 2020/2021⁹⁰ period. Chinese importers increased their purchases of Brazilian beef by more than 150% in 2020⁹¹.

AUD: Description of baseline scenario adopted

It is expected that unplanned deforestation is likely to occur in the Project Area in the absence of the REDD Project. In accordance with the predominant characteristics of the region, the baseline scenario is of cattle farming conducting illegal levels of deforestation, characteristics as follows:

- Small to medium producers: 100 – 200 hectares per property (Carrero et al.2015)
- Extensive production: average of 1.1 heads/hectare of cattle (Carrero et al.2015);
- Producing beef as the primary product (74%) (Carrero et al.2015);

⁸⁷ <https://amazonia.org.br/como-a-mp-da-grilagem-pode-mudar-o-mapa-de-regioes-da-amazonia/>

⁸⁸ <https://www.bbc.com/portuguese/brasil-55664305>

⁸⁹ [https://revistagloborural.globo.com/Noticias/Criacao/Boi/noticia/2021/01/apos-recorde-brasil-projeta-alta-de-5-nas-exportacoes-de-carne-bovina-em-](https://revistagloborural.globo.com/Noticias/Criacao/Boi/noticia/2021/01/apos-recorde-brasil-projeta-alta-de-5-nas-exportacoes-de-carne-bovina-em-2021.html#:~:text=Segundo%20Abrafrigo%2C%20pa%C3%ADs%20alcan%C3%A7ou%20marca,em%20rela%C3%A7%C3%A3o%20ao%20ano%20anterior&text=As%20exports%C3%A7%C3%B5es%20de%20carne%20bovine,by%20fortes%20shipments%20%C3%A0%20China)

[2021.html#:~:text=Segundo%20Abrafrigo%2C%20pa%C3%ADs%20alcan%C3%A7ou%20marca,em%20rela%C3%A7%C3%A3o%20ao%20ano%20anterior&text=As%20exports%C3%A7%C3%B5es%20de%20carne%20bovine,by%20fortes%20shipments%20%C3%A0%20China](https://revistagloborural.globo.com/Noticias/Criacao/Boi/noticia/2021/01/apos-recorde-brasil-projeta-alta-de-5-nas-exportacoes-de-carne-bovina-em-2021.html#:~:text=Segundo%20Abrafrigo%2C%20pa%C3%ADs%20alcan%C3%A7ou%20marca,em%20rela%C3%A7%C3%A3o%20ao%20ano%20anterior&text=As%20exports%C3%A7%C3%B5es%20de%20carne%20bovine,by%20fortes%20shipments%20%C3%A0%20China)

⁹⁰ <https://www.avisite.com.br/index.php?page=noticias&id=21284>

⁹¹ <https://www2.safras.com.br/eng/2020/09/23/meat-exports-in-brazil-will-be-an-important-differential-in-2021/>

- Carrying out deforestation in excess of legal levels and not complying with Legal Reserve requirements (Idesam 2011⁹²).

As noted in section 4.1 deforestation is closely correlated to the increase in cattle heads in the region, among other indicators linked to cattle farming, as confirmed also by the Carrero et al. (2015) study⁹³.

In the absence of the REDD project, it is assumed that the PA would undergo deforestation – to be supplanted by cattle farms – at an average annual rate of 1.86% per year, resulting in a total of 44,818.5 hectares deforested by November 2050.

The rate of deforestation adopted for calculation of the REDD Project benefits was obtained from historical measurements of deforestation utilizing Mapbiomas sources, in accordance with the VM0007 methodology requirements.

Above- and belowground carbon pools were determined by means of a literature survey regarding the Project region. Considering that the baseline process of deforestation involves timber harvesting for commercial markets, the content of carbon fixed into long-term wood products was also considered in calculation of net deforestation emissions. It is assumed that the Project Activity preserves soil organic carbon and litter pools to a greater extent than BAU activities. However, for conservativeness purposes, the project proponents decided not to include the soil and litter carbon pools in the REDD Project benefits.

Fossil fuel emissions were not accounted for in the Reference Area (baseline case) or for the Project Activity. It is assumed that the Project Activity also reduces emissions from fossil fuel burning, in comparison with BAU activities. However, this factor was also not accounted for conservativeness purposes and difficulties in monitoring during the project period.

In summary, regarding Evergreen's AUD component, SCENARIO 3: Small-scale beef cattle farming is the baseline scenario of the present REDD project, as further justified by the stepwise application of the VCS VT0001 v3.0 Tool for Additionality, which is fully presented in section 3.5, below.

Regarding the APD component of the baseline

Evergreen's APD component avoids deforestation of 26,470.88 ha of planned deforestation from 2022 to 2027.

This component concerns forest lands which have been legally authorized and documented to be converted to non-forest land by the project proponents, plans which and will be abandoned thanks to the present REDD Project. The proponents have requested to IPAAM permission to clear up to 20% of the Alvorada propriety, according to the legal limit prescribed in the Brazilian Forest

⁹²Idesam (2011) REDD+ Estudo de Oportunidades para a Região Sul do Amazonas (accessed 13/08/21): https://idesam.org/publicacao/REDD_Estudo_de_Oportunidades_Sul_Amazonas.pdf

⁹³ Carrero et al (2015): A Cadeia Produtiva de Carne Bovina no Amazonas, Figura 12.Área desmatada acumulada (em hectares) em Apuí (PRODES, 2014) e número do rebanho bovino

Code. In addition, the landowner has a plan to deforest in the next few years, which will not be executed in case of success in obtaining VCUs.

The following annual activities were planned within the deforestation schedule:

May to October – clear-cut area and harvest timber wood

November to December – remove any remaining vegetation by burning

December to January – aerial grass seeding

July – purchase livestock and begin grazing activities

And regarding the APD Deforestation Agent: The agent of deforestation regarding the Avoided Planned Deforestation component of the project is the proponent, Ituxi Administração e Participação Ltda.

The stepwise approach of the T-ADD Combined tool to identify the baseline scenario and demonstrate additionality in A/R CDM project activities is fully presented in section 3.5, below for AUD and APD.

The baseline will be revised every 10 years in accordance with the latest VCS rules.

3.5 Additionality

According to the procedure defined in the VM0007 methodology, the latest version of the tool referenced in T-ADD was used to identify credible alternative land use scenarios and evaluate both the alternatives and the proposed project scenarios, and to demonstrate the additionality of the project:

“Combined tool to identify the baseline scenario and demonstrate additionality in A/R CDM project activities (T-ADD)” (Version 01)”⁹⁴

The tool is applicable to this project, given the following applicability conditions of the tool:

- Conservation of forests within the proposed project boundary performed with or without being registered as the VCS REDD project activity⁹⁵ shall not lead to violation of any applicable law even if the law is not enforced.
- This tool is not applicable to small - scale afforestation and reforestation project activities.

⁹⁴ Source, CDM (accessed 15/07/21): <https://cdm.unfccc.int/methodologies/ARmethodologies/tools/ar-am-tool-02-v1.pdf>

⁹⁵ This sentence was adapted from the original version in the AR-AM Tool-02-v1, to fit the context of the present VCS REDD project. The original is: “Forestation of the land within the proposed project boundary performed with or without being registered as the A/R CDM project...”

Regarding the former point, as described in section 1.14 (Compliance with Laws, Statutes, and other Regulatory frameworks) the project is in compliance with all relevant local, regional, and national laws, statutes, and regulatory frameworks, therefore satisfying this applicability condition.

And regarding the second applicability condition, the project is large-scale and does not involve afforestation and reforestation, as pointed out in section 1.10, therefore fulfilling this applicability condition.

The additionality analysis, applying the T-ADD tool (Version 1), is presented below for AUD and APD activities.

AUD ACTIVITIES ANALYSIS

STEP 0. Preliminary screening based on the starting date of the VCS AFOLU project⁹⁶ activity

According to the step, “If project participants claim that the afforestation or reforestation VCS AFOLU project activity has a starting date after 31 December 1999 but before the date of its registration, then the project participants shall:

- I. Provide evidence that the starting date of the VCS AFOLU project activity was after 31 December 1999, and
- II. Provide evidence that the incentive from the planned sale of CERs was seriously considered in the decision to proceed with the project activity. This evidence shall be based on (preferably official, legal and/or other corporate) documentation that was available to third parties at, or prior to, the start of the project activity.”

Regarding point I. above, the project start date is defined as 25th November 2020. All of the project properties already had the explicit contractual intentions of conserving forests and REDD+ projects prior to 25/11/20, however, after 31 December 1999, as evidenced by:

- The contract between Carbonext and the project proponent (regarding the Alvorada, Buiucu and Aroeira properties)
- And the partnership contract between the project proponents Milênio and Ituxi Administração companies (regarding the São Damião and Boa Ventura II properties)

To substantiate the AUD intentions, an amendment was made with effect as of 25/11/20, date effectively considered as the start of the project, to the contract with a private security company, to monitor all the REDD+ projects led by Ituxi Administração (being the Unitor and Ituxi REDD+ projects), to provide security and vigilance services in the field to the Evergreen REDD+ projects. In this sense, the amendment serves to make explicit that the private security services were

⁹⁶ The AR-AM Tool-02-v1.PDF is the updated additionality tool recommended by VM0007, however it is intended for use on A/R CDM project activities. Therefore the term “A/R CDM project”, or similar, was altered to “VCS AFOLU project” in all instances (accessed 13/08/21) <https://cdm.unfccc.int/methodologies/ARmethodologies/tools/ar-am-tool-03-v2.1.0.pdf>

effective in the Evergreen REDD+ area as of 25/11/20. Both the purchase and private security contracts were evidenced at audit.

Regarding point II, the sale of carbon credits, in this case VERs, was seriously considered in the decision to proceed with the project activity. This is proven by the contract between the project proponents and Carbonext being signed (on 7th November 2020) prior to the project start date (25th November 2020). Evidence to this effect was duly provided at audit.

STEP 1. Identification of alternative land use scenarios to the proposed AFOLU project activity

Sub-step 1a. Identify credible alternative land use scenarios to the proposed VCS AFOLU project activity

a) The identified credible non-excluding alternative land use scenarios to the proposed VCS AFOLU project activity include:

SCENARIO 1: Continuation of the pre-project land use:

Under the pre-project scenario, one guard per each of the five properties was required for surveillance and upkeep of the properties, all of which have no economic activity. Each guard has a monthly salary of R\$2,000 per month⁹⁷. Therefore, there are only maintenance costs and therefore no IRR value was available, the NPV over the 30-year project lifetime is of -R\$1,037,482.

Scenario 1 was included in accordance with A/R CDM project activities (T-ADD) requirements.

SCENARIO 2: Project activity on the land within the project boundary performed without being registered as the VCS AFOLU project:

Project activities performed without being registered as the VCS AFOLU project. As there are no economic activities besides REDD being implemented, the scenario involves costs but no income. These costs are determined as being R\$2,140,138.23 as the initial investments, followed by average continued annual costs of R\$901,971.63, as described in the table below. This results in average continued per-month spending of R\$75,164.30 for the entire project area.

Table 30. Implementation costs associated with Scenario 2

	Initial Investments	Continued Annual Costs
Employee	R\$ 276,848.76	R\$ 636,848.76
Security team	R\$ 125,384.55	R\$ 125,384.55

⁹⁷ Source: Dissidio.com.br (accessed 13/08/2021) shows salary of a Forest Area Employee (“Encarregado da Área Florestal”) to be R\$1.994,75 per month in Amazonas State: <https://dissidio.com.br/salario/encarregado-da-area-florestal/>

Vehicles	R\$ 1,231,666.49	R\$ 98,696.49
Other	R\$ 2,738.00	R\$ 4,755.02
Infrastructure	R\$ 262,273.26	R\$ 1,440.00
Equipments	R\$ 209,350.90	R\$ 9,350.90
Trainings	R\$ 0.00	R\$ 20,000.00
Base	R\$ 31,876.27	R\$ 5,495.91
Total	R\$ 2,140,138.23	R\$ 901,971.63

The forest conservation and maintenance activities of Scenario 2 are therefore not financially attractive without carbon credit income. Notwithstanding this fact, Scenario 2 was included in accordance with A/R CDM project activities (T-ADD) requirements.

SCENARIO 3: Small-scale beef cattle farming:

As argued in the previous PD section (3.4) small to medium scale extensive beef cattle farming is the prevalent component of the regional economy, representing the majority (51%) of the municipal GDP, as well as the post-deforestation land-use in the RRD Reference Region, in which pasturelands represent over 98%.

Therefore, this is a credible scenario.

b) All identified land use scenarios above may be deemed realistic and credible, as they currently exist and are technically feasible in the project region. For all land use scenarios, credibility is justified by current BAU practices attested by the literature and local observations.

c) Outcome of Sub-step 1a: The credible alternative land-use scenarios that could have occurred on the land within the project boundary are SCENARIOS 1, 2 and 3, above.

Sub-step 1b. Consistency of credible land use scenarios with enforced mandatory applicable laws and regulations

a) The following procedure was applied:

i) Demonstration that all land use scenarios identified in the sub-step 1a are in compliance with all mandatory applicable legal and regulatory requirements:

SCENARIOS 1 and 2: Maintenance of forest on the area is what is specified as legal within the Law: Documentation of legal possession of the property is the only relevant aspect of law regarding No Economic Activity components of the scenario. Thus, this scenario is in compliance with legal and regulatory requirements.

ii) Demonstration that applicable mandatory legal requirements are systematically not enforced and that non-compliance with requirements is widespread:

SCENARIO 3: Small-scale beef cattle farming:

In the AUD case the activity does not meet the mandatory legal requirements. We can note that this scenario is widespread through its connection with cattle farming: given that cattle farming represents 51% of GDP in the municipality (Carrero et al. 2015), and in the project reference region it represents the vast majority of post-deforestation land-use (>98%) in the RRD, as argued in section 3.4. And studies note that illegal levels of deforestation are necessary preconditions to make cattle ranching financially viable Idesam (2011⁹⁸). It can therefore be concluded that the majority of rural properties in the municipality and the reference region fall within this scenario.

Furthermore, studies argue that cattle farmers in the region depend on the illegality of their business, and non-compliance with Legal Reserves in order to be financially viable, as detailed in section 3.4 above (Idesam 2011⁹⁸). Further evidence shows the significant correlation between growth of cattle farming and the curve of deforestation in the municipality (Carrero et al. 2015; Figure 44 in Section 3.4).

Following illegal deforestation in the region, cattle farming is commonly installed on deforested areas (Vitel, 2009). As noted previously, in the project Reference Region (RRD), cattle represents the vast majority of post-deforestation land-use (>98%), therefore it is widespread.

Finally, Carrero et al. (2015) note that 71% of slaughterhouses in Apuí are illegal, arguing in favor of the illegality of the beef chain of production being generally.

Therefore this scenario is not in compliance applicable mandatory legal requirements are systematically not enforced and that this scenario is widespread.

b) Outcome of Sub-step 1b: It has been demonstrated that SCENARIOS 1, 2 and 3 are plausible alternative land use scenarios to this VCS AFOLU project activity.

Sub-step 1c. Selection of the baseline scenario:

SCENARIO 3: Small-scale beef cattle farming is selected as the baseline scenario for the Evergreen REDD+ project, as it is the predominant land-use in the project region (see sub-step 1a) and although the majority of cattle farming is likely to be illegal (see sub-step 1b), this is not enforced and their illegality is ultimately a factor in favour of this activity.

SCENARIO 3: Small-scale beef cattle farming is the baseline scenario of the present REDD project.

Given that the scenarios above have been identified, in accordance with the CDM AR-AM Tool, we proceed to Step 2 (Barrier analysis).

STEP 2. Barrier analysis

⁹⁸Idesam (2011) REDD+ Estudo de Oportunidades para a Região Sul do Amazonas (accessed 13/08/21): https://idesam.org/publicacao/REDD_Estudo_de_Oportunidades_Sul_Amazonas.pdf

This step serves to identify barriers and to assess which of the land use scenarios identified in the sub-step 1b are not prevented by these barriers.

Sub-step 2a. Identification of barriers that would prevent the implementation of at least one alternative land use scenarios

According to T-ADD “Combined tool to identify the baseline scenario and demonstrate additionality in A/R CDM project activities”. The barriers which the previously identified land-use scenarios may potentially face are the following:

Investment barriers:

- Debt funding is not available for the land-use scenarios;
- No access to international capital markets;
- Lack of access to credit;

Institutional barriers:

- Risk related to changes in government policies or laws;
- Lack of enforcement of forest or land-use-related legislation.

Barriers due to social conditions and land-use practices:

- Widespread illegal practices (e.g. illegal grazing, non-timber product extraction and tree felling);

Barriers relating to land tenure, ownership, inheritance, and property rights:

- Lack of suitable land tenure legislation and regulation to support the security of tenure;
- Possibilities of large price risk due to the fluctuations in the prices of products related to the project activity over the project period in the absence of efficient markets.

Sub-step 2b. Elimination of land use scenarios that are prevented by the identified barriers

This step aims to determine which land use scenarios identified in sub-step 1b are prevented by at least one of the barriers listed in sub-step 2a.

Investment barriers:

Scenarios 1 and 2: Investment barriers exist in terms of Scenarios 1 and 2, as there are very few options for conservation of forest on private properties, above and beyond legal requirements, without generating any financial returns. The notable exception to this are Private Natural Heritage Reserves (“RPPNs” in Portuguese) which in the State of Amazonas are on average much smaller than the project area (0.05%, on average, of the

Project Area as described in Step 4 below) and they generate further costs and no particular incentives or subsidies, as shown in a 2012 ICMbio manual⁹⁹.

Scenario 3: However, regarding Scenario 3 (Cattle farming), having illegal levels of deforestation generally does not prevent this land-use scenario from obtaining funding. There are numerous funding resources and credit lines for cattle raising activities in Brazil¹⁰⁰. Moreover, the implementation of cattle raising activities can be funded by initial capital obtained with timber sales after deforestation, and subsequently benefit from speculation of the value of deforested land.

Institutional barriers: This barrier hinders legally compliant alternative land use scenario (specifically, Scenario 1 - 2), as it represents unfair competition from non-compliant producers (Lack of enforcement of forest or land-use-related legislation), causing uncertainty to investors (Risk related to changes in government policies or laws).

Barriers due to social conditions and land-use practices: This barrier hinders any compliant alternative land-use scenarios (Scenarios 1 - 2), due to widespread illegal practices, which lead to unfair competition from a great portion of regional producers and insecurity related to land tenure (trespassing by squatters). On the other hand, this factor favors cattle raising and pastureland (Scenario 3) which, as previously described, often depends on illegal practices to be financially viable.

Barriers relating to land tenure, ownership, inheritance, and property rights: This barrier hinders the legally compliant land-use scenarios (Scenarios 1 - 2), and represents an incentive to squatters and land-grabbers, which are in many cases associated with cattle farming¹⁰¹ Scenario 3.

Sub-step 2c. Determination of baseline scenario (if allowed by the barrier analysis)

As put into context above, Scenario 3 (small-scale beef cattle farming) would not be hindered or prevented by any of the barriers identified in Sub-step 2a. Thus, Scenario 3 is confirmed as the most plausible alternative land-use scenario, in the absence of the project activity.

In this sense, according to the tool:

“Forestation” (or the REDD project activity, in this case) “without being registered as a VCS AFOLU project activity” is not included in the list of land use scenarios that are not prevented by any barrier”

⁹⁹ ICMbio (2012) Perguntas e Respostas sobre Reserva Particular do Patrimônio Natural:

<https://www.icmbio.gov.br/portal/images/stories/comunicacao/downloads/ perguntas e respostas rppn.pdf>

¹⁰⁰ Sources: <https://www.bcb.gov.br/estabilidadefinanceira/creditorural> ;

<https://www.bndes.gov.br/wps/portal/site/home/onde-atuamos/agropecuaria>

¹⁰¹ Sources:

https://antigo.mma.gov.br/estruturas/225/arquivos/9_a_grilagem_de_terras_publicas_na_amaznia_brasileira_225.pdf ;

And the list contains only one land use scenario, therefore it is necessary to continue with Step 4: Common practice test.

STEP 4. Common practice test

According to T-ADD “CDM Combined tool to identify the baseline scenario and demonstrate additionality in A/R CDM project activities”, the previous steps are complemented with an analysis of the extent to which similar activities have already diffused in the geographical area of the proposed VCS AFOLU project activity. This test is a credibility check to demonstrate additionality that complements the barrier analysis (Step 2). Other registered VCS AFOLU project activities shall not be included in this analysis.

This analysis took into account similar activities in the project region, being the municipalities of Apuí and Novo Aripuanã, Amazonas, and the type of land area analyzed were private natural heritage reserves, a land category known as RPPN in Brazil. This is because they are private conservation reserves, and in this sense are comparable to the Evergreen area.

It was found through the official organ ICMbio, that in the state of Amazonas there are only 14 such areas, with an average of 65.5 ha. The nearest RPPN to the Evergreen REDD Project is located 666 km from the Evergreen REDD project, and is of 27.35 ha in area.

Therefore we can cite at least two essential differences: the private conservation areas are incomparably smaller (0.05%) in size to the Evergreen REDD project, and they are very distant (666 km) from the project area, and not located in the same jurisdictional area (municipality).

In this regard, the proposed VCS REDD project activity is not the baseline scenario and, hence, it is additional.

APD ACTIVITIES ANALYSIS

STEP 0. Preliminary screening based on the starting date of the VCS AFOLU project¹⁰² activity

According to the step, “If project participants claim that the afforestation or reforestation VCS AFOLU project activity has a starting date after 31 December 1999 but before the date of its registration, then the project participants shall:

- I. Provide evidence that the starting date of the VCS AFOLU project activity was after 31 December 1999, and

¹⁰² The AR-AM Tool-02-v1.PDF is the updated additionality tool recommended by VM0007, however it is intended for use on A/R CDM project activities. Therefore the term “A/R CDM project”, or similar, was altered to “VCS AFOLU project” in all instances (accessed 13/08/21) <https://cdm.unfccc.int/methodologies/ARmethodologies/tools/ar-am-tool-03-v2.1.0.pdf>

- II. Provide evidence that the incentive from the planned sale of CERs was seriously considered in the decision to proceed with the project activity. This evidence shall be based on (preferably official, legal and/or other corporate) documentation that was available to third parties at, or prior to, the start of the project activity.”

Regarding point I. above, the project start date is defined as 25th November 2020, as it was the date that the project owner submitted a request to the official organ IPAAM, to obtain permission to deforest a legal proportion of the Aroeira property in the Project Area (PA).

The justification is that maintaining the PA forested was no longer judged to be financially viable without carbon credits by the project owner, as of that date. Evidence for this was duly provided at audit.

Regarding point II, the sale of carbon credits, in this case VERs, was seriously considered in the decision to proceed with the project activity. This is proven by the contract between the project proponents and Carbonext being signed (on 7th November 2020) prior to the project start date (25th November 2020). Evidence to this effect was duly provided at audit.

STEP 1. Identification of alternative land use scenarios to the proposed AFOLU project activity

Sub-step 1a. Identify credible alternative land use scenarios to the proposed VCS AFOLU project activity

a) The identified credible non-excluding alternative land use scenarios to the proposed VCS AFOLU project activity include:

SCENARIO 1: Continuation of the pre-project land use:

Under the pre-project scenario, one guard per each of the five properties was required for surveillance and upkeep of the properties, all of which have no economic activity. Each guard has a monthly salary of R\$2,000 per month¹⁰³. Therefore, there are only maintenance costs and therefore no IRR value was available, the NPV over the 30-year project lifetime is of -R\$1,037,482.

Scenario 1 was included in accordance with A/R CDM project activities (T-ADD) requirements.

SCENARIO 2: Project activity on the land within the project boundary performed without being registered as the VCS AFOLU project:

Project activities performed without being registered as the VCS AFOLU project. As there are no economic activities besides REDD being implemented, the scenario involves costs but no income. These costs are determined as being R\$2,140,138.23 as the initial investments, followed by average continued annual costs of R\$901,971.63, as described

¹⁰³ Source: Dissidio.com.br (accessed 13/08/2021) shows salary of a Forest Area Employee (“Encarregado da Área Florestal”) to be R\$1.994,75 per month in Amazonas State: <https://dissidio.com.br/salario/encarregado-da-area-florestal/>

in the table below. This results in average continued per-month spending of R\$75,164.30 for the entire project area.

Table 31. Implementation costs associated with Scenario 2

	Initial Investments	Continued Annual Costs
Employee	R\$ 276,848.76	R\$ 636,848.76
Security team	R\$ 125,384.55	R\$ 125,384.55
Vehicles	R\$ 1,231,666.49	R\$ 98,696.49
Other	R\$ 2,738.00	R\$ 4,755.02
Infrastructure	R\$ 262,273.26	R\$ 1,440.00
Equipments	R\$ 209,350.90	R\$ 9,350.90
Trainings	R\$ 0.00	R\$ 20,000.00
Base	R\$ 31,876.27	R\$ 5,495.91
Total	R\$ 2,140,138.23	R\$ 901,971.63

The forest conservation and maintenance activities of Scenario 2 are therefore not financially attractive without carbon credit income. Notwithstanding this fact, Scenario 2 was included in accordance with A/R CDM project activities (T-ADD) requirements.

SCENARIO 3: Small-scale beef cattle farming:

As argued in the previous PD section (3.4) small to medium scale extensive beef cattle farming is the prevalent component of the regional economy, representing the majority (51%) of the municipal GDP, as well as the post-deforestation land-use in the RRD Reference Region, in which pasturelands represent over 98%.

Therefore, this is a credible scenario.

b) All identified land use scenarios above may be deemed realistic and credible, as they currently exist and are technically feasible in the project region. For all land use scenarios, credibility is justified by current BAU practices attested by the literature and local observations.

c) Outcome of Sub-step 1a: The credible alternative land-use scenarios that could have occurred on the land within the project boundary are SCENARIOS 1, 2 and 3, above.

Sub-step 1b. Consistency of credible land use scenarios with enforced mandatory applicable laws and regulations

a) The following procedure was applied:

i) Demonstration that all land use scenarios identified in the sub-step 1a are in compliance with all mandatory applicable legal and regulatory requirements:

SCENARIOS 1 and 2: Documentation of legal possession of the property is the only relevant aspect of law regarding No Economic Activity components of the scenario. Thus, this scenario is in compliance with legal and regulatory requirements.

SCENARIO 3: Small-scale beef cattle farming: Deforestation and cattle farming on the area is specified as legal within the Law in APD case: deforestation of up to 20% of a property is permitted in accordance with the Brazilian Forest Code, which stipulates that a property should officially allocate 80% of its total area as LR (Legal Reserve) for conservation. The remaining 20% of land may be deforested by license. Thus, this scenario is in compliance with legal and regulatory requirements.

b) Outcome of Sub-step 1b: It has been demonstrated that SCENARIOS 1, 2 and 3 are plausible alternative land use scenarios to this VCS AFOLU project activity.

Sub-step 1c. Selection of the baseline scenario:

SCENARIO 3: Small-scale beef cattle farming is selected as the baseline scenario for the Evergreen REDD+ project, as it is the predominant land-use in the project region (see sub-step 1a) and deforestation of up to 20% of the property for cattle farming is a legal and planned activity (see sub-step 1b).

SCENARIO 3: Small-scale beef cattle farming is the baseline scenario of the present REDD project.

Given that the scenarios above have been identified, in accordance with the CDM AR-AM Tool, we proceed to Step 2 (Barrier analysis).

STEP 2. Barrier analysis

This step serves to identify barriers and to assess which of the land use scenarios identified in the sub-step 1b are not prevented by these barriers.

Sub-step 2a. Identification of barriers that would prevent the implementation of at least one alternative land use scenarios

According to T-ADD “Combined tool to identify the baseline scenario and demonstrate additionality in A/R CDM project activities”. The barriers which the previously identified land-use scenarios may potentially face are the following:

Investment barriers:

- Debt funding is not available for the for the land-use scenarios;
- No access to international capital markets;
- Lack of access to credit;

Institutional barriers:

- Risk related to changes in government policies or laws;
- Lack of enforcement of forest or land-use-related legislation.

Barriers due to social conditions and land-use practices:

- Widespread illegal practices (e.g. illegal grazing, non-timber product extraction and tree felling);

Barriers relating to land tenure, ownership, inheritance, and property rights:

- Lack of suitable land tenure legislation and regulation to support the security of tenure;
- Possibilities of large price risk due to the fluctuations in the prices of products related to the project activity over the project period in the absence of efficient markets.

Sub-step 2b. Elimination of land use scenarios that are prevented by the identified barriers

This step aims to determine which land use scenarios identified in sub-step 1b are prevented by at least one of the barriers listed in sub-step 2a.

Investment barriers:

Scenarios 1 (Continuation of the pre-project land use) and 2 (Project activity without being registered as the VCS AFOLU project): Investment barriers exist to Scenarios 1 and 2, as there are very few options for conservation of forest on private properties, above and beyond legal requirements, without generating any financial returns. The notable exception to this are Private Natural Heritage Reserves (“RPPNs” in Portuguese) which in the State of Amazonas are on average much smaller than the project area (0.05%, on average, of the Project Area as described in Step 4 below) and they generate further costs and no particular incentives or subsidies, as shown in a 2012 ICMbio manual¹⁰⁴.

Scenario 3: However, regarding Scenario 3 (Cattle farming), access to finance is facilitated, even more so when conducted legally. There are numerous funding resources and credit lines for cattle raising activities in Brazil¹⁰⁵. Moreover, the implementation of cattle raising activities can be funded by initial capital obtained with timber sales after deforestation, and subsequently benefit from speculation of the value of deforested land.

¹⁰⁴ ICMbio (2012) Perguntas e Respostas sobre Reserva Particular do Patrimônio Natural: <https://www.icmbio.gov.br/portal/images/stories/comunicacao/downloads/perguntaserespostasrppn.pdf>

¹⁰⁵ Sources: <https://www.bcb.gov.br/estabilidadefinanceira/creditorural> ; <https://www.bndes.gov.br/wps/portal/site/home/onde-atuamos/agropecuaria>

Institutional barriers:

Scenarios 1 and 2: This barrier disproportionately hinders legally compliant alternative land-use scenarios that do not have revenue streams, as it promotes unfair competition from non-compliant producers (Lack of enforcement of forest or land-use-related legislation), causing uncertainty to investors (Risk related to changes in government policies or laws).

Scenario 3: This barrier does not hinder scenario 3, since there is no indication that changes in legislation will negatively impact the implementation of legal cattle ranching. On the contrary, in recent years Brazilian environmental policy has become more flexible with the legalization of activities potentially impacting the environment, such as the case of Provisional Measure 1040 of March 29, 2021, which provides automatic environmental licensing for companies and Decree 10,084, of 2019, which revoked the agroecological zoning of sugarcane. The lack of enforcement benefits illegal activities, but does not prevent the execution of legal cattle farming, which are a consolidated market in Brazil.

Barriers due to social conditions and land-use practices: This barrier hinders compliant alternative land-use scenarios without revenues (Scenarios 1 – 2), due to widespread illegal practices, which lead to unfair competition from a great portion of regional producers and insecurity related to land tenure (trespassing by squatters). On the other hand, this factor does not prevent cattle raising and pastureland (Scenario 3) which, as previously described, which are a consolidated market in Brazil, increasingly supported by the country's environmental policy.

Barriers relating to land tenure, ownership, inheritance, and property rights: This barrier hinders the legally compliant land-use scenarios without revenues (Scenarios 1 – 2), and represents an incentive to squatters and land-grabbers. On the other hand, this factor does not prevent cattle raising and pastureland (Scenario 3) which, as previously described, which are a consolidated market in Brazil, increasingly supported by the country's environmental policy.

Sub-step 2c. Determination of baseline scenario (if allowed by the barrier analysis)

As put into context above, Scenario 3 (small-scale beef cattle farming) would not be hindered or prevented by any of the barriers identified in Sub-step 2a. Thus, Scenario 3 is confirmed as the most plausible alternative land-use scenario, in the absence of the project activity.

In this sense, according to the tool:

“Forestation” (or the REDD project activity, in this case) “without being registered as a VCS AFOLU project activity” is not included in the list of land-use scenarios that are not prevented by any barrier”

And the list contains only one land use scenario, therefore it is necessary to continue with Step 4: Common practice test.

STEP 4. Common practice test

According to T-ADD “CDM Combined tool to identify the baseline scenario and demonstrate additionality in A/R CDM project activities”, the previous steps are complemented with an analysis of the extent to which similar activities have already diffused in the geographical area of the proposed VCS AFOLU project activity. This test is a credibility check to demonstrate additionality that complements the barrier analysis (Step 2). Other registered VCS AFOLU project activities shall not be included in this analysis.

This analysis took into account similar activities in the project region, being the municipalities of Apuí and Novo Aripuanã, Amazonas, and the type of land area analyzed were private natural heritage reserves, a land category known as RPPN in Brazil. This is because they are private conservation reserves, and in this sense are comparable to the Evergreen area.

It was found through the official organ ICMBio, that in the state of Amazonas there are only 14 such areas, with an average of 65.5 ha. The nearest RPPN to the Evergreen REDD Project is located 666 km from the Evergreen REDD project, and is of 27.35 ha in area.

Therefore we can cite at least two essential differences: the private conservation areas are incomparably smaller (0.05%) in size to the Evergreen REDD project, and they are very distant (666 km) from the project area, and not located in the same jurisdictional area (municipality).

In this regard, the proposed VCS REDD project activity is not the baseline scenario and, hence, it is additional.

3.6 Methodology Deviations

The Evergreen REDD+ Project has no methodology deviations at the time of audit.

4. QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

4.1 Baseline Emissions

The net baseline carbon stock changes and greenhouse gas emissions of the project were calculated through two different modules of the VM0007 Methodology.

In order to estimate the baseline emissions relating to APD, being forest lands on which the proponents have applied to IPAAM for permission to clear forests (20% of the Alvorada propriety according to the legal limit prescribed in the Brazilian Forest Code), the VMD0006 module (BL-PL) “Estimation of Baseline Carbon Stock Changes and Greenhouse Gas Emissions from Planned Deforestation and Planned Degradation” was applied.

The baseline net GHG emissions for planned deforestation were determined as:

$$\Delta C_{BSL,planned} = \sum_{t=1}^{t^*} \sum_{i=1}^M (\Delta C_{BSL,i,t} + GHG_{BSL-E,i,t})$$

Where:

$\Delta C_{BSL,planned}$ Net greenhouse gas emissions in the baseline from planned deforestation up to year t^* ; t CO₂-e

$\Delta C_{BSL,i,t}$ Net carbon stock changes in all pools in the baseline stratum i in year t ; t CO₂-e

$GHG_{BSL-E,i,t}$ Greenhouse gas emissions as a result of deforestation activities within the project boundary in the baseline stratum i in year t ; t CO₂-e yr⁻¹

i 1, 2, 3, ... M strata

t 1, 2, 3, ... t^* years elapsed since the projected start of the project activity

Where:

$\Delta C_{BSL,planned}$ Net greenhouse gas emissions in the baseline from planned deforestation up to year t^* ; t CO₂-e

$\Delta C_{BSL,i,t}$ Net carbon stock changes in all pools in the baseline stratum i in year t ; t CO₂-e

$GHG_{BSL-E,i,t}$	Greenhouse gas emissions as a result of deforestation activities within the project boundary in the baseline stratum i in year t ; t CO ₂ -e yr ⁻¹
i	1, 2, 3 ... M strata
t	1, 2, 3 ... t years elapsed since the start of the REDD project activity

Regarding the estimation of baseline emissions from unplanned deforestation, where agents of deforestation clear the land for ranching as final land use, the VMD0007 module (BL-UP) was applied: “Estimation of baseline carbon stock changes and greenhouse gas emissions from unplanned deforestation and unplanned wetland degradation”.

The application of the module followed the four parts:

Part 1 DEFINITION OF BOUNDARIES

Part 2 ESTIMATION OF ANNUAL AREAS OF UNPLANNED DEFORESTATION

Part 3 LOCATION AND QUANTIFICATION OF THREAT OF UNPLANNED DEFORESTATION

Part 4 ESTIMATION OF CARBON STOCK CHANGES AND GREENHOUSE GAS EMISSIONS

As explained, the X-UNC¹⁰⁶ Estimation of Uncertainty for REDD+ Project Activities module focuses on the following sources of uncertainty applicable to this project: i) Determination of rates of deforestation and degradation; ii) Uncertainty associated with estimation of stocks in carbon pools and changes in carbon stocks.

It is assumed that there is zero uncertainty in baseline rate of deforestation (item “i” above), as numbers are equal to a long-term average (BL-UP; which is the case in this project, where deforestation rate was taken as the average of the reference period) and are based on actual deforestation plans (BL-PL; which is the case in this project, as a planned deforestation plan is available).

Regarding initial and post-deforestation carbon stocks (item “ii” above), initial forest biomass data have been derived from peer-reviewed literature in the same the geographic region, biome, and climate regime as in the project area: for Submontane Dense Tropical Rainforest (code “Ds”), scientific references (Fearnside et al. 2013; Barni et al. 2016) have sourced biomass data for the project estimations, resulting in 679.0 and 696.6 tCO₂.ha⁻¹, respectively (i.e., average 687.8 tCO₂.ha⁻¹; CV%: 1.8%), equivalent to 399 t.ha; for Submontane Open Tropical Forest (code “As”) biomass estimates are presented in Fearnside et al. (2013) and Barni et al. (2016), whose figures converted to carbon stocks result in 708.3 and 680.9 tCO₂.ha⁻¹, respectively (i.e., average of

¹⁰⁶ https://verra.org/wp-content/uploads/2020/09/VMD0017-X-UNC_v2.2.pdf (last visited in 20/09/2021)

694.6 tCO₂.ha⁻¹; CV%: 2.8%), equivalent to 403 t.ha. Considering the very low variations between literature values (see CV%), uncertainty can be considered as zero for initial carbon stocks.

For the post-deforestation carbon stock (i.e., pasture carbon stock; item “ii” above), the same value adopted by the authority responsible for the National GHG Inventory was used in calculations; thus, it can be considered that an official national value has been taken and uncertainty can be regarded as zero in this case.

The calculation of uncertainty was done at a 95% confidence level for Ds, resulting in 5.28% of uncertainty; similarly, for As, an 8.14% uncertainty was calculated. Given that initial carbon stocks are the only source of uncertainty in the estimate of the total net GHG emission reductions, and uncertainty was estimated to be under 15% for both forest types, and no deduction resulted for uncertainty, as the allowable uncertainty in this methodology REDD+ MF is +/- 15% at a 95% confidence level.

According to the “Tool for testing significance of GHG emissions in A/R CDM project activities” (T-SIG), the sum of emissions from surveillance activities (main activity responsible for CO₂ emissions) being estimated as 17.7 tCO₂e/year, which is far below the 5% threshold compared with total emission reductions, these emissions are considered as insignificant.

Location analysis

As deforestation location analysis was not required due to being a transition deforestation configuration, the following conservative approach is defined as mandatory in accordance with the methodology: “Future deforestation is assumed to happen first in the strata with the lowest carbon stocks (in all relevant carbon pools)”. Specifically, the stratum with the lower carbon stock of the two classes, where future deforestation is predicted to occur first, is the submontane dense tropical rainforest.

Table 32. Deforestation risk strata of the Evergreen REDD+ Project

Stratum	
Submontane dense tropical rainforest	Submontane open tropical rainforest
44,551.2	59,523.6
Low to high biomass →	

Estimation of the annual areas of unplanned baseline deforestation in the RRD

Table 33. Projection of annual baseline deforestation for the Project Area (Location Analysis), over the project duration, in each of the Project Area's strata

Stratum				
Submontane dense				
Gross baseline emissions from deforestation				
Year	ha/year	ha (cumulative)	tCO ₂ /year	tCO ₂
2020	196,23	196,23	134.967	134.967
2021	1.932,14	2.128,37	1.328.923	1.463.890
2022	1.896,20	4.024,57	1.304.207	2.768.097
2023	1.860,93	5.885,50	1.279.951	4.048.048
2024	1.826,32	7.711,83	1.256.146	5.304.194
2025	1.792,36	9.504,18	1.232.784	6.536.977
2026	1.759,02	11.263,21	1.209.856	7.746.833
2027	1.726,31	12.989,51	1.187.355	8.934.188
2028	1.694,20	14.683,72	1.165.272	10.099.460
2029	1.662,69	16.346,41	1.143.600	11.243.060
2030	1.631,77	17.978,18	1.122.331	12.365.391
2031	1.601,42	19.579,60	1.101.457	13.466.849
2032	1.571,64	21.151,24	1.080.972	14.547.821
2033	1.542,41	22.693,64	1.060.868	15.608.689
2034	1.513,72	24.207,37	1.041.138	16.649.826
2035	1.485,57	25.692,93	1.021.774	17.671.601
2036	1.457,94	27.150,87	1.002.771	18.674.372
2037	1.430,82	28.581,70	984.121	19.658.493
2038	1.404,21	29.985,91	965.818	20.624.311
2039	1.378,10	31.364,01	947.856	21.572.166
2040	1.352,47	32.716,48	930.227	22.502.393
2041	1.327,31	34.043,79	912.926	23.415.320
2042	1.302,63	35.346,42	895.947	24.311.267
2043	1.278,40	36.624,82	879.284	25.190.551
2044	1.254,63	37.879,45	862.931	26.053.483
2045	1.231,29	39.110,74	846.882	26.900.365
2046	1.208,39	40.319,13	831.132	27.731.496
2047	1.185,92	41.505,05	815.674	28.547.170
2048	1.163,86	42.668,91	800.504	29.347.674
2049	1.142,22	43.811,12	785.616	30.133.290
2050	1.007,34	44.818,46	692.848	30.826.138

Stratum			
Submontane open tropical rainforest			
Annual baseline deforestation for the Project Area			
Year	Conservative approach	Total yearly area (ha/year)	Total cumulative area (ha)
2020	0.0	0.0	0.0
2021	0.0	0.0	0.0
2022	0.0	0.0	0.0
2023	0.0	0.0	0.0
2024	0.0	0.0	0.0
2025	0.0	0.0	0.0
2026	0.0	0.0	0.0
2027	0.0	0.0	0.0
2028	0.0	0.0	0.0
2029	0.0	0.0	0.0
2030	0.0	0.0	0.0
2031	0.0	0.0	0.0
2032	0.0	0.0	0.0
2033	0.0	0.0	0.0
2034	0.0	0.0	0.0
2035	0.0	0.0	0.0
2036	0.0	0.0	0.0
2037	0.0	0.0	0.0
2038	0.0	0.0	0.0
2039	0.0	0.0	0.0
2040	0.0	0.0	0.0
2041	0.0	0.0	0.0
2042	0.0	0.0	0.0
2043	0.0	0.0	0.0

2044	0.0	0.0	0.0
2045	0.0	0.0	0.0
2046	0.0	0.0	0.0
2047	0.0	0.0	0.0
2048	0.0	0.0	0.0
2049	0.0	0.0	0.0
2050	0.0	0.0	0.0

The resulting average annual rate of annual deforestation rate in the submontane dense stratum is 1.86%.

Regarding baseline deforestation areas from planned deforestation, the baseline areas for planned deforestation were as follows, as evidenced during the project audit.

Table 34. Annual baseline deforestation for the Project Area from planned deforestation over the project duration, in each of the Project Area's strata

Stratum: Submontane dense tropical rainforest		
Gross baseline emissions from planned deforestation		
Year	ha/year	ha (cumulative)
2020	0	0.00
2021	0	0.00
2022	2,500	2,500.00
2023	5,000	7,500.00
2024	5,000	12,500.00
2025	5,000	17,500.00
2026	5,000	22,500.00
2027	3,971	26,470.88
2028	0	26,470.88
2029	0	26,470.88
2030	0	26,470.88

Stratum: Submontane open tropical rainforest		
Gross baseline emissions from planned deforestation		
Year	ha/year	ha (cumulative)
2020	0.00	0.00
2021	0.00	0.00
2022	0.00	0.00
2023	0.00	0.00
2024	0.00	0.00
2025	0.00	0.00
2026	0.00	0.00
2027	0.00	0.00
2028	0.00	0.00
2029	0.00	0.00
2030	0.00	0.00

Stratum: Sum of strata		
Gross baseline emissions from planned deforestation		
Year	ha/year	ha (cumulative)
2020	0.00	0.00
2021	0.00	0.00
2022	2,500.00	2,500.00
2023	5,000.00	7,500.00
2024	5,000.00	12,500.00
2025	5,000.00	17,500.00
2026	5,000.00	22,500.00
2027	3,970.88	26,470.88
2028	0.00	26,470.88
2029	0.00	26,470.88
2030	0.00	26,470.88

Biomass

As previously described in section 3.3, four forest classes with varying biomass levels are present in Project Area: Submontane dense tropical rainforest (covering 51% of the total area); Submontane open tropical forest (46%); Alluvial dense tropical rainforest (2%); and Lowland dense tropical rainforest (1%). Therefore, the Submontane dense and Submontane open categories represent 97% of the total, and it was considered conservative and efficient to exclude the two remaining classes of Alluvial dense tropical rainforest (2%); and Lowland dense tropical rainforest (1%). It is conservative to do so as their biomass values are on average 37% higher than the two forest classes taken into account, being: Alluvial dense tropical rainforest 696.2 t/ha; and Lowland dense tropical rainforest 585.7 t/ha. Both Submontane dense and Submontane open biomass values were obtained from literature (Fearnside et al. 2013¹⁰⁷; Barni et al. 2016¹⁰⁸). For Submontane Dense Tropical Rainforest (code “Ds”), scientific references (Fearnside et al. 2013; Barni et al. 2016) have sourced biomass data for the project estimations, resulting in 679.0 and 696.6 tCO₂.ha⁻¹, respectively (i.e., average 687.8 tCO₂.ha⁻¹; CV%: 1.8%), equivalent to 399 t.ha; for Submontane Open Tropical Forest (code “As”) biomass estimates are presented in Fearnside et al. (2013) and Barni et al. (2016), whose figures converted to carbon stocks result in 708.3 and 680.9 tCO₂.ha⁻¹, respectively (i.e., average of 694.6 tCO₂.ha⁻¹; CV%: 2.8%), equivalent to 403 t.ha.

¹⁰⁷ <https://revista.ufrr.br/agroambiente/article/viewFile/971/1026>; page 98 (accessed in 05/05/2021)

¹⁰⁸ http://philip.inpa.gov.br/publ_livres/mss%20and%20in%20press/Barni_et_al-biomassa_florestal_em_Roraima_PORTUGUES_2016.07.19.pdf; page 19 (Table 3) (accessed in 05/05/2021)

Table 35. Above- and below-ground carbon stocks within different strata in the Project Area

Stratum	Area (ha)	Proportion (%)	Aboveground (total) (t/ha)	Belowground (t/ha)	Total aboveground per stratum (t)	Total belowground per stratum (t)
Submontane dense	44.551	42,8%	251	148	11.201.920	6.578.905
Submontane open	59.524	57,2%	254	149	15.114.547	8.876.797
Total	104.075	100,0%			26.316.466	15.455.702
Carbon Pools						
Under Deforestation Risk Analysis	104.075		Stratum		Aboveground, per stratum (tCO₂)	Belowground, per stratum (tCO₂)
	CF		Submontane dense		19.304.642	11.337.647
	0,47		Submontane open		26.047.402	15.297.680
			Total		45.352.044	26.635.327
					C_{AB_tree}	C_{BB_tree}
			Submontane dense		433,3	254,5
			Submontane open		437,6	257,0

In order to calculate the carbon pools (above and belowground) for each stratum, the total biomass of the total area of each stratum was multiplied by a CF (Carbon Fraction) in Dry Matter equal to 0.4722 (conversion from dry mass to tC), and then by 44/12 (conversion factor from tC to tCO₂¹⁰⁹).

Baseline emissions from unplanned deforestation

In order to estimate emissions from unplanned deforestation that would occur in the Project Area in the absence of project (i.e. in the baseline case), the annual estimated area of deforestation (see “Projection of annual baseline deforestation for the Project Area”) multiplied by the sum of aboveground and belowground carbon stocks in forest for each biomass stratum (see the table in the biomass section above). The result of this procedure is shown in the tables below.

¹⁰⁹ Default value 0.47 tC t⁻¹ d.m. (3_CP-AB, pg. 12). <https://verra.org/wp-content/uploads/2017/11/VMD0001v1.1.pdf>

Table 36. Summary of gross baseline emissions from unplanned deforestation that would occur within the Project Area in the baseline case

Stratum				
Submontane dense				
Gross baseline emissions from deforestation				
Year	ha/year	ha (cumulative)	tCO ₂ /year	tCO ₂
2020	196,23	196,23	134.967	134.967
2021	1.932,14	2.128,37	1.328.923	1.463.890
2022	1.896,20	4.024,57	1.304.207	2.768.097
2023	1.860,93	5.885,50	1.279.951	4.048.048
2024	1.826,32	7.711,83	1.256.146	5.304.194
2025	1.792,36	9.504,18	1.232.784	6.536.977
2026	1.759,02	11.263,21	1.209.856	7.746.833
2027	1.726,31	12.989,51	1.187.355	8.934.188
2028	1.694,20	14.683,72	1.165.272	10.099.460
2029	1.662,69	16.346,41	1.143.600	11.243.060
2030	1.631,77	17.978,18	1.122.331	12.365.391
2031	1.601,42	19.579,60	1.101.457	13.466.849
2032	1.571,64	21.151,24	1.080.972	14.547.821
2033	1.542,41	22.693,64	1.060.868	15.608.689
2034	1.513,72	24.207,37	1.041.138	16.649.826
2035	1.485,57	25.692,93	1.021.774	17.671.601
2036	1.457,94	27.150,87	1.002.771	18.674.372
2037	1.430,82	28.581,70	984.121	19.658.493
2038	1.404,21	29.985,91	965.818	20.624.311
2039	1.378,10	31.364,01	947.856	21.572.166
2040	1.352,47	32.716,48	930.227	22.502.393
2041	1.327,31	34.043,79	912.926	23.415.320
2042	1.302,63	35.346,42	895.947	24.311.267
2043	1.278,40	36.624,82	879.284	25.190.551
2044	1.254,63	37.879,45	862.931	26.053.483
2045	1.231,29	39.110,74	846.882	26.900.365
2046	1.208,39	40.319,13	831.132	27.731.496
2047	1.185,92	41.505,05	815.674	28.547.170
2048	1.163,86	42.668,91	800.504	29.347.674
2049	1.142,22	43.811,12	785.616	30.133.290
2050	1.007,34	44.818,46	692.848	30.826.138

Stratum				
Submontane open				
Gross baseline emissions from deforestation				
Year	ha/year	ha (cumulative)	tCO ₂ /year	tCO ₂
2020	0.00	0.00	0.00	0.00
2021	0.00	0.00	0.00	0.00
2022	0.00	0.00	0.00	0.00
2023	0.00	0.00	0.00	0.00
2024	0.00	0.00	0.00	0.00
2025	0.00	0.00	0.00	0.00
2026	0.00	0.00	0.00	0.00
2027	0.00	0.00	0.00	0.00
2028	0.00	0.00	0.00	0.00
2029	0.00	0.00	0.00	0.00
2030	0.00	0.00	0.00	0.00
2031	0.00	0.00	0.00	0.00
2032	0.00	0.00	0.00	0.00
2033	0.00	0.00	0.00	0.00
2034	0.00	0.00	0.00	0.00
2035	0.00	0.00	0.00	0.00
2036	0.00	0.00	0.00	0.00
2037	0.00	0.00	0.00	0.00
2038	0.00	0.00	0.00	0.00
2039	0.00	0.00	0.00	0.00
2040	0.00	0.00	0.00	0.00
2041	0.00	0.00	0.00	0.00
2042	0.00	0.00	0.00	0.00
2043	0.00	0.00	0.00	0.00
2044	0.00	0.00	0.00	0.00
2045	0.00	0.00	0.00	0.00
2046	0.00	0.00	0.00	0.00
2047	0.00	0.00	0.00	0.00
2048	0.00	0.00	0.00	0.00
2049	0.00	0.00	0.00	0.00

2050	0.00	0.00	0.00	0.00
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Baseline emissions from planned deforestation

In order to estimate emissions from planned deforestation that would occur in the Project Area in the absence of project (i.e. in the baseline case), the annual estimated area of deforestation (see “Projection of annual baseline deforestation for the Project Area”) multiplied by the sum of aboveground and belowground carbon stocks in forest for each biomass stratum (see the table in the biomass section above). The result of this procedure is shown in the tables below.

Table 37. Summary of gross baseline emissions from planned deforestation that would occur within the Project Area in the baseline case

Stratum: Submontane dense				
Gross baseline emissions from planned deforestation				
Year	ha/year	ha (cumulative)	tCO ₂ /year	tCO ₂
2020	0	0.00	0.00	0.00
2021	0	0.00	0.00	0.00
2022	2,500	2,500.00	1,719,500.00	1,719,500.00
2023	5,000	7,500.00	3,439,000.00	5,158,500.00
2024	5,000	12,500.00	3,439,000.00	8,597,500.00
2025	5,000	17,500.00	3,439,000.00	12,036,500.00
2026	5,000	22,500.00	3,439,000.00	15,475,500.00
2027	3,971	26,470.88	2,731,170.14	18,206,670.14
2028	0	26,470.88	0.00	18,206,670.14
2029	0	26,470.88	0.00	18,206,670.14
2030	0	26,470.88	0.00	18,206,670.14

Stratum: Submontane open				
Gross baseline emissions from planned deforestation				
Year	ha/year	ha (cumulative)	tCO ₂ /year	tCO ₂
2012	0.00	0.00	0.00	0.00

2013	0.00	0.00	0.00	0.00
2014	0.00	0.00	0.00	0.00
2015	0.00	0.00	0.00	0.00
2016	0.00	0.00	0.00	0.00
2017	0.00	0.00	0.00	0.00
2018	0.00	0.00	0.00	0.00
2019	0.00	0.00	0.00	0.00
2020	0.00	0.00	0.00	0.00
2021	0.00	0.00	0.00	0.00
2022	0.00	0.00	0.00	0.00

Sum of strata				
Gross baseline emissions from planned deforestation				
Year	ha/year	ha (cumulative)	tCO ₂ /year	tCO ₂
2012	0.00	0.00	0.00	0.00
2013	0.00	0.00	0.00	0.00
2014	2,500.00	2,500.00	1,719,500.00	1,719,500.00
2015	5,000.00	7,500.00	3,439,000.00	5,158,500.00
2016	5,000.00	12,500.00	3,439,000.00	8,597,500.00
2017	5,000.00	17,500.00	3,439,000.00	12,036,500.00
2018	5,000.00	22,500.00	3,439,000.00	15,475,500.00
2019	3,970.88	26,470.88	2,731,170.14	18,206,670.14
2020	0.00	26,470.88	0.00	18,206,670.14
2021	0.00	26,470.88	0.00	18,206,670.14
2022	0.00	26,470.88	0.00	18,206,670.14

Emissions from biomass burning in the baseline

Based on the IPCC 2006 Inventory Guidelines, estimating greenhouse gas emissions from biomass burning was determined as follows. The same methodology was applied for both AUD and APD components of the project:

$$E_{BiomassBurn,i,t} = \sum_{g=1}^G ((A_{burn,i,t} * B_{i,t} * COMF_i * G_{g,i}) * 10^{-3}) * GWP_g$$

Where:

$E_{BiomassBurn,i,t}$	Greenhouse gas emissions due to biomass burning as part of deforestation activities in stratum i in year t; tCO ₂ -e of each GHG (CO ₂ , CH ₄ , N ₂ O)
$A_{burn,i,t}$	Area burnt for stratum i at time t; ha
$B_{i,t}$	Average aboveground biomass stock before burning stratum i, time t; tonnes d.m. ha ⁻¹
$COMF_i$	Combustion factor for stratum i; dimensionless (default value derived from Table 2.6 of IPCC, 2006) ¹¹⁰
$G_{g,i}$	Emission factor for stratum i for gas g; kg t ⁻¹ dry matter burnt (default values derived from Table 2.5 of IPCC, 2006) ¹¹¹
GWP_g	Global warming potential for gas g; t CO ₂ /t gas g (default values from IPCC: CH ₄ = 28; N ₂ O = 265)
g	1, 2, 3 ... G greenhouse gases
i	1, 2, 3 ... M strata
t	1, 2, 3 ... t years elapsed since the start of the REDD project activity

The table below shows the parameters used to calculate biomass burning for the baseline scenario, as well as results accounted for CH₄ and N₂O emissions generated as a consequence of incomplete biomass burning of non-commercial wood after logging, over a 30-year period.

Table 38. Biomass burning in the baseline scenario – AUD component

COMF	0.50 dimensionless		
G_{CH4}	4.8 g/kg of dry matter burnt	GWP_{CH4} ¹¹²	28
G_{N2O}	0.2 g/kg of dry matter burnt	GWP_{N2O}	265

¹¹⁰ E-BPB refers to Table 2.6 of 2006 IPCC Guidelines for National Greenhouse Gas Inventories Volume 4 Agriculture, Forestry and Other Land Use, Chapter 2, “Primary tropical moist forest” https://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/4_Volume4/V4_02_Ch2_Generic.pdf (last visited in 20/09/2021)

¹¹¹ E-BPB refers to Table 2.5; page 2.47 “Tropical forest” of Volume 4, Chapter 2, of the IPCC 2006 Inventory Guidelines: For CH₄: 6.8 - 2 = 4.8 g kg⁻¹ dry matter burnt (conservative); For N₂O: 0.20 g kg⁻¹ dry matter burnt (unique value proposed): https://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/4_Volume4/V4_02_Ch2_Generic.pdf (last visited in 10/09/2021)

¹¹² Source IPCC: [WG1AR5_Chapter08_FINAL.pdf](https://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/4_Volume4/V4_02_Ch2_Generic.pdf) (ipcc.ch)

			CH ₄		N ₂ O	
Biomass Burning Emissions			Sum of Strata		Sum of Strata	
Year	ha/year	ha (cumulative)	tCO ₂ /year	tCO ₂ (cumulative)	tCO ₂ /year	tCO ₂ (cumulative)
2020	196,23	196,23	3.108,79	3.108,79	1.225,94	1.225,94
2021	1932,14	2.128,37	30.609,94	33.718,72	12.070,88	13.296,82
2022	1896,20	4.024,57	30.040,65	63.759,37	11.846,39	25.143,20
2023	1860,93	5.885,50	29.481,94	93.241,31	11.626,06	36.769,27
2024	1826,32	7.711,83	28.933,63	122.174,94	11.409,84	48.179,10
2025	1792,36	9.504,18	28.395,51	150.570,45	11.197,63	59.376,74
2026	1759,02	11.263,21	27.867,40	178.437,85	10.989,38	70.366,12
2027	1726,31	12.989,51	27.349,11	205.786,96	10.784,99	81.151,11
2028	1694,20	14.683,72	26.840,47	232.627,43	10.584,41	91.735,52
2029	1662,69	16.346,41	26.341,28	258.968,71	10.387,56	102.123,08
2030	1631,77	17.978,18	25.851,38	284.820,09	10.194,37	112.317,44
2031	1601,42	19.579,60	25.370,58	310.190,67	10.004,77	122.322,21
2032	1571,64	21.151,24	24.898,73	335.089,41	9.818,70	132.140,91
2033	1542,41	22.693,64	24.435,66	359.525,07	9.636,09	141.777,00
2034	1513,72	24.207,37	23.981,20	383.506,26	9.456,87	151.233,87
2035	1485,57	25.692,93	23.535,19	407.041,45	9.280,99	160.514,86
2036	1457,94	27.150,87	23.097,47	430.138,93	9.108,38	169.623,24
2037	1430,82	28.581,70	22.667,90	452.806,83	8.938,98	178.562,22
2038	1404,21	29.985,91	22.246,32	475.053,14	8.772,73	187.334,95
2039	1378,10	31.364,01	21.832,57	496.885,72	8.609,57	195.944,52
2040	1352,47	32.716,48	21.426,52	518.312,24	8.449,45	204.393,96
2041	1327,31	34.043,79	21.028,03	539.340,26	8.292,30	212.686,26
2042	1302,63	35.346,42	20.636,94	559.977,20	8.138,08	220.824,34
2043	1278,40	36.624,82	20.253,13	580.230,33	7.986,72	228.811,07
2044	1254,63	37.879,45	19.876,45	600.106,79	7.838,19	236.649,25
2045	1231,29	39.110,74	19.506,79	619.613,57	7.692,41	244.341,66
2046	1208,39	40.319,13	19.143,99	638.757,57	7.549,34	251.891,00
2047	1185,92	41.505,05	18.787,95	657.545,51	7.408,94	259.299,94
2048	1163,86	42.668,91	18.438,52	675.984,03	7.271,14	266.571,08
2049	1142,22	43.811,12	18.095,60	694.079,63	7.135,91	273.707,00
2050	1007,34	44.818,46	15.958,82	710.038,45	6.293,28	280.000,28

Table 39. Emissions from biomass burning in the baseline – APD component

COMF	0.50	dimensionless		
G_{CH4}	4.8	g/kg of dry matter burnt	GWP_{CH4}¹¹³	28
G_{N2O}	0.2	g/kg of dry matter burnt	GWP_{N2O}	265

			CH ₄		N ₂ O	
Biomass Burning Emissions			Sum of Strata		Sum of Strata	
Year	ha/year	ha (cumulative)	tCO ₂ /year	tCO ₂ (cumulative)	tCO ₂ /year	tCO ₂ (cumulative)
2020	0.00	0.00	0.00	0.00	0.00	0.00
2021	0.00	0.00	0.00	0.00	0.00	0.00
2022	2,500.00	2,500.00	39,606.36	39,606.36	15,618.58	15,618.58
2023	5,000.00	7,500.00	79,212.72	118,819.08	31,237.16	46,855.74
2024	5,000.00	12,500.00	79,212.72	198,031.80	31,237.16	78,092.90
2025	5,000.00	17,500.00	79,212.72	277,244.52	31,237.16	109,330.06
2026	5,000.00	22,500.00	79,212.72	356,457.24	31,237.16	140,567.22
2027	3,970.88	26,470.88	62,908.82	419,366.06	24,807.79	165,375.01
2028	0.00	26,470.88	0.00	419,366.06	0.00	165,375.01
2029	0.00	26,470.88	0.00	419,366.06	0.00	165,375.01
2030	0.00	26,470.88	0.00	419,366.06	0.00	165,375.01

Wood products carbon pool in the baseline

To estimate the biomass carbon of the commercial volume extracted in the process of deforestation, the following equation was applied, which is applicable both for Evergreen's APD and AUD components, according to "Option 2: Commercial inventory estimation", as recommended in the CP-W:

$$C_{XB,i} = C_{ABtree,i} * \frac{1}{BCEF} * Pcom_i$$

Where:

$C_{XB,i}$ Mean stock of extracted biomass carbon from stratum i; t CO₂-e ha⁻¹

$C_{ABtree,i}$ Mean aboveground biomass carbon stock in stratum i; tCO₂-e ha⁻¹

¹¹³ Source IPCC: [WG1AR5_Chapter08_FINAL.pdf \(ipcc.ch\)](#)

<i>BCEF</i>	Biomass conversion and expansion factor (BCEF) for conversion of merchantable volume to total aboveground tree biomass; dimensionless
<i>i</i>	1,2,3, ... M strata

In order to calculate the proportion of biomass carbon extracted that remains sequestered in long-term wood products after 100 years, it was simply and conservatively assumed that all extracted biomass not retained in long-term wood products after 100 years is emitted in the year harvested, instead of tracking annual emissions through retirement, burning and decomposition. All factors are derived from Winjum et al. 1998¹¹⁴.

$$C_{WP,i} = \sum_{ty=s,w,o,p,o} C_{XB,ty,i} * (1 - WW_{ty}) * (1 - SLF_{ty}) * (1 - OF_{ty})$$

Where:

$C_{WP,i}$	Carbon stock in long-term wood products pool (stock remaining in wood products after 100 years) from stratum i post deforestation; t CO ₂ -e ha ⁻¹
$C_{XB,ty,i}$	Mean stock of extracted biomass carbon by class of wood product ty from stratum i; t CO ₂ -e ha ⁻¹
WW_{ty}	Wood waste. The fraction immediately emitted through mill inefficiency by class of wood product ty; dimensionless (0.24 for developing countries; Winjum et al. 1998 cited by CP-W)
SLF_{ty}	Fraction of wood products that will be emitted to the atmosphere within 5 years of timber harvest by class of wood product ty; dimensionless (0.2 for sawnwood; Winjum et al. 1998 cited by CP-W)
OF_{ty}	Fraction of wood products that will be emitted to the atmosphere between 5 and 100 years of timber harvest by class of wood product ty; dimensionless (0.80 for sawnwood in tropical forests; Winjum et al. 1998 cited by CP-W)
Ty	Wood product class – defined here as sawnwood (s)
I	1,2,3,... M strata

¹¹⁴ Winjum, J.K., Brown, S. and Schlamadinger, B. 1998. Forest harvests and wood products: sources and sinks of atmospheric carbon dioxide. Forest Science 44: 272-284. <https://academic.oup.com/forestscience/article/44/2/272/4626952>

The parameters used in calculation of wood products carbon pool in the baseline, as well as the results of estimates (sum of strata), are demonstrated in the table below, for the whole project period.

Table 40. Summary of calculations of wood products carbon pool in the baseline scenario – AUD component

Merchantable wood in exploitation (m ³ /ha)	35.08	WW _{ty}	0.24
Wood average density (t/m ³)	0.59	SLF _{ty}	0.20 ¹¹⁵
Forest management cycle (years)	1	OF _{ty}	0.80 ¹¹⁵

Stratum	C _{AB,tree} (tCO _{2e} /ha)	BCEF ¹¹⁶	Pcom	C _{XB} (tCO _{2e} /ha)	C _{WP} (tCO _{2e} /ha)
Submontane dense	433.31	1.32	0.08235	27.03	3.29
Submontane open	437.60	1.32	0.08155	27.03	3.29
				54.1	6.57

Wood products carbon pool in baseline			Sum of	
			Strata	
Year	ha/year	ha (cumulative)	tCO ₂ /year	tCO ₂
2020	196,23	196,23	645,09	645,09
2021	1.932,14	2.128,37	6.351,69	6.996,77
2022	1.896,20	4.024,57	6.233,55	13.230,33
2023	1.860,93	5.885,50	6.117,62	19.347,95
2024	1.826,32	7.711,83	6.003,84	25.351,79
2025	1.792,36	9.504,18	5.892,18	31.243,97
2026	1.759,02	11.263,21	5.782,60	37.026,57
2027	1.726,31	12.989,51	5.675,05	42.701,62
2028	1.694,20	14.683,72	5.569,51	48.271,13
2029	1.662,69	16.346,41	5.465,92	53.737,05
2030	1.631,77	17.978,18	5.364,26	59.101,31
2031	1.601,42	19.579,60	5.264,50	64.365,81
2032	1.571,64	21.151,24	5.166,59	69.532,40

¹¹⁵ Source: <https://verra.org/wp-content/uploads/2018/03/VMD0005-CP-W-v1.1.pdf> (pg 13 - considering sawnwood)

¹¹⁶ Source: <https://verra.org/wp-content/uploads/2017/11/VMD0001v1.1.pdf> (pg 14, being the average the three factors)

2033	1.542,41	22.693,64	5.070,50	74.602,90
2034	1.513,72	24.207,37	4.976,20	79.579,09
2035	1.485,57	25.692,93	4.883,65	84.462,74
2036	1.457,94	27.150,87	4.792,82	89.255,56
2037	1.430,82	28.581,70	4.703,68	93.959,24
2038	1.404,21	29.985,91	4.616,20	98.575,44
2039	1.378,10	31.364,01	4.530,35	103.105,79
2040	1.352,47	32.716,48	4.446,09	107.551,88
2041	1.327,31	34.043,79	4.363,40	111.915,28
2042	1.302,63	35.346,42	4.282,25	116.197,52
2043	1.278,40	36.624,82	4.202,61	120.400,13
2044	1.254,63	37.879,45	4.124,44	124.524,57
2045	1.231,29	39.110,74	4.047,74	128.572,31
2046	1.208,39	40.319,13	3.972,46	132.544,77
2047	1.185,92	41.505,05	3.898,57	136.443,34
2048	1.163,86	42.668,91	3.826,07	140.269,41
2049	1.142,22	43.811,12	3.754,91	144.024,32
2050	1.007,34	44.818,46	3.311,52	147.335,84

Table 41 - Summary of calculations of wood products carbon pool in the baseline scenario – APD component

Wood products carbon pool in baseline			Sum of Strata	
Year	ha/year	ha (cumulative)	tCO ₂ /year	tCO ₂
2020	0.00	0.00	0.00	0.00
2021	0.00	0.00	0.00	0.00
2022	2,500.00	2,500.00	8,218.48	8,218.48
2023	5,000.00	7,500.00	16,436.96	24,655.44
2024	5,000.00	12,500.00	16,436.96	41,092.40
2025	5,000.00	17,500.00	16,436.96	57,529.35
2026	5,000.00	22,500.00	16,436.96	73,966.31
2027	3,970.88	26,470.88	13,053.83	87,020.15
2028	0.00	26,470.88	0.00	87,020.15
2029	0.00	26,470.88	0.00	87,020.15
2030	0.00	26,470.88	0.00	87,020.15

Pasture carbon pools in the baseline

Regarding calculation of the carbon pool remaining in pasturelands after deforestation, a conservative value of 27.8 tCO₂/ha ($C_{ABnon-tree,post,i} + C_{BBnon-tree,post,i}$) was applied¹¹⁷ for both AUD and APD components. The proportion of baseline deforestation converted to pasture was defined as 98.9% (see Table 29). The table below summarizes the results obtained for pasture carbon pools in the baseline scenario, for 30 years of project.

Table 42. Calculations regarding pasture carbon pools in the baseline scenario – AUD component

Baseline Pasture Carbon Pool			Sum of Strata	
Year	ha/year	ha (cumulative)	tCO ₂ /year	tCO ₂
2020	196,23	196,23	5.446,70	5.446,70
2021	1932,14	2.128,37	53.629,63	59.076,33
2022	1896,20	4.024,57	52.632,21	111.708,55
2023	1860,93	5.885,50	51.653,34	163.361,89
2024	1826,32	7.711,83	50.692,68	214.054,57
2025	1792,36	9.504,18	49.749,88	263.804,45
2026	1759,02	11.263,21	48.824,62	312.629,07
2027	1726,31	12.989,51	47.916,56	360.545,63
2028	1694,20	14.683,72	47.025,40	407.571,03
2029	1662,69	16.346,41	46.150,80	453.721,83
2030	1631,77	17.978,18	45.292,48	499.014,31
2031	1601,42	19.579,60	44.450,11	543.464,42
2032	1571,64	21.151,24	43.623,42	587.087,84
2033	1542,41	22.693,64	42.812,09	629.899,93
2034	1513,72	24.207,37	42.015,86	671.915,79
2035	1485,57	25.692,93	41.234,44	713.150,23
2036	1457,94	27.150,87	40.467,55	753.617,77
2037	1430,82	28.581,70	39.714,92	793.332,69
2038	1404,21	29.985,91	38.976,29	832.308,98
2039	1378,10	31.364,01	38.251,40	870.560,38
2040	1352,47	32.716,48	37.539,98	908.100,36
2041	1327,31	34.043,79	36.841,80	944.942,17
2042	1302,63	35.346,42	36.156,61	981.098,77

¹¹⁷ Source: http://redd.mma.gov.br/images/FREL/RR_LULUCF_Mudana-de-Uso-e-Floresta.pdf (Table 5, is the value of 7.57 tC/ha, for the Amazon biome, multiplied by the 44/12 conversion factor)

2043	1278,40	36.624,82	35.484,16	1.016.582,93
2044	1254,63	37.879,45	34.824,21	1.051.407,14
2045	1231,29	39.110,74	34.176,54	1.085.583,68
2046	1208,39	40.319,13	33.540,91	1.119.124,60
2047	1185,92	41.505,05	32.917,11	1.152.041,71
2048	1163,86	42.668,91	32.304,91	1.184.346,62
2049	1142,22	43.811,12	31.704,09	1.216.050,71
2050	1007,34	44.818,46	27.960,38	1.244.011,09

Table 43. Calculations regarding pasture carbon pools in the baseline scenario – APD component

Baseline Pasture Carbon Pool			Sum of Strata	
Year	ha/year	ha (accumulative)	tCO ₂ /year	tCO ₂
2020	0.00	0.00	0.00	0.00
2021	0.00	0.00	0.00	0.00
2022	2,500.00	2,500.00	69,391.67	69,391.67
2023	5,000.00	7,500.00	138,783.33	208,175.00
2024	5,000.00	12,500.00	138,783.33	346,958.33
2025	5,000.00	17,500.00	138,783.33	485,741.67
2026	5,000.00	22,500.00	138,783.33	624,525.00
2027	3,970.88	26,470.88	110,218.35	734,743.35
2028	0.00	26,470.88	0.00	734,743.35
2029	0.00	26,470.88	0.00	734,743.35
2030	0.00	26,470.88	0.00	734,743.35

4.2 Project Emissions

The Project Area currently does not carry out any activities, so there are no project emissions to report at the time of audit.

4.3 Leakage

Market Leakage - LK-ME

Similarly to the Reference Area and Project Area, the Leakage Belt is also subject to risks of land-grabbing promoted by illegal organizations (i.e. family-scale land-grabber associations, land-property documentation forgers), mostly supported by unscrupulous sawmills and political interests. Total GHG emissions due to market-effects leakage through decreased timber harvest is equal to the summed emissions from timber harvest in the baseline case potentially displaced plus a leakage factor:

$$LK_{MarketEffects,Timber} = \sum_{i=1}^M (LF_{Me} * AL_{T,i})$$

Where:

$LK_{MarketEffects,Timber}$	Total GHG emissions due to market- effects leakage through decreased timber harvest; t CO2-e
LF_{Me}	Leakage factor for market-effects calculations; dimensionless
$AL_{T,i}$	Summed emissions from timber harvest in stratum i in the baseline case potentially displaced through implementation of carbon project; t CO2-e
i	1,2,3,...M strata

The deduction factor (LF_{ME}) was adopted as 0.2, given that the biomass of total aboveground tree is considered to be 32,65% greater in the Amazon Biome than in the Project Area. According to the module VMD0011 (LK-ME), when the mean biomass is more than 15% greater than the biomass within the project boundaries, the LF_{ME} shall be considered 0.2. When evaluating the Leakage Belt deforestation factors and general forest characteristics (stratification, forest type, carbon stocks), the same parameters used for the Project Area are assumed to be equal in the Leakage Belt. This assumption is valid based on previous similarity analysis, which demonstrates that the Leakage Belt area and the Project Area present similarities in the following criteria: Politics and Legislation, Soil and Landscape, Climate and Vegetation, and Accessibility.

The total volume that would have been logged in the baseline in the Project Area, across strata and time periods, is estimated as follows:

$$AL_{T,i} = \sum_{t=1}^t (C_{BSL,XBT,i,t})$$

Where:

$AL_{T,i}$	Summed emissions from timber harvest in stratum i in the baseline case potentially displaced through implementation of carbon project; t CO2-e
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$C_{BSL,XBT,i,t}$	Carbon emission due to displaced timber harvests in the baseline scenario in stratum i in time t; t CO2-e
i	1,2,3,...M strata
t	1, 2, 3, ... t years elapsed since the projected start of the REDD project activity

The carbon emission due to the displaced logging has two components: the biomass carbon of the extracted timber and the biomass carbon in the forest damaged in the process of timber extraction:

$$C_{BSL,XBT,I,T} = ([V_{BSL,XE,I,t} * D_{mn} * CF] + [V_{BSL,XE,I,t} * LDF] + [V_{BSL,XE,I,t} * LIF]) * \frac{44}{12}$$

Where:

$C_{BSL,XBT,i,t}$	Carbon emission due to displaced timber harvests in the baseline scenario in stratum i in time t; t CO2-e
$V_{BSL,XE,I,t}$	Volume of timber projected to be extracted from within the project boundary during the baseline in stratum i at time t; m3
D_{mn}	Mean wood density of commercially harvested species; t d.m.m-3
CF	Carbon fraction of biomass for commercially harvested species j; t C td.m.-1
LDF	Logging damage factor; t C m-3 (default 0.53 t C m-3 for broadleaf and mixed forests ¹¹⁸)
LIF	Logging infrastructure factor; t C m-3 (default 0.29 t C m-3)
i	1,2,3,...M strata
t	1, 2, 3, ... t years elapsed since the projected start of the REDD project activity

The table below summarizes the calculation steps and results of market leakage estimates for the Evergreen REDD+ Project.

D_{mn}	0.59 t/m ³
CF	0.47
LDF	0.53 tC/m ³
LIF	0.29 tC/m ³

¹¹⁸ Source: <https://verra.org/wp-content/uploads/2018/03/VMD0011-LK-ME-v1.0.pdf> (pg 4)

Table 44. Market Leakage: calculation steps and annual estimates

Year							CBSL _{XBT,i,t}
2020	(	10	+	18,5924	+	10,1732)	* 3,666667 = 141,2 tCO ₂ /ha
2021	(	10	+	18,5924	+	10,1732)	* 3,666667 = 141,2 tCO ₂ /ha
2022	(	10	+	18,5924	+	10,1732)	* 3,666667 = 141,2 tCO ₂ /ha
2023	(	10	+	18,5924	+	10,1732)	* 3,666667 = 141,2 tCO ₂ /ha
2024	(	10	+	18,5924	+	10,1732)	* 3,666667 = 141,2 tCO ₂ /ha
2025	(	10	+	18,5924	+	10,1732)	* 3,666667 = 141,2 tCO ₂ /ha
2026	(	10	+	18,5924	+	10,1732)	* 3,666667 = 141,2 tCO ₂ /ha
2027	(	10	+	18,5924	+	10,1732)	* 3,666667 = 141,2 tCO ₂ /ha
2028	(	10	+	18,5924	+	10,1732)	* 3,666667 = 141,2 tCO ₂ /ha
2029	(	10	+	18,5924	+	10,1732)	* 3,666667 = 141,2 tCO ₂ /ha
2030	(	10	+	18,5924	+	10,1732)	* 3,666667 = 141,2 tCO ₂ /ha
2031	(	10	+	18.5924	+	10.1732)	* 3.666667 = 141.2 tCO ₂ /ha
2032	(	10	+	18.5924	+	10.1732)	* 3.666667 = 141.2 tCO ₂ /ha
2033	(	10	+	18.5924	+	10.1732)	* 3.666667 = 141.2 tCO ₂ /ha
2034	(	10	+	18.5924	+	10.1732)	* 3.666667 = 141.2 tCO ₂ /ha
2035	(	10	+	18.5924	+	10.1732)	* 3.666667 = 141.2 tCO ₂ /ha
2036	(	10	+	18.5924	+	10.1732)	* 3.666667 = 141.2 tCO ₂ /ha
2037	(	10	+	18.5924	+	10.1732)	* 3.666667 = 141.2 tCO ₂ /ha
2038	(	10	+	18.5924	+	10.1732)	* 3.666667 = 141.2 tCO ₂ /ha
2039	(	10	+	18.5924	+	10.1732)	* 3.666667 = 141.2 tCO ₂ /ha
2040	(	10	+	18.5924	+	10.1732)	* 3.666667 = 141.2 tCO ₂ /ha
2041	(	10	+	18.5924	+	10.1732)	* 3.666667 = 141.2 tCO ₂ /ha
2042	(	10	+	18.5924	+	10.1732)	* 3.666667 = 141.2 tCO ₂ /ha
2043	(	10	+	18.5924	+	10.1732)	* 3.666667 = 141.2 tCO ₂ /ha
2044	(	10	+	18.5924	+	10.1732)	* 3.666667 = 141.2 tCO ₂ /ha
2045	(	10	+	18.5924	+	10.1732)	* 3.666667 = 141.2 tCO ₂ /ha
2046	(	10	+	18.5924	+	10.1732)	* 3.666667 = 141.2 tCO ₂ /ha
2047	(	10	+	18.5924	+	10.1732)	* 3.666667 = 141.2 tCO ₂ /ha
2048	(	10	+	18.5924	+	10.1732)	* 3.666667 = 141.2 tCO ₂ /ha
2049	(	10	+	18.5924	+	10.1732)	* 3.666667 = 141.2 tCO ₂ /ha
2050	(	10	+	18.5924	+	10.1732)	* 3.666667 = 141.2 tCO ₂ /ha

Year	V _{BSL}	Year	ha/year	ha (cumulative)	C _{BSL,XBT}	AL _T *LF _{ME}
	m ³ /ha				tCO ₂ /year	tCO ₂ /year
2020	35,1	2020	196,23	196,23	27.699,74	5.539,95
2021	35,1	2021	1.932,14	2.128,37	272.739,00	54.547,80
2022	35,1	2022	1.896,20	4.024,57	267.666,51	53.533,30
2023	35,1	2023	1.860,93	5.885,50	262.688,37	52.537,67
2024	35,1	2024	1.826,32	7.711,83	257.802,81	51.560,56
2025	35,1	2025	1.792,36	9.504,18	253.008,11	50.601,62
2026	35,1	2026	1.759,02	11.263,21	248.302,59	49.660,52
2027	35,1	2027	1.726,31	12.989,51	243.684,58	48.736,92
2028	35,1	2028	1.694,20	14.683,72	239.152,46	47.830,49
2029	35,1	2029	1.662,69	16.346,41	234.704,63	46.940,93
2030	35,1	2030	1.631,77	17.978,18	230.339,52	46.067,90
2031	35,1	2031	1.601,42	19.579,60	226.055,60	45.211,12
2032	35,1	2032	1.571,64	21.151,24	221.851,34	44.370,27
2033	35,1	2033	1.542,41	22.693,64	217.725,28	43.545,06
2034	35,1	2034	1.513,72	24.207,37	213.675,96	42.735,19
2035	35,1	2035	1.485,57	25.692,93	209.701,95	41.940,39
2036	35,1	2036	1.457,94	27.150,87	205.801,85	41.160,37
2037	35,1	2037	1.430,82	28.581,70	201.974,28	40.394,86
2038	35,1	2038	1.404,21	29.985,91	198.217,90	39.643,58
2039	35,1	2039	1.378,10	31.364,01	194.531,39	38.906,28
2040	35,1	2040	1.352,47	32.716,48	190.913,43	38.182,69
2041	35,1	2041	1.327,31	34.043,79	187.362,76	37.472,55
2042	35,1	2042	1.302,63	35.346,42	183.878,13	36.775,63
2043	35,1	2043	1.278,40	36.624,82	180.458,31	36.091,66
2044	35,1	2044	1.254,63	37.879,45	177.102,09	35.420,42
2045	35,1	2045	1.231,29	39.110,74	173.808,29	34.761,66
2046	35,1	2046	1.208,39	40.319,13	170.575,75	34.115,15
2047	35,1	2047	1.185,92	41.505,05	167.403,33	33.480,67
2048	35,1	2048	1.163,86	42.668,91	164.289,91	32.857,98
2049	35,1	2049	1.142,22	43.811,12	161.234,40	32.246,88
2050	35,1	2050	1.007,34	44.818,46	142.195,38	28.439,08

Leakage outside the Leakage Belt (Step 4 - LK-ASU)

Immigrants prevented from migrating into and deforesting the project area are conservatively assumed to migrate to an alternative forest area and to cause deforestation in the alternative area. The alternative forest area could be within the Leakage Belt or it could be elsewhere in the country. The proportion migrating to the Leakage Belt is calculated as the area of the Leakage Belt as a proportion of the total available forest area nationally (AVFOR). AVFOR was estimated as follows:

$$AVFOR = TOTFOR - PROTFOR - MANFOR$$

Where:

<i>AVFOR</i>	Total available national forest area for unplanned deforestation; ha
<i>TOTFOR</i>	Total available national forest area; ha
<i>PROTFOR</i>	Total area of fully protected forests nationally; ha
<i>MANFOR</i>	Total area of forests under active management nationally; ha

As the country has a great variety of forest biomes in all its extension, TOTFOR considered only the Amazon Rainforest biome. This is a conservative approach. Thus, as a representation of the total area of Amazon Rainforest in Brazilian Territory, TOTFOR consisted of multiplying size of the Brazilian Amazon by 97%, which represents its preserved area, according to SEMA¹¹⁹. As a result, TOTFOR represents 486,461,572 ha.

According to the Embrapa¹²⁰, PROTFOR is equivalent to 10.4% of the Brazilian territory, calculated as 88,566,400 ha. MANFOR is estimated in 1,400,000, according to IBAMA¹²¹. In this context, AVFOR is estimated as 396,495,172 ha.

The proportion of Leakage Belt area related to the total available national forest area (PROPLB) is calculated by dividing Leakage Belt area (LBFOR; 120,089.87 ha) by AVFOR. This procedure results in PROP_{LB} equal to 0.000302879 (dimensionless).

The average carbon stock across the Leakage Belt (C_{LB}; 435,8 tCO₂/ha; based on similarity analysis, data from the Project Area was applied to Leakage Belt area) and the average carbon

¹¹⁹ Source: <http://meioambiente.am.gov.br/unidade-de-conservacao/>

¹²⁰ Source: <https://www.embrapa.br/car/sintese>

¹²¹ Source: Manejo sustentável autorizado pelo Ibama em 2019 totalizou 39 mil hectares

stock for all available forest area outside the Leakage Belt (C_{OLB} ; 578.1 tCO₂/ha¹²²) were taken for calculation of the proportional difference in carbon stocks between areas of forest available for unplanned deforestation both inside and outside the Leakage Belt ($PROP_{CS}$). $PROP_{CS}$ is calculated by dividing the stock outside the Leakage Belt (C_{OLB}) by the stock inside the Leakage Belt (C_{LB}), which results in a value of 1.3266.

The proportion of baseline deforestation caused by immigrating population ($PROP_{IMM}$) was estimated for a period from 2012 to 2020. For calculating $PROP_{IMM}$, it was used local data¹²³ for births, deaths and population. It is then assumed that the total annual population growth in a given municipality is attributed to: i) births and ii) immigration. Thus, by subtracting the number of annual births from the total annual population growth, it is possible to infer the number of immigrants. According to the number of immigrants, we have inferred the proportion of deforestation attributed to immigrant agents ($PROP_{IMM}$) as 1.33%.

The proportional leakage for areas with immigrating populations (LK_{PROP}) was then equal to the immigrating proportion multiplied by the proportion of available national forest area outside the Leakage Belt multiplied by the proportional difference in stocks between forests inside and outside the Leakage Belt.

$$LK_{PROP} = PROP_{IMM} * (1 - PROP_{LB}) * PROP_{CS}$$

Where:

LK_{PROP}	Proportional leakage for areas with immigrating populations; proportion
$PROP_{IMM}$	Estimated proportion of baseline deforestation caused by immigrating population; proportion
$PROP_{LB}$	Area of forest available for unplanned deforestation as a proportion of the total national forest area available for unplanned deforestation; proportion
$PROP_{CS}$	Proportional difference in stocks between areas of forest available for unplanned deforestation both inside and outside the Leakage Belt; proportion

LK_{PROP} was estimated in 0.018.

Leakage due to the proportion of the baseline deforestation actors who are displaced to areas outside the Leakage Belt was therefore equal to the change in stocks in the baseline scenario

¹²² Source: S.S. Saatchi, R.A. Houghton, R.C. dos Santos Alvalá, J.V. Soares, and Yifan Yu. Distribution of Aboveground Live Biomass in the Amazon Basin. 2007.

https://www.researchgate.net/publication/227502927_Distribution_of_aboveground_live_biomass_in_the_Amazon_basin

¹²³ Sources: <http://tabnet.datasus.gov.br/cgi/deftohtm.exe?sinasc/cnv/nvam.def> ;

<https://www.ibge.gov.br/estatisticas/sociais/populacao/9103-estimativas-de-populacao.html>

minus the change in stocks in the project scenario multiplied by the proportional leakage factor for areas with immigrating populations:

$$\Delta C_{LK-ASU,OLB} = (\Delta C_{BSL,LK,unplanned} - \Delta C_{P,LB}) * LK_{PROP}$$

Where:

$\Delta C_{LK-ASU,OLB}$	Net CO ₂ emissions due to unplanned deforestation displaced outside the Leakage Belt ; t CO ₂ -e
$\Delta C_{BSL,LK,unplanned}$	Net CO ₂ equivalent emissions in the baseline from unplanned deforestation in the leakage belt; t CO ₂ -e
$\Delta C_{P,LB}$	Net CO ₂ equivalent emissions within the leakage belt in the project case; t CO ₂ -e
LK_{PROP}	Proportional leakage for areas with immigrating populations; proportion

For the difference in emissions from unplanned deforestation within the Leakage Belt in the baseline and in the project case, a 10% factor was considered (i.e. $\Delta C_{P,LB}$ was considered to be 10% higher than $\Delta C_{BSL,LK,unplanned}$). It is assumed that this factor is valid for the Evergreen REDD+ Project, given that the project proponent will adopt a series of activities for leakage mitigation, as previously mentioned in this VCS-PD.

The table below summarizes the results obtained for calculation of Leakage outside the Leakage Belt.

Table 45. Estimation results for leakage outside the Leakage Belt

Leakage Outside			Sum of Strata		
			$\Delta C_{BSL,LK,unplanned}$	$\Delta C_{P,LB}$	$\Delta C_{LK-ASU,OLB}$
Year	ha/year	ha (accumulative)	tCO ₂ /year	tCO ₂ /year	tCO ₂ /year
2020	226,43	226,43	154.991,69	170.490,86	-272,92
2021	2.229,45	2.455,88	1.526.089,48	1.678.698,42	-2.687,27
2022	2.187,99	4.643,87	1.497.706,80	1.647.477,47	-2.637,29
2023	2.147,30	6.791,17	1.469.851,98	1.616.837,18	-2.588,24
2024	2.107,36	8.898,53	1.442.515,22	1.586.766,75	-2.540,11
2025	2.068,17	10.966,70	1.415.686,88	1.557.255,57	-2.492,87
2026	2.029,70	12.996,40	1.389.357,50	1.528.293,25	-2.446,50
2027	1.991,95	14.988,35	1.363.517,80	1.499.869,58	-2.401,00

2028	1.954,91	16.943,26	1.338.158,68	1.471.974,54	-2.356,35
2029	1.918,55	18.861,81	1.313.271,19	1.444.598,31	-2.312,52
2030	1.882,87	20.744,68	1.288.846,57	1.417.731,22	-2.269,51
2031	1.847,85	22.592,53	1.264.876,20	1.391.363,82	-2.227,30
2032	1.813,48	24.406,01	1.241.351,65	1.365.486,81	-2.185,88
2033	1.779,75	26.185,77	1.218.264,61	1.340.091,07	-2.145,23
2034	1.746,65	27.932,42	1.195.606,94	1.315.167,64	-2.105,33
2035	1.714,17	29.646,59	1.173.370,68	1.290.707,75	-2.066,17
2036	1.682,29	31.328,88	1.151.547,97	1.266.702,77	-2.027,75
2037	1.651,00	32.979,88	1.130.131,13	1.243.144,24	-1.990,03
2038	1.620,30	34.600,17	1.109.112,60	1.220.023,86	-1.953,02
2039	1.590,16	36.190,34	1.088.484,98	1.197.333,48	-1.916,70
2040	1.560,59	37.750,92	1.068.241,00	1.175.065,10	-1.881,05
2041	1.531,56	39.282,48	1.048.373,53	1.153.210,88	-1.846,07
2042	1.503,08	40.785,56	1.028.875,55	1.131.763,11	-1.811,73
2043	1.475,12	42.260,68	1.009.740,21	1.110.714,23	-1.778,04
2044	1.447,69	43.708,37	990.960,75	1.090.056,82	-1.744,97
2045	1.420,76	45.129,14	972.530,56	1.069.783,61	-1.712,52
2046	1.394,34	46.523,48	954.443,13	1.049.887,45	-1.680,67
2047	1.368,41	47.891,88	936.692,11	1.030.361,32	-1.649,41
2048	1.342,96	49.234,84	919.271,22	1.011.198,34	-1.618,73
2049	1.317,98	50.552,82	902.174,33	992.391,76	-1.588,63
2050	1.162,35	51.715,17	795.643,00	875.207,30	-1.401,04

Leakage Factor (final result)

Based on the expected effectiveness of the proposed REDD+ project activities, the carbon stock changes and greenhouse gas emissions in the Leakage Belt that are expected to occur due to the implementation of the REDD+ project activity (that would not occur in the baseline case) were conservatively estimated as being 10% higher in the project case. It is assumed that this factor is valid for the Evergreen REDD+ Project, given that the project proponent will adopt a series of activities for leakage mitigation, as previously mentioned in this VCS-PD.

Thus, the final results of leakage correspond to 10% of the sum of previously estimated leakage components (i.e. Market Leakage + Leakage outside the Leakage Belt), whose results are presented in the table below.

Table 46. Annual leakage calculated for the Evergreen REDD+ Project

TOTAL LEAKAGE			Sum of Strata	
			Total Leakage	Shifting Leakage
Year	ha/year	ha (cumulative)	tCO ₂ /year	tCO ₂ /year
2020	196,23	196,23	5.812,87	581,3
2021	1.932,14	2.128,37	57.235,07	5.723,5
2022	1.896,20	4.024,57	56.170,60	5.617,1
2023	1.860,93	5.885,50	55.125,92	5.512,6
2024	1.826,32	7.711,83	54.100,67	5.410,1
2025	1.792,36	9.504,18	53.094,49	5.309,4
2026	1.759,02	11.263,21	52.107,02	5.210,7
2027	1.726,31	12.989,51	51.137,92	5.113,8
2028	1.694,20	14.683,72	50.186,84	5.018,7
2029	1.662,69	16.346,41	49.253,45	4.925,3
2030	1.631,77	17.978,18	48.337,42	4.833,7
2031	1.601,42	19.579,60	47.438,42	4.743,8
2032	1.571,64	21.151,24	46.556,15	4.655,6
2033	1.542,41	22.693,64	45.690,28	4.569,0
2034	1.513,72	24.207,37	44.840,52	4.484,1
2035	1.485,57	25.692,93	44.006,56	4.400,7
2036	1.457,94	27.150,87	43.188,12	4.318,8
2037	1.430,82	28.581,70	42.384,89	4.238,5
2038	1.404,21	29.985,91	41.596,60	4.159,7
2039	1.378,10	31.364,01	40.822,98	4.082,3
2040	1.352,47	32.716,48	40.063,74	4.006,4
2041	1.327,31	34.043,79	39.318,62	3.931,9
2042	1.302,63	35.346,42	38.587,36	3.858,7
2043	1.278,40	36.624,82	37.869,70	3.787,0
2044	1.254,63	37.879,45	37.165,39	3.716,5
2045	1.231,29	39.110,74	36.474,18	3.647,4
2046	1.208,39	40.319,13	35.795,82	3.579,6
2047	1.185,92	41.505,05	35.130,08	3.513,0
2048	1.163,86	42.668,91	34.476,72	3.447,7

2049	1.142,22	43.811,12	33.835,51	3.383,6
2050	1.007,34	44.818,46	29.840,11	2.984,0

4.4 Net GHG Emission Reductions and Removals

Net GHG Emission Reductions and Removals can be summarized as the “Estimated baseline emissions” minus the “Estimated project emissions” minus the “Estimated leakage emissions”, whose components are presented below.

Estimate baseline emissions

- = Baseline emissions from unplanned deforestation
- + Emissions from biomass burning in the baseline
- Sum of wood products and pasture carbon pools in the baseline case

Estimate project emissions

- = Emissions arising from logging gap in Project Area
- + Emissions from constructing logging infrastructure for removal of timber in Project Area
- Wood Products Carbon Pool in Project Area

Estimate leakage emissions

- = (Sum of Market Leakage and Leakage outside the Leakage Belt)
- * Leakage Factor

Table 47. Evergreen REDD+ project net GHG emissions reductions and removals

Year	Estimated baseline emissions or removals (tCO ₂ e)	Estimated project emissions or removals (tCO ₂ e)	Estimated leakage emissions (tCO ₂ e)	Estimated net GHG emission reductions or removals (tCO ₂ e)
2020	133.210	0	6.121	127.089
2021	1.311.622	0	60.271	1.251.351
2022	2.984.343	0	59.150	2.925.193
2023	4.657.518	0	58.050	4.599.467
2024	4.634.022	0	56.971	4.577.052
2025	4.610.964	0	55.911	4.555.053

2026	4.588.335	0	54.871	4.533.464
2027	3.867.512	0	53.851	3.813.661
2028	1.150.102	0	52.849	1.097.253
2029	1.128.712	0	51.866	1.076.846
2030	1.107.720	0	50.902	1.056.818
2031	1.087.118	0	49.955	1.037.163
2032	1.066.900	0	49.026	1.017.874
2033	1.047.057	0	48.114	998.943
2034	1.027.584	0	47.219	980.364
2035	1.008.472	0	46.341	962.131
2036	989.716	0	45.479	944.237
2037	971.309	0	44.633	926.676
2038	953.245	0	43.803	909.441
2039	935.516	0	42.989	892.527
2040	918.117	0	42.189	875.928
2041	901.041	0	41.404	859.637
2042	884.284	0	40.634	843.649
2043	867.837	0	39.879	827.959
2044	851.697	0	39.137	812.560
2045	835.857	0	38.409	797.448
2046	820.312	0	37.695	782.617
2047	805.055	0	36.994	768.061
2048	790.082	0	36.306	753.777
2049	775.388	0	35.630	739.758
2050	683.828	0	31.423	652.405
Total	48.394.477	0	1.398.074	46.996.404

The total net greenhouse gas emissions reductions corresponding to the AUD and APD components of the baseline are presented in the table below.

Emissions from both APD and AUD presented in Table 48 below include:

Carbon stock changes from initial land-use (forest) to post-deforestation land-use (pasture), and biomass burning.

Table 48. Evergreen REDD+ AUD and APD components' emission reduction

Year	AUD emissions (tCO ₂)	APD emissions (tCO ₂)
2020	133.210	0
2021	1.311.622	0
2022	1.287.228	1.697.115
2023	1.263.288	3.394.230
2024	1.239.793	3.394.230

2025	1.216.735	3.394.230
2026	1.194.106	3.394.230
2027	1.171.897	2.695.615
2028	1.150.102	0
2029	1.128.712	0
2030	1.107.720	0
2031	1.087.118	0
2032	1.066.900	0
2033	1.047.057	0
2034	1.027.584	0
2035	1.008.472	0
2036	989.716	0
2037	971.309	0
2038	953.245	0
2039	935.516	0
2040	918.117	0
2041	901.041	0
2042	884.284	0
2043	867.837	0
2044	851.697	0
2045	835.857	0
2046	820.312	0
2047	805.055	0
2048	790.082	0
2049	775.388	0
2050	683.828	0
Total	30.424.829	17.969.648

5. MONITORING

5.1 Data and Parameters Monitored

Data / Parameter	$A_{burn,i,t}$
Data unit	ha
Description	Area burnt in stratum i at time t

Source of data	Remote sensing data
Description of measurement methods and procedures to be applied	It is considered that burning is a common practice in the region, and that all deforested area undergoes burning in a given moment ¹²⁴ . The Amazon Biome comprises a great amount of biomass, and post-deforestation residuals are very abundant. There is no technology known and economically feasible to allow mechanical skidding or disposal of deforestation residual biomass. Selling of these residuals is not feasible, as transportation is more expensive than the residual material itself. In this context, the only feasible alternative for cattle ranchers for land clearing is setting fire in those residues, getting rid of them thoroughly, quickly, and cheaply. According to an article in the "Globo" newspaper: "Basically, whenever you deforest, you burn it. This is a viable way to get rid of all the weeds. Burning also helps prepare the soil for planting. It serves to reduce soil acidity, a problem in the Amazon, and deposits nutrients" - Philip Fearnside, American biologist and scientist ¹²⁵ .
Frequency of monitoring/recording	Areas burnt will be monitored yearly, examination will occur prior to any verification event.
Value applied	This value varies annually, as a function of deforested area.
Monitoring equipment	Remote sensing
QA/QC procedures to be applied	Best practices in remote sensing Land use / land change map for monitoring period; Overlay land use / land change map with fire alerts location data from INPE-BDQUEIMADAS (http://www.inpe.br/queimadas/abasFogo.php) into the period; Quantify pixels of deforested areas over fire alerts.
Purpose of data	Monitor burned forest areas
Calculation method	N/A
Comments	As burning of biomass is common practice in the region, it was considered that all the deforested areas were burnt – deforestation cycle includes burning.

Data / Parameter	ADistPA
Data unit	ha

¹²⁴ CNR 2019: <https://cnr.ncsu.edu/news/2019/09/amazon-rainforest-fires-everything-you-need-to-know/>

¹²⁵ <https://g1.globo.com/natureza/noticia/2019/08/23/queimadas-e-desmatamento-estao-relacionados-na-amazonia-entenda.ghml> (last visited in 20/09/2021)

Description	Area impacted by natural disturbance in the project stratum i converted to natural disturbance stratum q in year t; ha
Source of data	Remote Sensing imagery combined with ground verification or GPS coordinates
Description of measurement methods and procedures to be applied	Minimum monitoring unit shall be equal to a minimum of 11 Landsat pixels or one hectare.
Frequency of monitoring/recording	Must be monitored at least every 5 years or if verification occurs on a frequency of less than every 5 years examination must occur prior to any verification event
Value applied	0
Monitoring equipment	Remote sensing and GIS tools
QA/QC procedures to be applied	The Mapbiomas project contributes to understand the land use dynamics in Brazil. The data generated by this program is used in this project. Mapbiomas data are applicable for use in this project, according to the criteria listed below (Methodology VM0007): i) Mapbiomas data covers the entire project area, leakage belt and reference region. ii) Mapbiomas data cover the entire reference period (beginning, middle and end) of the fixed baseline period. iii) Mapbiomas monitors conversion of forest land to non-forest land. iv) Monitoring occurred during the entire fixed baseline period. In case of unavailability of Mapbiomas data for monitoring period, other sources will be consulted such as PRODES or a classification of imagery (Landsat8) will be carried out to measure deforested area: 1) Land use and land cover mapping is assessed using images with spatial resolution superior to 30 meters. Image acquisition is performed during the period of low incidence of clouds and rainfall in the region, within July and September. 2) Images undergo geometric correction by means of geo-referencing, using topographic maps as reference or USG-NASA orthorectified images. 3) For analysis of areas with cloud cover, visual interpretation of radar image would be performed. 4) Evaluation of classification accuracy is performed by analyzing the overall accuracy and kappa index obtained from a confusion matrix. The minimum accuracy of the mapping classification should be over 90%, considered very high.

Purpose of data	Calculation of project emissions
Calculation method	Ex ante, estimations of emissions from natural disturbances shall be based on historic incidence of such event in the Project region
Comments	N/A

Data / Parameter	ABSLPAT
Data unit	ha
Description	Annual area of baseline deforestation in the project area at year t
Source of data	Remote sensing data and GIS
Description of measurement methods and procedures to be applied	Forest cover change due to deforestation is monitored through periodic assessment of classified satellite imagery covering the project area provided by Mapbiomas project.
Frequency of monitoring/recording	Annually
Value applied	The value will be calculated ex-post, before every verification period.
Monitoring equipment	Remote sensing and GIS
QA/QC procedures to be applied	The Mapbiomas project contributes to understand the land use dynamics in Brazil. The data generated by this program is used in this project. Mapbiomas data are applicable for use in this project, according to the criteria listed below (Methodology VM0007): i) Mapbiomas data covers the entire project area, leakage belt and reference region. ii) Mapbiomas data cover the entire reference period (beginning, middle and end) of the fixed baseline period. iii) Mapbiomas monitors conversion of forest land to non-forest land. iv) Monitoring occurred during the entire fixed baseline period. In case of unavailability of Mapbiomas data for monitoring period, other sources will be consulted such as PRODES or a classification of imagery (Landsat8) will be carried out to measure deforested area: 1) Land use and land cover mapping is assessed using images with spatial resolution superior to 30 meters. Image acquisition is performed during the period of low incidence of clouds and rainfall in the region, within July and September.

	2) Images undergo geometric correction by means of geo-referencing, using topographic maps as reference or USG-NASA orthorectified images. 3) For analysis of areas with cloud cover, visual interpretation of radar image would be performed. Evaluation of classification accuracy is performed by analyzing the overall accuracy and kappa index obtained from a confusion matrix. The minimum accuracy of the classification mapping should be over than 90%, considered very high.
Purpose of data	• Calculation of project emissions • Calculation of baseline emissions
Calculation method	Analysis of satellite images and maps
Comments	N/A

Data / Parameter	$V_{EXT\ z\ i\ t}$
Data unit	m ³
Description	Volume extracted from logging stratum z in stratum i in year t
Source of data	Records and reports documenting amount of wood extracted within project boundary. Official data of timber harvest reports from logging in sustainable forest management. Local field inventory.
Description of measurement methods and procedures to be applied	All logged trees are previously inventoried.
Frequency of monitoring/recording	To be determined, according to the decision listed in the 'Comments' section.
Value applied	The value will be calculated ex-post.
Monitoring equipment	The same equipment applied in forest inventory.
QA/QC procedures to be applied	Forest inventory data can be crosschecked with official data of timber harvest reports from logging in sustainable forest management.
Purpose of data	Calculation of project emissions

Calculation method	Official data of timber harvest reports from logging in sustainable forest management and timber inventory.
Comments	The parameter will only be measured if the project proponents decide to have forest management, depending on the market conditions and knowing that the management need to have the FSC certification. It is being listed here for precaution.

Data / Parameter	$C_{EXT\ z\ i\ t}$
Data unit	tCO ₂ -e
Description	Biomass carbon stock of timber extracted within the project boundary for logging stratum z, in stratum i in year t;
Source of data	Official data of timber volume reports from logging in sustainable forest management
Description of measurement methods and procedures to be applied	Official data of timber volume reports from logging in sustainable forest management will be converted to tCO ₂ -e, considering wood basic density and carbon fraction, multiplied by 44/12. All logged trees are previously inventoried.
Frequency of monitoring/recording	To be determined, according to the decision listed in the 'Comments' section.
Value applied	The value will be calculated ex-post.
Monitoring equipment	The logged trees are previously inventoried.
QA/QC procedures to be applied	Forest inventory data can be crosschecked with official data of timber volume reports from logging in sustainable forest management.
Purpose of data	Calculation of project emissions
Calculation method	Official data of timber volume reports from logging in sustainable forest management ($V_{EXT\ z\ i\ t}$) will be converted to tCO ₂ -e, considering wood basic density and carbon fraction, multiplied by 44/12.
Comments	The parameter will only be measured if the project proponents decide to have forest management, depending on the market conditions and knowing that the management need to have the FSC certification. It is being listed here for precaution.

Data / Parameter	$C_{L,i,t}$
Data unit	tCO ₂ -e
Description	Actual net project emissions arising in the logging gap, in stratum <i>i</i> in year <i>t</i>
Source of data	Official data of timber volume reports from logging in sustainable forest management
Description of measurement methods and procedures to be applied	Biomass carbon stock of timber extracted within the project boundary ($C_{EXT,z,i,t}$) is summed to volume of logs in sustainable forest management ($V_{EXT,z,i,t}$) multiplied by LDF (Logging damage factor), to estimate both amounts of emissions of timber extracted and emissions caused for logging damage.
Frequency of monitoring/recording	To be determined, according to the decision listed in the 'Comments' section.
Value applied	The value will be calculated ex-post.
Monitoring equipment	The logged trees are previously inventoried.
QA/QC procedures to be applied	Forest inventory data can be crosschecked with official data of timber volume reports from logging in sustainable forest management.
Purpose of data	Calculation of project emissions
Calculation method	Biomass carbon stock of timber extracted within the project boundary ($C_{EXT,z,i,t}$) is summed to volume of logs in sustainable forest management ($V_{EXT,z,i,t}$) multiplied by LDF (Logging damage factor), to estimate both amounts of emissions of timber extracted and emissions caused for logging damage.
Comments	The parameter will only be measured if the project proponents decide to have forest management, depending on the market conditions and knowing that the management need to have the FSC certification. It is being listed here for precaution.

Data / Parameter	$A_{DECKS,i,t}$
Data unit	ha
Description	Area of logging decks in stratum <i>i</i> in year <i>t</i>

Source of data	Field measurements or reported measurements such as postharvest assessment reports and post-harvest maps that are based on field measurements. Remote sensing data and GIS.
Description of measurement methods and procedures to be applied	Systematic sampling must take place to ensure all decks within the area logged are identified and a conservative estimate of area produced.
Frequency of monitoring/recording	To be determined, according to the decision listed in the 'Comments' section.
Value applied	The value will be calculated ex-post
Monitoring equipment	According to the Annual Operational Plans of the Sustainable Management Plan.
QA/QC procedures to be applied	The measured area of logging decks in current logging gaps will be compared with those of previous logging gaps.
Purpose of data	Calculation of project emissions
Calculation method	Data obtained from annual forest management.
Comments	The parameter will only be measured if the project proponents decide to have forest management, depending on the market conditions and knowing that the management need to have the FSC certification. It is being listed here for precaution.

Data / Parameter	$A_{ROAD,i,t}$
Data unit	ha
Description	Area of roads in stratum i in year t
Source of data	Reported measurements such as post-harvest assessment reports, post-harvest maps that are based on field measurements, or Annual Operational Plans of the Sustainable Management Plan. Remote sensing data and GIS.
Description of measurement methods and procedures to be applied	The area of roads created may be based on the length of roads multiplied by the average width of roads. The length of all roads created during selective logging within a stratum i in year t must be measured through systematically sampling the entire area logged to produce a conservative estimate of the length of roads created. The average width of the roads may be estimated

	through systematically sampling road width. Sufficient number of measurements of road width shall be measured to achieve a precision of equal or less than 15% of the mean at the 95% confidence interval. Where different categories of roads exist, different average road widths must be used.
Frequency of monitoring/recording	To be determined, according to the decision listed in the 'Comments' section.
Value applied	The value will be calculated ex-post
Monitoring equipment	According to the Annual Operational Plans of the Sustainable Management Plan.
QA/QC procedures to be applied	The measured area of roads will be crosschecked with GIS analysis.
Purpose of data	Calculation of project emissions
Calculation method	Estimations of emissions from road creation shall be based on logging management plans or average width of roads and length of roads produced for logging in the farm. GIS analysis will support final conclusions.
Comments	The parameter will only be measured if the project proponents decide to have forest management, depending on the market conditions and knowing that the management need to have the FSC certification. It is being listed here for precaution.

Data / Parameter	L_{sk}
Data unit	m
Description	Length of skid trail sk.
Source of data	Reported measurements such as post-harvest assessment reports, post-harvest maps that are based on field measurements, or Annual Operational Plans of the Sustainable Management Plan.
Description of measurement methods and procedures to be applied	The length of all skid trails within a stratum i in year t may be estimated through using systematic sampling with a random start of the entire area logged or within a sampled known logged area within the project boundary to produce a conservative estimate of the length of skid trails created. Where sampling is

	used, the total length of all skid trails can then be equal to the mean length of skid trails per unit area multiplied by the total area logged.
Frequency of monitoring/recording	To be determined, according to the decision listed in the 'Comments' section.
Value applied	The value will be calculated ex-post
Monitoring equipment	According to the Annual Operational Plans of the Sustainable Management Plan.
QA/QC procedures to be applied	The measured length of skid trails in current logging gaps will be compared with those of previous logging gaps.
Purpose of data	Calculation of project emissions
Calculation method	Estimations of emissions from skid trail creation shall be based on logging management plans or average length and number of skid trails produced due to logging in the farm.
Comments	The parameter will only be measured if the project proponents decide to have forest management, depending on the market conditions and knowing that the management need to have the FSC certification. It is being listed here for precaution.

Data / Parameter	C_{AB_tree, dest}
Data unit	t CO ₂ -e ha ⁻¹
Description	Carbon stock in aboveground tree biomass assumed to be killed per unit area resulting from the creation of the skid trail in stratum i.
Source of data	Publicly available scientific data, Annual Operational Plans of SFMPs, and forest management team data.
Description of measurement methods and procedures to be applied	As indicated in module CP-AB.
Frequency of monitoring/recording	The maximum size tree assumed to be killed during skid trail creation must be monitored at least every 5 years or if verification occurs on a frequency of less than every 5 years examination must occur prior to any verification event.

Value applied	Currently N/A, to be calculated ex-post, after SFMP implementation.
Monitoring equipment	On-the-ground measurement, data according to the Annual Operational Plans of the Sustainable Management Plan, and scientific data review.
QA/QC procedures to be applied	In the case of forest management team data, QA/QC procedures will be in accordance with those stipulated by the SFMPs. Furthermore, the measured area of skid trails will be compared with those of previous skid trails.
Purpose of data	Calculation of project emissions
Calculation method	Multiplication of skid trail dimensions by carbon stock in accordance with parameter CAB_tree, described in section 4.1
Comments	N/A to this project during the current monitoring period as there is currently no logging in the project.

Data / Parameter	CBB_tree,dest
Data unit	t CO2-e ha-1
Description	Carbon stock in belowground tree biomass assumed to be killed per unit area resulting from the creation of the skid trail in stratum i
Source of data	Publicly available scientific data, Annual Operational Plans of SFMPs, and forest management team data.
Description of measurement methods and procedures to be applied	As indicated in module CP-AB.
Frequency of monitoring/recording	Must be monitored at least every 5 years or if verification occurs on a frequency of less than every 5 years examination must occur prior to any verification event
Value applied	Currently N/A, to be calculated ex-post, after SFMP implementation.
Monitoring equipment	On-the-ground measurement, Annual Operational Plans of the Sustainable Management Plan, and peer-reviewed data study.

QA/QC procedures to be applied	In the case of forest management team data, QA/QC procedures will be in accordance with those stipulated by the SFMPs. Furthermore, the measured area of skid trails will be compared with those of previous skid trails.
Purpose of data	Calculation of project emissions
Calculation method	Multiplication of skid trail dimensions by carbon stock in accordance with parameter CBB_tree, described in section 4.1
Comments	N/A to this project during the current monitoring period as there is currently no logging in the project.

Data / Parameter	Cs _{u,lg}
Data unit	t C
Description	Carbon stock of trees snapped, leaning, or uprooted in logging gap lg
Source of data	Publicly available scientific data, Annual Operational Plans of SFMPs, and forest management team data.
Description of measurement methods and procedures to be applied	If the forest management team data is used: Measurements (e.g. DBH, H) shall be taken on all trees (>10 cm DBH) that have been significantly damaged and are assumed to be killed by the felling of the timber tree. This shall include all trees where the bark of the stem has been damaged, where the stem has been snapped off, where the stem has been pushed over, and those trees that have been uprooted. The above and belowground carbon stock of each tree must be estimated using the same allometric regression equation and root to shoot ratio used in the module for estimating the carbon pool in trees (CP-AB) in the baseline scenario.
Frequency of monitoring/recording	Measurement shall take place one time prior to any verification event.
Value applied	Currently N/A, to be calculated ex-post, after SFMP implementation.
Monitoring equipment	On-the-ground measurement, Annual Operational Plans of the Sustainable Management Plan, and peer-reviewed data study. If peer-reviewed study data is used, the value of carbon stock of trees snapped, leaning, or uprooted due to logging will be

	applied in the logging area, that will be measured ex-post, when applicable, using remote sensing and GIS.
QA/QC procedures to be applied	In the case of forest management team data, QA/QC procedures will be in accordance with those stipulated by the SFMPs.
Purpose of data	Calculation of project emission
Calculation method	Literature data from reputed sources will be used and cross-checked with field data from forest management team, if available.
Comments	The parameter will only be measured if the project proponents decide to have forest management, depending on the market conditions and knowing that the management need to have the FSC certification. It is being listed here for precaution.

Data / Parameter	$C_{B,lg}$
Data unit	t C
Description	Carbon stock of branches knocked to the ground as a direct consequence of tree felling in logging gap lg
Source of data	Publicly available scientific data, Annual Operational Plans of SFMPs, and forest management team data.
Description of measurement methods and procedures to be applied	As indicated in VM0007's M-REDD module.
Frequency of monitoring/recording	Measurement shall take place prior to every verification event.
Value applied	Currently N/A, to be calculated ex-post, after SFMP implementation.
Monitoring equipment	On-the-ground measurement, Annual Operational Plans of the Sustainable Management Plan, and peer-reviewed data study.
QA/QC procedures to be applied	In the case of forest management team data, QA/QC procedures will be in accordance with those stipulated by the SFMPs.
Purpose of data	Calculation of project emissions

Calculation method	Literature data from reputed sources will be used and cross-checked with field data from forest management team, if available.
Comments	The parameter will only be measured if the project proponents decide to have forest management, depending on the market conditions and knowing that the management need to have the FSC certification. It is being listed here for precaution.

Data / Parameter	W_{skid}
Data unit	m
Description	Mean width of skid trails
Source of data	Publicly available scientific data, Annual Operational Plans of SFMPs, and forest management team data
Description of measurement methods and procedures to be applied	The average width of skid trails created within a stratum i can be based on reported widths; a conservative estimate based on machinery used; or additional field measurements. Reported width: the average width of field measured skid trails within FSC Post Harvest Assessment reports from logging that has taken place within the project area; Conservative estimate: Width edge of tires on largest skidder type * 140% can only be used where skidder type(s) is known and used to create all skid trails. (skidder defined as heavy vehicle used in logging operation to create path and pull cut trees to logging road); Field measurements: average of field sampling based on systematic sampling with a random start. The width of the skid trail shall be equal to the distance between trees undamaged by skid trail creation on one side to trees undamaged by skid trail creation on the other side. Sufficient number of measurements of road width shall be measured to achieve a precision of equal or less than 15% of the mean at the 95% confidence interval.
Frequency of monitoring/recording	Must be monitored at least every 5 years or if verification occurs on a frequency of less than every 5 years examination must occur prior to any verification event

Value applied	Currently N/A, to be calculated ex-post, after SFMP implementation.
Monitoring equipment	On-the-ground measurement, Annual Operational Plans of the Sustainable Management Plan, and peer-reviewed data study.
QA/QC procedures to be applied	In the case of forest management team data, QA/QC procedures will be in accordance with those stipulated by the SFMPs.
Purpose of data	Calculation of project emissions
Calculation method	Literature data from reputed sources will be used and cross-checked with field data from forest management team, if available.
Comments	N/A to this project during the current monitoring period as there is currently no logging in the project.

Data / Parameter	Leakage outside
Data unit	tCO ₂ /year
Description	Net CO ₂ emissions due to unplanned deforestation displaced outside the leakage belt up to year t*
Source of data	Remote sensing data and GIS. Secondary data.
Description of measurement methods and procedures to be applied	The unplanned activities in leakage management areas that result in carbon stock decrease will be subject to monitoring, when significant.
Frequency of monitoring/recording	Annually
Value applied	Values are described in Table 45
Monitoring equipment	Remote sensing and GIS. Secondary data.
QA/QC procedures to be applied	N/A.
Purpose of data	Calculation of leakage
Calculation method	As per LK-ASU, Step 4.
Comments	N/A.

Data / Parameter	MANFOR
Data unit	ha
Description	Total area of forests under active management nationally
Source of data	Official country-specific data from IBAMA ¹²⁶ .
Description of measurement methods and procedures to be applied	As per LK-ASU, a demonstration is required that areas will be protected against deforestation. Such a demonstration must include the existence of forest guards in sufficient numbers to prevent illegal colonization and an active management plan detailing harvest plans and return intervals, and/or evidence that the concession owner has previously evicted illegal colonists/squatters from the forest areas. Ex-ante it can be assumed that MANFOR must remain constant.
Frequency of monitoring/recording	Annually
Value applied	1,400,000
Monitoring equipment	N/A.
QA/QC procedures to be applied	As per Section 9.3 of REDD+ MF or other VCS methodology that uses this module.
Purpose of data	Calculation of leakage emissions
Calculation method	N/A.
Comments	N/A.

Data / Parameter	PROTFOR
Data unit	ha
Description	Total area of fully protected forests nationally
Source of data	Official country-specific data from ISA ¹²⁷ .

¹²⁶ Source: Manejo sustentável autorizado pelo Ibama em 2019 totalizou 39 mil hectares

¹²⁷ Source: Painel de Dados ICMBio

Description of measurement methods and procedures to be applied	As per LK-ASU, a demonstration is required that areas will be protected against deforestation. Such a demonstration is made by government mechanisms and national policies. Ex-ante it can be assumed that PROTFOR must remain constant.
Frequency of monitoring/recording	Annually
Value applied	88,566,400
Monitoring equipment	N/A.
QA/QC procedures to be applied	As per Section 9.3 of REDD+ MF or other VCS methodology that uses this module.
Purpose of data	Calculation of leakage emissions
Calculation method	N/A.
Comments	N/A.

Data / Parameter	TOTFOR
Data unit	ha
Description	Total available national forest area
Source of data	Official country-specific data. As the country has a great variety of forest biomes in all its extension, TOTFOR considered only the Amazon Rainforest biome. This is a conservative approach. Thus, as a representation of the total area of Amazon Rainforest in Brazilian Territory, TOTFOR consisted of multiplying size of the Brazilian Amazon by 97%, which represents its preserved area, according to SEMA ¹²⁸ .
Description of measurement methods and procedures to be applied	As per LK-ASU, forest areas suitable for conversion to livestock. Ex ante it can be conservatively assumed that TOTFOR must remain constant for the baseline period.
Frequency of monitoring/recording	Annually
Value applied	486,461,572

¹²⁸ Source: <http://meioambiente.am.gov.br/unidade-de-conservacao/>

Monitoring equipment	N/A.
QA/QC procedures to be applied	As per Section 9.3 of REDD+ MF or other VCS methodology that uses this module.
Purpose of data	Calculation of leakage emissions
Calculation method	N/A.
Comments	N/A.

Data / Parameter	$\Delta C_{P, LB}$
Data unit	tCO ₂ e
Description	Net greenhouse gas emissions within the leakage belt in the project case
Source of data	As per Module M-REDD
Description of measurement methods and procedures to be applied	As per Module M-REDD.
Frequency of monitoring/recording	Annually
Value applied	To be measured ex-post.
Monitoring equipment	N/A.
QA/QC procedures to be applied	As per Section 9.3 of REDD+ MF or other VCS methodology that uses this module.
Purpose of data	Calculation of leakage emissions
Calculation method	N/A.
Comments	N/A.

Data / Parameter	$PROP_{IMM}$
Data unit	Proportion
Description	Estimated proportion of baseline deforestation caused by immigrating population

Source of data	Official country-specific (government) data. The proportion of baseline deforestation caused by immigrating population ($PROP_{IMM}$) was estimated for a period from 2012 to 2020. For calculating $PROP_{IMM}$, it was used local data ¹²⁹ for births, deaths and population. It is then assumed that the total annual population growth in a given municipality is attributed to: i) births and ii) immigration. Thus, by subtracting the number of annual births from the total annual population growth, it is possible to infer the number of immigrants.
Description of measurement methods and procedures to be applied	Estimated as proportion of the area deforested in the past 5 years by population that migrated into the leakage belt and project area in the past 5 years (all areas within 2 km of the boundaries of the project area and the leakage belt must be considered here).
Frequency of monitoring/recording	Annually
Value applied	1.33
Monitoring equipment	N/A.
QA/QC procedures to be applied	As per Section 9.3 of REDD+ MF or other VCS methodology that uses this module.
Purpose of data	Calculation of leakage emissions
Calculation method	N/A.
Comments	N/A.

Data / Parameter	$A_{DefLB,i,t}$
Data unit	ha
Description	Area of recorded deforestation in the leakage belt in the project case in stratum i in year t
Source of data	As per Module M-REDD. Satellite imagery.
Description of measurement methods	As per Module M-REDD. Satellite imagery analysis.

¹²⁹ Sources: <http://tabnet.datasus.gov.br/cgi/deftohtm.exe?sinasc/cnv/nvam.def> ; <https://www.ibge.gov.br/estatisticas/sociais/populacao/9103-estimativas-de-populacao.html>

and procedures to be applied	
Frequency of monitoring/recording	Annually
Value applied	To be measured ex-post.
Monitoring equipment	N/A.
QA/QC procedures to be applied	As per Section 9.3 of REDD+ MF or other VCS methodology that uses this module.
Purpose of data	Calculation of leakage emissions
Calculation method	N/A.
Comments	N/A.

Data / Parameter	$A_{DefPA,i,u,t}$
Data unit	ha
Description	Area of recorded deforestation in the project area in the project case in stratum i converted to land use u in year t
Source of data	As per Module M-REDD. Satellite imagery.
Description of measurement methods and procedures to be applied	As per Module M-REDD. Satellite imagery analysis.
Frequency of monitoring/recording	Annually
Value applied	To be measured ex-post.
Monitoring equipment	N/A.
QA/QC procedures to be applied	As per Section 9.3 of REDD+ MF or other VCS methodology that uses this module.
Purpose of data	Calculation of leakage emissions
Calculation method	N/A.
Comments	N/A.

Data / Parameter	RfT
Data unit	%
Description	Risk factor used to calculate VCS buffer credits
Source of data	- VCS Non-Permanence Risk Report (v3.1), - Remote sensing data and GIS, - Supervisor report. - Literature data.
Description of measurement methods and procedures to be applied	All sources of data from the VCS Non-Permanence Risk Report will be used to measure the various risk factors.
Frequency of monitoring/recording	Annually
Value applied	10
Monitoring equipment	VCS-approved AFOLU Non-Permanence Risk Tool
QA/QC procedures to be applied	Literature data from reputed sources will be used and critically checked. When possible, the average of two or more sources will be used.
Purpose of data	• Calculation of project emissions
Calculation method	All the risk factors described in the VCS Risk Report were assessed.
Comments	N/A

Data / Parameter	Project Forest Cover Monitoring Map
Data unit	ha
Description	Map showing the location of forest land within the project area at the beginning of each monitoring period. If within the Project Area some forest land is cleared, the benchmark map must show the deforested areas at each monitoring event
Source of data	Remote sensing in combination with GPS data collected during ground truthing

Description of measurement methods and procedures to be applied	The minimum map accuracy must be 90% for the classification of forest/non-forest in the remote sensing imagery. If the classification accuracy is less than 90% then the map is not acceptable for further analysis. More remote sensing data and ground truthing data will be needed to produce a product that reaches the 90% minimum mapping accuracy
Frequency of monitoring/recording	Must be monitored at least every 5 years or if verification occurs on a frequency of less than every 5 years examination must occur prior to any verification event
Value applied	To be calculated ex-post
Monitoring equipment	Remote sensing and GIS
QA/QC procedures to be applied	The Mapbiomas project contributes to understand the land use dynamics in Brazil. The data generated by this program is used in this project. Mapbiomas data are applicable for use in this project, according to the criteria listed below (Methodology VM0007): i) Mapbiomas data covers the entire project area, leakage belt and reference region. ii) Mapbiomas data cover the entire reference period (beginning, middle and end) of the fixed baseline period. iii) Mapbiomas monitors conversion of forest land to non-forest land. iv) Monitoring occurred during the entire fixed baseline period. In case of unavailability of Mapbiomas data for monitoring period, other sources will be consulted such as PRODES or a classification of imagery (Landsat8) will be carried out to measure deforested area: 1. Land use and land cover mapping is assessed using images with spatial resolution superior to 30 meters. Image acquisition is performed during the period of low incidence of clouds and rainfall in the region, within July and September. 2. Images undergo geometric correction by means of geo-referencing, using topographic maps as reference or USG-NASA orthorectified images. 3. For analysis of areas with cloud cover, visual interpretation of radar image would be performed. Evaluation of classification accuracy is performed by analyzing the overall accuracy and kappa index obtained from a confusion matrix. The minimum accuracy of the classification mapping should be over than 90%, considered very good.
Purpose of data	Project Emission
Calculation method	Remote sensing and GIS

Comments	N/A
Data / Parameter	Leakage Belt Forest Cover Monitoring Map
Data unit	ha
Description	Map showing the location of forest land within the leakage belt area at the beginning of each monitoring period. Only applicable where leakage is to be monitored in a leakage belt
Source of data	Remote sensing in combination with GPS data collected during ground truthing
Description of measurement methods and procedures to be applied	The minimum map accuracy must be 90% for the classification of forest/non-forest in the remote sensing imagery. If the classification accuracy is less than 90% then the map is not acceptable for further analysis. More remote sensing data and ground truthing data will be needed to produce a product that reaches the 90% minimum mapping accuracy.
Frequency of monitoring/recording	Must be monitored at least every 5 years or if verification occurs on a frequency of less than every 5 years examination must occur prior to any verification event
Value applied	To be calculated ex-post
Monitoring equipment	Remote sensing and GIS
QA/QC procedures to be applied	The Mapbiomas project contributes to understand the land use dynamics in Brazil. The data generated by this program is used in this project. Mapbiomas data are applicable for use in this project, according to the criteria listed below (Methodology VM0007): i) Mapbiomas data covers the entire project area, leakage belt and reference region. ii) Mapbiomas data cover the entire reference period (beginning, middle and end) of the fixed baseline period. iii) Mapbiomas monitors conversion of forest land to non-forest land. iv) Monitoring occurred during the entire fixed baseline period. In case of unavailability of Mapbiomas data for monitoring period, other sources will be consulted such as PRODES or a classification of imagery (Landsat8) will be carried out to measure deforested area: Land use and land cover mapping is assessed using images with spatial resolution superior to 30 meters. Image acquisition is performed during the period of low incidence of clouds and rainfall in the region, within July and September.

	5. Images undergo geometric correction by means of geo-referencing, using topographic maps as reference or USG-NASA orthorectified images. 6. For analysis of areas with cloud cover, visual interpretation of radar image would be performed. Evaluation of classification accuracy is performed by analyzing the overall accuracy and kappa index obtained from a confusion matrix. The minimum accuracy of the classification mapping should be over than 90%, considered very good.
Purpose of data	Leakage emissions
Calculation method	Remote sensing and GIS
Comments	N/A

Data / Parameter	ADefLB _{i,u,t}
Data unit	ha
Description	Area of recorded deforestation in the leakage belt in stratum i converted to land use u in year t
Source of data	As per Module M-REDD v2.2. Remote sensing imagery.
Description of measurement methods and procedures to be applied	As per Module M-REDD. Satellite imagery analysis.
Frequency of monitoring/recording	Annually
Value applied	To be measured ex-post.
Monitoring equipment	N/A
QA/QC procedures to be applied	As per Section 9.3 of REDD+ MF or other VCS methodology that uses this module.
Purpose of data	Calculation of leakage emissions
Calculation method	N/A.
Comments	N/A.

5.2 Data and Parameters Available at Validation

Data / Parameter	CF
Data unit	tC _t /td.m ⁻¹
Description	Carbon fraction of dry matter in t C t ⁻¹ d.m
Source of data	Values from the literature (e.g. IPCC 2006 INV GLs AFOLU Chapter 4 Table 4.3) shall be used if available, otherwise default value of 0.47 t C t ⁻¹ d.m. can be used
Value applied	0.47
Justification of choice of data or description of measurement methods and procedures applied	The default value was used for conservativeness purposes.
Purpose of Data	• Calculation of baseline emissions • Calculation of project emissions • Calculation of leakage
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	44/12
Data unit	Dimensionless
Description	Carbon mass to CO ₂ e mass conversion factor
Source of data	From scientific literature: 2006 IPCC Guidelines for National Greenhouse Gas Inventories Volume 4 AFOLU
Value applied	44/12
Justification of choice of data or description of measurement methods and procedures applied	Conversion from C to CO ₂ based on molecular weights
Purpose of Data	• Calculation of baseline emissions • Calculation of project emissions • Calculation of leakage

Comments	IPCC standard value
Data / Parameter	R
Data unit	t root d.m.t ⁻¹ shoot d.m.
Description	Root to shoot ratio appropriate to species or forest type / biome; note that as defined here, root to shoot ratio is applied as belowground biomass per unit area: aboveground biomass per unit area (not on a per stem basis)
Source of data	According to CP-AB - page 17; "Tropical rainforest"; ">125 t.ha ⁻¹ ".
Value applied	0.37
Justification of choice of data or description of measurement methods and procedures applied	Local values are not known, and the value proposed in CP-AB is conservative.
Purpose of Data	• Calculation of baseline emissions • Calculation of project emissions • Calculation of leakage
Comments	N/A.

Data / Parameter	WW_{ty}
Data unit	Dimensionless
Description	Fraction of extracted biomass effectively emitted to the atmosphere during production by class of wood product ty
Source of data	Default value for developing countries: CP-W - page 14.
Value applied	0.24
Justification of choice of data or description of measurement methods and procedures applied	As per CP-W.
Purpose of Data	Calculation of baseline emissions
Comments	Parameter values to be updated if new empirically based peer-reviewed findings become available.

Data / Parameter	SLF_{ty}
Data unit	Dimensionless
Description	Fraction of wood products that will be emitted to the atmosphere within 5 years of production by class of wood product ty
Source of data	As per CP-W: Sawnwood, page 13.
Value applied	0.20
Justification of choice of data or description of measurement methods and procedures applied	Default conservative value prescribed by CP-W.
Purpose of Data	Calculation of baseline emissions
Comments	Parameter values to be updated if new empirically based peer-reviewed findings become available

Data / Parameter	OF_{ty}
Data unit	Dimensionless
Description	Fraction of wood products that will be emitted to the atmosphere between 5 and 100 years of timber harvest by class of wood product ty
Source of data	The OF_{ty} is the complementary number of SLF_{ty} : the sum of both parameters must equal 1 (i.e., 100%).
Value applied	0.80
Justification of choice of data or description of measurement methods and procedures applied	As per CP-W.
Purpose of Data	Calculation of baseline emissions
Comments	Parameter values to be updated if new empirically based peer-reviewed findings become available.

Data / Parameter	P_{COMI}
Data unit	Dimensionless

Description	Commercial volume as a percent of total aboveground volume in stratum <i>i</i> .
Source of data	For calculation of this parameter, the volume of merchantable wood in exploitation (in m³/ha) has been based on “Florestal Santa Maria Project” (35.08 m³/ha), whose Project Area is located about 120 km South of this Project Area and has the same two forest classes represented within it (According to Figure 22 of FSM VCS-PD¹³⁰): Submontane open tropical forest (“As”), and Submontane dense tropical forest (“Ds”)”, in the IBGE classification, which are the same as those predominating in this project (51% and 46% of the Evergreen PA, respectively). Age classes are assumed to be similar, as both sites had not been deforested or managed until the date of their forest inventories (i.e., both were primary forests). In this context, it is assumed that the composition of species and tree sizes are the same, given the identical IBGE classification for both typologies, given that both areas held primary forests at the inventory date. Importantly, based on literature consulted, both As and Ds typologies have very close aboveground biomasses (As: 254 t/ha; Ds: 251 t/ha): therefore, it is assumed that tree sizes are also similar in primary forest sites. In the “Florestal Santa Maria Project” aboveground biomass ranges from 224 to 268 t/ha, while the average aboveground biomass in this project is estimated as 253 t/ha. Furthermore it is noted that the climate type is the same for both projects – specifically, Tropical monsoon climate area (type (“Am”) of the Köppen climate classification system). And the predominant soil type in both project is the same, Red-Yellow Argisol (PVe), as shown under Figure 20 of the FSM PD. Thus, as prescribed in CP-W, a forest inventory from a proxy area in the same region, representing the same forest type and age class was chosen for calculation of this parameter.
Value applied	Submontane dense: 0.08235 Submontane open: 0.08155
Justification of choice of data or description of measurement methods and procedures applied	As prescribed in CP-W, a forest inventory from a proxy area in the same region, representing the same forest type and age class was chosen for calculation of this parameter: Submontane open tropical forest (“As”), and Submontane dense tropical forest (“Ds”).

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https://registry.verra.org/mymodule/ProjectDoc/Project_ViewFile.asp?FileID=52137&IDKEY=9lksjoiuqwgnrnoiuomnckjashoufifmln902309ksdfiku098l71896923 (last visited in 10/09/2021)

	This parameter is updated at baseline renewal when aboveground biomass is re-inventoried as per module CP-AB (at least every 10 years).
Purpose of Data	Calculation of baseline emissions
Comments	Updated at the time of baseline revision (at least every 10 years). Application of the commercial percentage of total volume introduces the simplifying assumption (and conservative, as it is only used in the ex-ante baseline calculations) that all commercial stocks are extracted (i.e., perfect efficiency).

Data / Parameter	$C_{WP,i}$
Data unit	t CO ₂ e ha ⁻¹
Description	Mean carbon stock entering the wood products pool from stratum <i>i</i>
Source of data	VCS Module VMD0005 REDD Methodological Module: Estimation of Carbon Stocks in The Long-Term Wood Products Pool (CP-W) ¹³¹ . This parameter has been calculated using default values prescribed in CP-W.
Value applied	2.61
Justification of choice of data or description of measurement methods and procedures applied	As per CP-W.
Purpose of Data	Calculation of baseline emissions
Comments	N/A.

Data / Parameter	C_{ab_tree}
Data unit	t CO ₂ -e ha ⁻¹
Description	Mean aboveground biomass carbon stock in stratum <i>i</i>
Source of data	The value is the result of the division of the total aboveground carbon pool per stratum by the area, as indicated in Table 35
Value applied	433.3 for Submontane dense 437.6 for Submontane open

¹³¹ <https://verra.org/wp-content/uploads/2018/03/VMD0005-CP-W-v1.1.pdf> (last visited in 28/09/2021)

Justification of choice of data or description of measurement methods and procedures applied	As indicated in module CP-AB.
Purpose of Data	Calculation of baseline emissions
Comments	N/A

Data / Parameter	C_{bb_tree}
Data unit	t CO ₂ -e ha ⁻¹
Description	Mean belowground biomass carbon stock in stratum i
Source of data	The value is the result of the division of the total aboveground carbon pool per stratum by the area, as indicated in Table 35
Value applied	254.5 for Submontane dense 257.0 for Submontane open
Justification of choice of data or description of measurement methods and procedures applied	As indicated in module CP-AB.
Purpose of Data	Calculation of baseline emissions
Comments	N/A

Data / Parameter	C_{XB}
Data unit	t CO ₂ -e ha ⁻¹
Description	Mean stock of extracted biomass carbon from stratum i
Source of data	Calculated as in Table 40
Value applied	27.03
Justification of choice of data or description of measurement methods and procedures applied	Calculated according to Module CP-W

Purpose of Data	Calculation of baseline emissions
Comments	N/A.

Data / Parameter	Pasture carbon pool
Data unit	t CO ₂ e
Description	Pasture carbon pool in the baseline scenario
Source of data	<i>Terceiro Inventário Brasileiro de Emissões e Remoções Antrópicas de Gases de Efeito Estufa Relatórios de Referência Setor Uso da Terra, Mudança do Uso da Terra e Florestas</i> (Third Brazilian Inventory of Greenhouse Gas Emissions and Removals Reference Reports Land Use, Land Use Change and Forestry Sector). Ministry of Science, Technology and Innovation, 2015 ¹³² . Deforestation measured through data from Mapbiomas project.
Value applied	Table 42
Justification of choice of data or description of measurement methods and procedures applied	The post-deforestation biomass (pasture) according to the National GHG Inventory has been multiplied by the deforestation measured through data from Mapbiomas.
Purpose of Data	Calculation of baseline emissions
Comments	Calculation based on country-specific values.

Data / Parameter	BCEF
Data unit	Dimensionless
Description	Biomass conversion and expansion factor for conversion of commercial wood volume per unit area to total aboveground tree biomass per unit area
Source of data	According to CP-AB - page 14, being the average of the three proposed factors.
Value applied	1.32

¹³² http://redd.mma.gov.br/images/FREL/RR_LULUCF_Mudana-de-Uso-e-Floresta.pdf (last visited in 17/09/2021)

Justification of choice of data or description of measurement methods and procedures applied	BCEF was applied for conversion of merchantable volume to total aboveground tree biomass
Purpose of Data	• Calculation of baseline emissions • Calculation of project emissions • Calculation of leakage
Comments	N/A.

Data / Parameter	Cab_{icl}
Data unit	tCO ₂ /ha
Description	Average carbon stock per hectare in the above-ground biomass carbon pool of initial forest class icl
Source of data	Average of public literature data from the project region. Further details are provided in “1.13 Conditions Prior to Project Initiation” of this VCS-PD.
Value applied	Submontane dense tropical rainforest: 432.6 Submontane open tropical forest: 437.7
Justification of choice of data or description of measurement methods and procedures applied	1.32 Biomass Expansion Factor (BCEF) was applied for conversion of merchantable volume to total aboveground tree biomass, according to CP-AB - page 14, being the average of the three factors presented in the module, for conservativeness. 0.589 t/m ³ wood density was applied, according to Nogueira (2008).
Purpose of Data	Calculation of baseline emissions
Comments	Literature studies used for this assessment, as well as respective calculations, are available for consultation by the audit team.

Data / Parameter	Cbb_{icl}
Data unit	tCO ₂ /ha
Description	Average carbon stock per hectare in the below-ground biomass carbon pool of initial forest class icl

Source of data	Average of public literature data from the project region. Further details are provided in “1.13 Conditions Prior to Project Initiation” of this VCS-PD.
Value applied	Submontane dense tropical rainforest: 254.5 Submontane open tropical forest: 257.0
Justification of choice of data or description of measurement methods and procedures applied	0.37 root-shoot ratio (R) was applied, according to “2006 IPCC Guidelines for National Greenhouse Gas Inventories”, V. 4, Ch. 4, AFOLU, pg. 4.49, Table 4-4.
Purpose of Data	Calculation of baseline emissions
Comments	Literature studies used for this assessment, as well as respective calculations, are available for consultation by the audit team.

Data / Parameter	$C_{ABnon-tree,post,i}$; $C_{BBnon-tree,post,i}$
Data unit	tCO ₂ /ha
Description	Post-deforestation carbon stock in aboveground non-tree vegetation in stratum i; t CO ₂ -e ha ⁻¹ ; Post-deforestation carbon stock in belowground non-tree biomass in stratum i; t CO ₂ -e ha ⁻¹
Source of data	<i>Terceiro Inventário Brasileiro de Emissões e Remoções Antrópicas de Gases de Efeito Estufa Relatórios de Referência Setor Uso da Terra, Mudança do Uso da Terra e Florestas</i> (Third Brazilian Inventory of Greenhouse Gas Emissions and Removals Reference Reports Land Use, Land Use Change and Forestry Sector). Ministry of Science, Technology and Innovation, 2015 ¹³³ .
Value applied	27.8 (sum of above and belowground biomass)
Justification of choice of data or description of measurement methods and procedures applied	Value used in the National GHG inventory.
Purpose of Data	Calculation of baseline emissions
Comments	Country-specific value provided for above and belowground biomass of pasture.

¹³³ http://redd.mma.gov.br/images/FREL/RR_LULUCF_Mudana-de-Uso-e-Floresta.pdf (last visited in 17/09/2021)

Data / Parameter	Cabfcl
Data unit	tCO ₂ /ha
Description	Average carbon stock per hectare in the above-ground biomass carbon pool of final post-deforestation class fcl
Source of data	Weighted average (by area obtained in Terra Class database): 2006 IPCC Guidelines for National Greenhouse Gas Inventories, V. 4, Chapter 6: Grassland, pg. 6.27, Table 6.4 (for Pasture: 76.1% of area) 2006 IPCC Guidelines for National Greenhouse Gas Inventories, V. 4, Chapter 4: Forest Land, pg. 4.63, Table 4.12 (for Pasture with regeneration: 23.9% of area) Value applied: 61.1
Value applied	27.8
Justification of choice of data or description of measurement methods and procedures applied	Conservative default value from IPCC, to estimate post-deforestation land use carbon stock.
Purpose of Data	• Calculation of baseline emissions • Calculation of project emissions • Calculation of leakage
Comments	Conservative average to be used in calculations, based on uncertainties in source values.

Data / Parameter	COMF
Data unit	Dimensionless
Description	Combustion factor for stratum i (vegetation type)

Source of data	E-BPB refers to Table 2.6 of 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 4 Agriculture, Forestry and Other Land Use, Chapter 2, “Primary tropical moist forest” ¹³⁴
Value applied	0.50
Justification of choice of data or description of measurement methods and procedures applied	Value was applied according to E-BPB: Table 2.6 of 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 4 Agriculture, Forestry and Other Land Use, Chapter 2, “Primary tropical moist forest”
Purpose of Data	Calculation of baseline emissions Calculation of project emissions
Comments	N/A.

Data / Parameter	G_{gi}
Data unit	g kg ⁻¹ dry matter burnt
Description	Emission factor for stratum i for gas g
Source of data	Defaults can be found in Volume 4, Chapter 2, of the IPCC 2006 Inventory Guidelines in table 2.5 (see Annex 2: emission factors for various types of burning for CH ₄ and N ₂ O).
Value applied	G _{CH₄} = 4.8 G _{N₂O} = 0.2
Justification of choice of data or description of measurement methods and procedures applied	Conservative default values from IPCC 2006.
Purpose of Data	• Calculation of baseline emissions • Calculation of project emissions • Calculation of leakage emissions
Comments	N/A.

Data / Parameter	Deforestation
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¹³⁴ https://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/4_Volume4/V4_02_Ch2_Generic.pdf (last visited in 20/09/2021)

Data unit	ha
Description	Maps of forest cover areas converted into non-forest areas
Source of data	Measured through data from Mapbiomas project
Value applied	Yearly variable: deforestation values are presented for the Reference Region, Leakage Belt and Project Area (projections) in this VCS-PD
Justification of choice of data or description of measurement methods and procedures applied	The Mapbiomas project contributes to understand the land use dynamics in Brazil. The data generated by this program is used in this project. Mapbiomas data are applicable for use in this project, according to the criteria listed below (Methodology VM0007): i) Mapbiomas data covers the entire project area, leakage belt and reference region. ii) Mapbiomas data cover the entire reference period (beginning, middle and end) of the fixed baseline period. iii) Mapbiomas monitors conversion of forest land to non-forest land. iv) Monitoring occurred during the entire fixed baseline period. In case of unavailability of Mapbiomas data for the monitoring period, other sources will be consulted such as PRODES, or a classification of imagery (Landsat8) will be carried out to measure deforested area: 1) Land use and land cover mapping is assessed using images with spatial resolution superior to 30 meters. Image acquisition is performed during the period of low incidence of clouds and rainfall in the region, within July and September. 2) Images undergo geometric correction by means of geo-referencing, using topographic maps as reference or USG-NASA orthorectified images. 3) For analysis of areas with cloud cover, visual interpretation of radar image would be performed. Evaluation of classification accuracy is performed by analyzing the overall accuracy and kappa index obtained from a confusion matrix. The minimum accuracy of the classification mapping should be over than 90%, considered very high.
Purpose of Data	• Calculation of baseline emissions
Comments	N/A

Data / Parameter	Dmm
Data unit	t d.m.m ⁻³

Description	Mean wood density of commercially harvested species
Source of data	Source: Brown, S., A. J. R. Gillespie, and A. E. Lugo, 1989. Biomass estimation methods for tropical forests with applications to forest inventory data. Forest Science, 35:881-902. See pg. 890, Table 4, Moist
Value applied	0.59
Justification of choice of data or description of measurement methods and procedures applied	Country-specific data obtained from the same biome.
Purpose of Data	• Calculation of baseline emissions • Calculation of project emissions • Calculation of leakage emissions
Comments	N/A.

Data / Parameter	LDF
Data unit	t C m ⁻³
Description	Factor for calculating the biomass of dead wood created during logging operations per cubic meter extracted (i.e. Logging Damage Factor)
Source of data	VMD0001 LK-ME ¹³⁵
Value applied	0.53
Justification of choice of data or description of measurement methods and procedures applied	It is the default value for broadleaf and mixed forests, according to module VMD0001 LK-ME. Default value for broadleaf and mixed forests of 0.53 t C m ⁻³ from 774 logging gaps measured by Winrock International in Bolivia, Belize, the Republic of Congo, Brazil and Indonesia may be used for tropical broadleaf forests
Purpose of Data	• Calculation of leakage emissions • Calculation of project emissions
Comments	N/A.

Data / Parameter	LIF
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¹³⁵ Source: <https://verra.org/wp-content/uploads/2018/03/VMD0011-LK-ME-v1.0.pdf> (pg 8)

Data unit	t C m ⁻³
Description	Factor for calculating the emissions arising from the creation of logging infrastructure (roads, skid trails and decks) during logging operations per cubic meter extracted
Source of data	LK-ME, pg 8
Value applied	0.29
Justification of choice of data or description of measurement methods and procedures applied	Conservative default value of 0.29 t CO ₂ -e m ⁻³ calculated from 1,839 hectares of logging concessions analysed by Winrock International in the Republic of Congo and Brazil, may be used for tropical broadleaf forests.
Purpose of Data	• Calculation of leakage emissions • Calculation of project emissions
Comments	N/A.

Data / Parameter	LF_{ME}
Data unit	dimensionless
Description	Leakage factor for market effects calculations
Source of data	VMD0011 (LK-ME)
Value applied	0.2
Justification of choice of data or description of measurement methods and procedures applied	When the mean biomass is more than 15% greater than the biomass within the project boundaries, the LF _{ME} shall be considered 0.2. In the Evergreen REDD+ Project, the biomass of total aboveground tree is considered to be 32,65% greater in the Amazon Biome than in the Project Area.
Purpose of Data	Calculation of leakage
Comments	N/A.

Data / Parameter	C_{LB}
Data unit	t CO ₂ e ha ⁻¹
Description	Area-weighted average aboveground tree carbon stock for forests available for unplanned deforestation inside the leakage belt

Source of data	Project Area data
Value applied	435.8
Justification of choice of data or description of measurement methods and procedures applied	Based on similarity analysis, data from the Project Area was applied to Leakage Belt area. It was taken a weighted average of aboveground biomass inside the Project Area.
Purpose of Data	Calculation of leakage emissions
Comments	N/A.

Data / Parameter	COLB
Data unit	t CO ₂ e ha ⁻¹
Description	Area-weighted average aboveground tree carbon stock for forests available for unplanned deforestation outside the leakage belt
Source of data	Saatchi, R.A. Houghton, R.C. dos Santos Alvalá, J.V. Soares, and Yifan Yu. Distribution of Aboveground Live Biomass in the Amazon Basin. 2007. As per LK-ASU, the number is derived from peer-reviewed literature that is appropriate, as it considers the same biome.
Value applied	578.1
Justification of choice of data or description of measurement methods and procedures applied	The value of 578,1 tCO ₂ /ha is the total mean biomass for floodplain forest in the Amazon basin of 157.66 tC/ha (according to Table 7 the study mentioned before), multiplied by 44/12, the conversion factor from tC to tCO ₂ .
Purpose of Data	Calculation of leakage emissions
Comments	N/A.

Data / Parameter	DLF
Data unit	%
Description	Displacement Leakage Factor
Source of data	Local assessment
Value applied	10

Justification of choice of data or description of measurement methods and procedures applied	If deforestation agents do not participate in leakage prevention activities and project activities, the Displacement Factor shall be 100%. Where leakage prevention activities are implemented, the factor shall be equal to the proportion of the baseline agents estimated to be given the opportunity to participate in leakage prevention activities and project activities. The project design team estimates that 100% of potential deforestation agents in the Reference Region will be given the opportunity to participate in leakage prevention activities. Given that the PP is divulging the project activity and recruiting new project instances, it can be stated that most of neighbors are being given opportunity to participate in leakage prevention activities. Thus, the “Displacement Leakage Factor” (DLF) was conservatively defined as 10%.
Purpose of Data	Calculation of leakage
Comments	This value is an ex-ante estimate. Accurate and actual values will be monitored and reported in verification periods

5.3 Monitoring Plan

This Monitoring Plan was developed according to Methodology VM0007 Version 1.6. The methodology encompasses four main monitoring tasks:

- i) Monitoring of project implementation;
- ii) Monitoring of actual carbon stock changes and GHG emissions within the project area;
- iii) Monitoring of leakage; and
- iv) Ex post calculation of net anthropogenic GHG emissions reductions.

This Monitoring Plan describes how these tasks will be implemented. For each task, the monitoring plan includes the following aspects:

- a) Technical description of the monitoring tasks;
- b) Data to be collected;
- c) Overview of data collection procedures;
- d) Quality control and quality assurance procedures;
- e) Data archiving; and
- f) Organization and responsibilities of the parties involved in all the above.

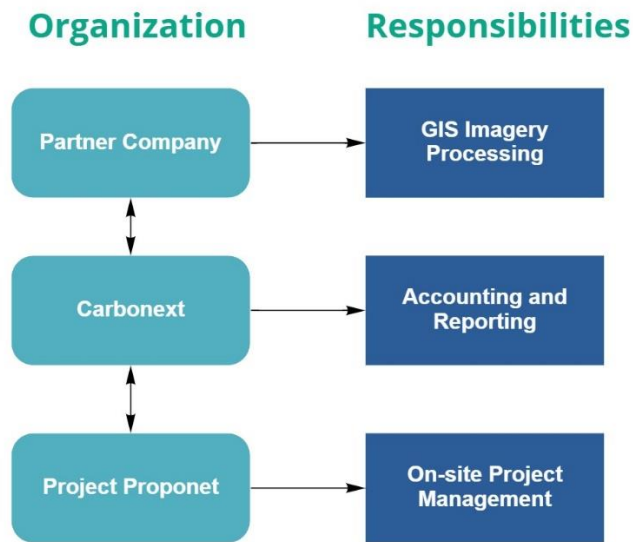


Figure 45. General overview of parties involved in monitoring activities.

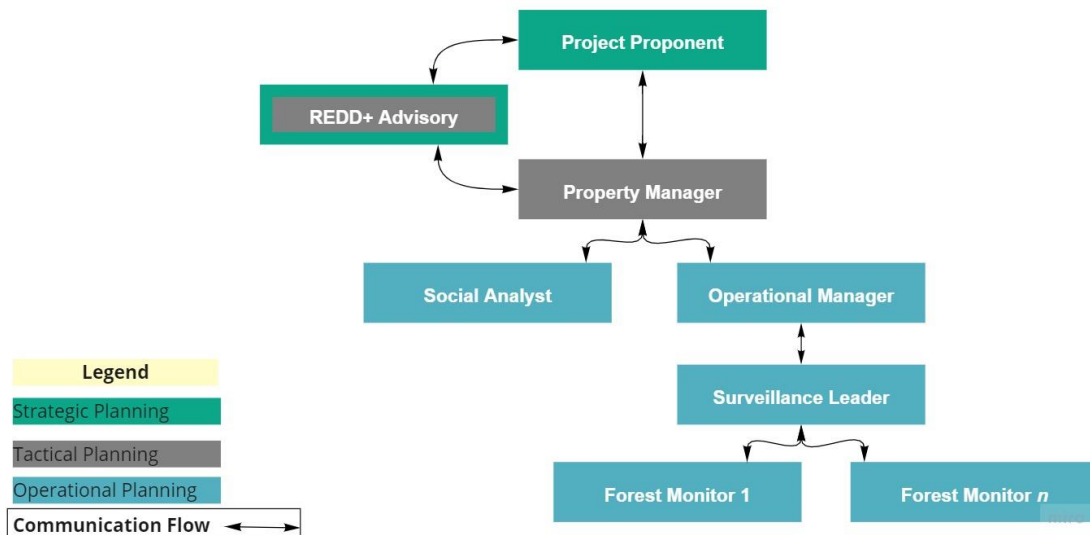


Figure 46. General overview of staff in the Project Area

Figure 46 exemplifies the current project organization chart, being the communication flow arrows between the team members. The document “Procedure for Asset Control” (Proced_Control e Patrimonial e Combate a Incendio) describes in detail the processes for

monitoring, combating and preventing fires. However, the Carbonext team and the owners are together reviewing the operating procedures to standardize monitoring actions, determine responsibilities, how evidence should be recorded, how to prevent risks to forest integrity and how to combat in case of occurrences. This review aims to make actions more assertive and agile in combating and preventing deforestation, invasions and forest fires

In case new instances are added, the same procedure will be applied, with safeguards for necessary adjustments.

The central GHG information system and controls, associated with the project and its monitoring, are under technical responsibility of Carbonext. The backup of central GHG information system and controls is kept in a cloud drive, as well as in hard drives of project proponents for security. The monitoring controls are also under Carbonext responsibility and respective information is updated according to pre-determined monitoring frequencies and inclusion of new instances. The owners are responsible for on-site monitoring, as well as for carrying out action plans if there is any occurrence. Owners will forward the evidence of the actions to the Carbonext team, which will analyze and record the occurrences for audit purposes.

5.3.1 Monitoring of Actual Carbon Stock Changes and GHG Emissions within the Project Area

5.3.1.1 Monitoring of project implementation

a) Technical description of the monitoring tasks.

Project activities implemented within the project area will be monitored to be consistent with the management plans of the project area and the PD.

b) Data to be collected.

Monitoring of deforestation-avoidance activities will be performed by means of evaluations of the surveillance rounds and using satellite imagery to continuously inspect the forest condition within the Project Area. All images, maps and records generated during project implementation should be conserved and made available to VCS verifiers at verification for inspection to demonstrate that the AUD project activity has actually been implemented.

Monitoring of social and biodiversity parameters of project implementation will be based on data required in Table 49 and Table 50 which attest that foreseen activities are being effectively implemented. A system will be implemented to record data on costs and investments, based on invoices, receipts and contracts related to activity implementation, as well as signed attendance lists.

c) Overview of data collection procedures.

All invoices, receipts and contracts related to activities implemented in this REDD project shall be conserved in printed version. Whenever possible, documentation should be kept in electronic format.

d) Quality control and quality assurance procedures.

The project proponent will train personnel to collect and keep all documentation in a sure place. All electronic documentation should also be sent to CARBONEXT to further security and checking.

e) Data archiving.

All maps and records generated during project implementation will be conserved and made available to VCS verifiers at verification. Backup copies of files should be available in the project proponent facilities, as well as in CARBONEXT facilities.

All documents and records will be kept in a secure retrievable manner for at least two years after the end of the project crediting period.

f) Organization and responsibilities of the parties involved in all the above.

The project proponent is responsible to implement this monitoring item. CARBONEXT is co-responsible in archiving, and quality control and quality assurance procedures.

5.3.1.2 Monitoring of land-use and land-cover change within the project area

a) Technical description of the monitoring tasks.

Monitoring of land-use and land-cover change within the Project Area will be performed annually by analyzing satellite imagery of the Project Area.

Imagery analysis of land use will be based on secondary information from Mapbiomas project, referring mainly to the classes "Forest Land" and "Non-Forest Land"

b) Data to be collected.

The categories of change that will be subject to MRV-A (monitoring, reporting, verification and accounting) are "Area of forest land converted to non-forest land", "Area of forest land undergoing carbon stock decrease" and "Area of forest land undergoing carbon stock increase".

In this context, data to be collected consists of annual land use cover processed by Mapbiomas project for the entire land coverage of Project Area and other such as Leakage belt and reference region.

The validation will be performed by using satellite images from Landsat 8 TM (orbits 230/65, 230/66, 231/65 and 231/66) to cover the total geographic scope of the Project Area and

Reference Region. Other optical sensors could be use for accuracy assessment in case of cloud cover such as Sentinel 2 and CBERS.

c) Overview of data collection procedures.

The Mapbiomas project contributes to understand the land use dynamics in Brazil. The data generated by this program is used in this project. Mapbiomas data are applicable for use in this project, according to the criteria listed below (Methodology VM0007):

- i) Mapbiomas data cover the entire project area, leakage belt and reference region.
- ii) Mapbiomas data cover the entire reference period (beginning, middle and end) of the fixed baseline period.
- iii) Mapbiomas monitors conversion of forest land to non-forest land.
- iv) Monitoring occurred during the entire fixed baseline period.

d) Quality control and quality assurance procedures.

The validation of land-use data used for modeling of land use will be performed by using the confusion matrix, in order to calculate the overall index of success by period and by class. Three specific classes will be used: forest, accumulated deforestation and other (hydrography, not forest, clouds, roads, residues, unclassified objects, and others).

The validation will be performed by using satellite images from Landsat 8 TM (orbits 230/65, 230/66, 231/65 and 231/66) to cover the total geographic scope of the Project Area and Reference Region. Other optical sensors could be use for accuracy assessment in case of cloud cover such as Sentinel 2 and CBERS.

With the help of the "Create Random Points" tool in ArcGIS 10.0, at least 100 random points will be generated for each class / year as samples for evaluation, using satellite images as reference, making it possible to generate a confusion matrix for calculation of the accuracy indexes, and the Kappa index (indicators for validation of mapping accuracy). Land use classes must have higher values than 90% for the accuracy, as required in VMD0007 3.3 methodology.

e) Data archiving.

All maps and records generated during project implementation will be conserved and made available to VCS verifiers at verification for inspection to demonstrate that the AUD project activity has actually been implemented.

All documents and records will be kept in a secure retrievable manner for at least two years after the end of the project crediting period.

f) Organization and responsibilities of the parties involved in all the above.

All satellite imagery assessments will be performed either in-house by CARBONEXT or by a third-party specialized partner company such as AVIX. CARBONEXT is responsible for reporting and data archiving, according to VM0007, and for providing assistance during verification audits. The Project Proponent is co-responsible for data archiving.

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

a) Technical description of the monitoring tasks.

Monitoring of carbon stocks is mandatory in the following cases:

Within the project area:

a) Areas subject to significant carbon stock decrease in the project scenario according to the *ex-ante* assessment. These will be areas subject to controlled deforestation and planned harvest activities, such as logging, fuel wood collection and charcoal production. In these areas, carbon stock changes must be estimated at least once after each harvest event.

b) Areas subject to unplanned and significant carbon stock decrease, e.g., due to uncontrolled forest fires and other catastrophic events. In these areas, carbon stock losses must be estimated as soon as possible after the catastrophic event.

Within leakage management areas:

a) Areas subject to planned and significant carbon stock decrease in the project scenario according to the *ex-ante* assessment. In these areas, carbon stocks must be estimated at least once after the planned event that caused the carbon stock decrease.

b) Data to be collected.

The results of monitoring activity data and carbon stocks must be reported using the same formats and tables used for the *ex-ante* assessment, according to Methodology VM0007 (the applicability of each table must be evaluated *ex post*, in the Monitoring Report).

Non-CO₂ emissions from forest fires are subject to monitoring and accounting, when significant.

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.

If the area (or a sub-set of it) is affected by natural disturbances or man-made events generated VCU in past verifications, the total net change in carbon stocks and GHG emissions in the area(s)

that generated VCUs must be estimated, and an equivalent amount of VCUs must be cancelled from the VCS buffer.

c) Overview of data collection procedures.

The Mapbiomas project contributes to understand the land use dynamics in Brazil. The data generated by this program is used in this project. Mapbiomas data are applicable for use in this project, according to the criteria listed below (Methodology VM0007):

- i) Mapbiomas data cover the entire project area, leakage belt and reference region.
- ii) Mapbiomas data cover the entire reference period (beginning, middle and end) of the fixed baseline period.
- iii) Mapbiomas monitors conversion of forest land to non-forest land.
- iv) Monitoring occurred during the entire fixed baseline period.

d) Quality control and quality assurance procedures.

The validation of land-use data used for modeling of land use will be performed by using the confusion matrix, in order to calculate the overall index of success by period and by class. Three specific classes will be used: forest, accumulated deforestation and other (hydrography, not forest, clouds, roads, residues, unclassified objects, and others).

The validation will be performed by using satellite images from Landsat 8 TM (orbits 230/65, 230/66, 231/65 and 231/66) to cover the total geographic scope of the Project Area and Reference Region. Other optical sensors could be use for accuracy assessment in case of cloud cover such as Sentinel 2 and CBERS.

With the help of the "Create Random Points" tool in ArcGIS 10.0, 100 random points will be generated for each class / year as samples for evaluation, using satellite images as reference, making it possible to generate a confusion matrix for calculation of the accuracy indexes, and the Kappa index (indicators for validation of mapping accuracy).

Land use classes must have higher values than 90% accuracy for the accuracy and Kappa index, as required in VM0007 1.6 methodology.

e) Data archiving.

All maps and records generated during project implementation will be conserved and made available to VCS verifiers at verification for inspection to demonstrate that the AUD project activity has actually been implemented.

All documents and records will be kept in a secure retrievable manner for at least two years after the end of the project crediting period.

f) Organization and responsibilities of the parties involved in all the above.

All satellite imagery assessments will be performed by a third-party specialist GIS company, currently represented by Avix. CARBONEXT is responsible for reporting and data archiving, and for providing assistance during verification audits. The Project Proponent is co-responsible for data archiving.

5.3.2 Monitoring of Leakage

a) Technical description of the monitoring tasks

The sources of leakage identified as significant in the *ex-ante* assessment are subject to monitoring. Two sources of leakage are potentially subject to monitoring:

- I. Decrease in carbon stocks and increase in GHG emissions associated with leakage prevention activities;
- II. Decrease in carbon stocks and increase in GHG emissions in due to activity displacement leakage.

This Project Activity does not involve decrease in carbon stocks and increase in GHG emissions associated with leakage prevention activities. In this project, leakage prevention activities do not involve any carbon stock reduction due to deforestation or additional emissions caused by increased grazing activities. In this case, only the decrease in carbon stocks and increase in GHG emissions in due to activity displacement leakage will be monitored.

b) Data to be collected.

Deforestation above the baseline in the leakage belt area will be considered activity displacement leakage.

The result of the *ex-post* estimations of carbon stock changes must be reported using the same table formats used in the *ex-ante* assessment of baseline carbon stock changes in the leakage belt.

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 and considered leakage. The operational entity verifying the monitoring data shall determine whether the documentation provided by the project proponent represents sufficient evidence to consider the detected deforestation as not attributable to the Project Activity and therefore not leakage.

To estimate the increased GHG emissions due to forest fires in the leakage belt area the assumption is made that forest clearing is done by burning the forest. The parameter values used to estimate emissions shall be the same used for estimating forest fires in the baseline, except for the initial carbon stocks (Cab, Cdw) which shall be those of the initial forest classes burned in the leakage belt area.

Report the result of the estimations using the same table formats used in the ex-ante assessment of baseline GHG emissions from forest fires in the project:

- Parameters used to calculate emissions from forest fires in the leakage belt area
- Ex post estimated non-CO₂ emissions from forest fires in the leakage belt area.

c) Overview of data collection procedures.

The Mapbiomas project contributes to understand the land use dynamics in Brazil. The data generated by this program is used in this project. Mapbiomas data are applicable for use in this project, according to the criteria listed below (Methodology VM0007):

- i) Mapbiomas data cover the entire project area, leakage belt and reference region.
- ii) Mapbiomas data cover the entire reference period (beginning, middle and end) of the fixed baseline period.
- iii) Mapbiomas monitors conversion of forest land to non-forest land.

Monitoring occurred during the entire fixed baseline period.

d) Quality control and quality assurance procedures.

The validation of land-use data used for modeling of land use will be performed by using the confusion matrix, in order to calculate the overall index of success by period and by class. Three specific classes will be used: forest, accumulated deforestation and other (hydrography, not forest, clouds, roads, residues, unclassified objects, and others).

The validation will be performed by using satellite images from Landsat 8 TM (orbits 230/65, 230/66, 231/65 and 231/66) to cover the total geographic scope of the Project Area and Reference Region. Other optical sensors could be used for accuracy assessment in case of cloud cover such as Sentinel 2 and CBERS.

With the help of the "Create Random Points" tool in ArcGIS 10.0, at least 100 random points will be generated for each class / year as samples for evaluation, using satellite images as reference, making it possible to generate a confusion matrix for calculation of the accuracy indexes, and the Kappa index (indicators for validation of mapping accuracy). Land use classes must have higher values than 90% for the accuracy and Kappa index, as required in VM0007 1.6 methodology.

e) Data archiving.

All maps and records generated during project implementation will be conserved and made available to VCS verifiers at verification for inspection to demonstrate that the AUD project activity has actually been implemented.

All documents and records will be kept in a secure retrievable manner for at least two years after the end of the project crediting period.

f) Organization and responsibilities of the parties involved in all the above.

All satellite imagery assessments will be performed by the third-party GIS company. CARBONEXT is responsible for reporting and data archiving, and for providing assistance during verification audits. The Project Proponent is co-responsible for data archiving.

5.3.3. Ex Post Calculation of Net Anthropogenic GHG Emission Reduction

a) Technical description of the monitoring tasks.

The calculation of ex post net anthropogenic GHG emission reductions is similar to the ex-ante calculation with the only difference that ex post estimated carbon stock changes and GHG emissions must be used in the case of the project scenario and leakage.

b) Data to be collected.

Report the ex post estimated net anthropogenic GHG emissions and calculation of Verified Carbon Units (VCUt, and VBCt) using the same table format used for the ex-ante assessment:

- Ex post estimated net anthropogenic GHG emission reductions and VCUt.

c) Overview of data collection procedures.

Data collection procedures are the same as described in previous steps. This step involves compilation of data from previous procedures to calculate ex post net anthropogenic GHG emission reduction.

d) Quality control and quality assurance procedures.

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.

e) Data archiving.

All maps and records generated during project implementation will be conserved and made available to VCS verifiers at verification for inspection to demonstrate that the AUD project activity has actually been implemented.

All documents and records will be kept in a secure retrievable manner for at least two years after the end of the project crediting period.

f) Organization and responsibilities of the parties involved in all the above.

All satellite imagery assessments will be performed by AVIX. CARBONEXT is responsible for reporting and data archiving, and for providing assistance during verification audits. The Project Proponent is co-responsible for data archiving.

5.3.4 Community and Biodiversity Variables to be Monitored

Communities

a) Technical description of the monitoring tasks.

Among the proposed activities, the project proponent forecasts the organization of trainings focusing on wild-harvesting (“agro-extractivism”), sustainable forest management and health and safety. Furthermore, fire brigade teams will be trained.

b) Data to be collected.

The indicators that will be monitored are described in the table below.

Table 49. Social parameters to be monitored

Activities dependent on the completion of the Validation Process						
Activity	Scope	Indicator	Unit	Monitoring Frequency	Goal	Corrective Actions after Critical Analyses
Training of Fire Brigade	Project Area	Attendance	N° of attendees	Annual	100% employees	Enhance partnership with teaching institutions; Improve dissemination and communication means; Revise condition of local and time of sessions
Health and Security monitoring	Project Area	Occurrences	N° of occurrences registered; N° of corrective actions performed	Semiannual	90% corrective actions completed	Improve supervision attendance in the field; Improve the number of supervisors in the field
Advice on nutritional aspects	Project Area	Attendance	N° of attendees	Annual	At least 30 participants (employees + neighbors)	Enhance partnership with teaching institutions; Improve dissemination and communication means; Revise condition of

						local and time of sessions
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Activities dependent on carbon credit sales

Training on sustainable forest management	Regional	Attendance	N° of attendees	Annual	At least 15 participants (employees + neighbors)	Enhance partnership with teaching institutions; Improve dissemination and communication means; Revise condition of local and time of sessions
Training on sustainable wild-harvesting	Regional	Attendance	N° of attendees	2 years	At least 30 participants (employees + neighbors)	Enhance partnership with teaching institutions; Improve dissemination and communication means; Revise condition of local and time of sessions

c) Overview of data collection procedures.

The following forms will be applied after any of the trainings or the advice on nutritional aspects are completed for data collection:

- I. **Attendance List:** It contains the name of the participant, type of affiliation with the project and signature.
- II. **Reaction Assessment:** participants will be able to register their perceptions regarding the content presented, making it possible to evaluate the content and make suggestions for future training. This assessment can be done anonymously and is not mandatory.

In relation to the Health and Security audits, there is a checklist (named “Vistoria de Saúde e Segurança”) that will be applied.

d) Quality control and quality assurance procedures.

All communication with workers and communities will be registered in minutes of meeting, which might be signed by all parties involved. Reports should be produced according to the monitoring frequency adopted. These reports should clearly inform the results of variables involved in monitoring, by means of photos, interviews, and documents.

e) Data archiving.

All records generated during project implementation will be conserved and made available to VCS verifiers at verification for inspection to demonstrate that the AUD project activity has actually been implemented.

All documents and records will be kept in a secure retrievable manner for at least two years after the end of the project crediting period.

f) Organization and responsibilities of the parties involved in all the above.

The Project Proponent is responsible for financing, implementing, and monitoring social aspects within the Project Area. Carbonext is co-responsible for monitoring the realization of the trainings and keep the evidence in a data room.

Biodiversity

a) Technical description of the monitoring tasks.

The monitoring tasks aim to assess the diversity of the project area in a certain period of time. The primary data generated by these inventories comprise one of the most important steps in decisions making regarding the management of natural areas and conservation actions.

These activities are dependent on the completion of the validation process and on the sales of carbon credits to be implemented.

b) Data to be collected.

This assessment will be monitored and reported according to the frequency adopted, as described in the Table 50.

Table 50. Biodiversity parameters to be monitored

Activities dependent on carbon credit sales						
Biomass, fauna and flora inventory	Project Area	Carbon Stock	tCO ₂ per hectare	5 years	Maintenance of carbon stocks	Increase in surveillance mechanisms; Develop conservation practices; Consult specialists;
		Endangered fauna species	Nº of endangered species		Maintenance of number of fauna endangered species	
		Total fauna species	Nº of species		Maintenance of total number of species	
		Endangered flora species	Nº of endangered species		Maintenance of number of flora endangered species	
		Total flora species	Nº of species		Maintenance of total number of species	

c) Overview of data collection procedures.

Data collection and records will be carried out by the local administrator.

d) Quality control and quality assurance procedures.

The quality control and quality assurance procedures will be determined by the local administrator.

e) Data archiving.

All records generated during project implementation will be conserved and made available to VCS verifiers at verification for inspection to demonstrate that the AUD project activity has actually been implemented.

All documents and records will be kept in a secure retrievable manner for at least two years after the end of the project crediting period.

f) Organization and responsibilities of the parties involved in all the above.

The Project Proponent is responsible for all assessments in this Project Activity.

Carbonext is co-responsible for data archiving.

5.3.5. Monitoring degradation due to selective logging of forest management areas possessing a FSC certificate

a) Technical description of the monitoring tasks;

The monitoring due to selective logging will only be measured if the project proponents decide to have forest management, depending on the market conditions and knowing that the management need to have the FSC certification. It is being listed here for precaution.

In the case of forest management, the net emissions are estimated by combining:

- Emissions arising from logging gap: encompass emissions from felling timber tree and emissions from incidental damage caused by falling timber tree,
- Emissions from infrastructure: from constructing logging infrastructure for removal of timber, such as haul roads, skid trails and logging decks,
- Removals from long term wood products resulting from timber extraction

b) Data to be collected;

The calculation procedure for estimating net ex post emissions and removals related to selective logging activities in the project case will be equal to the summed emissions arising from selective logging operations. Emissions resulting from selective logging may be omitted if they are deemed de minimis through the use of the Tool T-SIG.

c) Overview of data collection procedures.

Data will be collected from official forest management reports combined with the LDF taken from the most recent version of VMD0011 (LK-ME) for broadleaf and mixed forests.

d) Quality control and quality assurance procedures.

In accordance with FSC certification.

e) Data archiving;

All records generated during project implementation will be conserved and made available to VCS verifiers at verification for inspection to demonstrate that the AUD project activity has actually been implemented.

All documents and records will be kept in a secure retrievable manner for at least two years after the end of the project crediting period

f) Organization and responsibilities of the parties involved in all the above.

All satellite imagery assessments will be performed by AVIX. CARBONEXT is responsible for reporting and data archiving, and for providing assistance during verification audits. The Project Proponent is co-responsible for data archiving.

5.3.6. Monitoring areas undergoing carbon stock enhancement

a) Technical description of the monitoring tasks:

According to the VMD0015 module of the VM0007 methodology, “if during initial stratification (using Module X-STR) the project contains forest areas that are both deforested in the baseline and assumed to be accumulating carbon, then their geographic boundaries will be known— this will be one or more of the strata. The system in place for monitoring the project area will be used for monitoring any changes that occur in this stratum (or strata). Ground measurements will be used to monitor the change in carbon stocks through time as given in the carbon pool modules.

It is conservative to assume that no carbon stock enhancement is occurring. Projects may elect to set $\Delta CP_{Enh,i,t} = 0$.”

Given that it is not the case for the present project that “the project contains forest areas that are both deforested in the baseline and assumed to be accumulating carbon”, and furthermore that it is conservative to omit this variable, the variable was not included in the Monitoring Plan for the present period.

5.3.7. Monitoring areas undergoing natural disturbance

a) Technical description of the monitoring tasks:

In accordance with the VMD0015 module, for monitoring of areas undergoing natural disturbance ex-post in the project area such as tectonic activity (earthquake, landslide, volcano), extreme weather (hurricane), pest, drought, or fire that result in a loss of forest carbon stocks (excepting forest degradation), the area disturbed shall be delineated and the resulting emissions estimated.

b) Data to be collected:

Monitoring of deforestation-avoidance activities will be performed by means of evaluations of the surveillance rounds and using satellite imagery to continuously inspect the forest condition within the Project Area. All images, maps and records generated during project implementation should be conserved and made available to VCS verifiers at verification for inspection, to demonstrate that the AUD project activity has actually been implemented.

c) Overview of data collection procedures:

The category of change that will be subject to MRV-A (monitoring, reporting, verification and accounting) is area of “Area of forest land disturbed” which will be ascertained via overlaying land use / land change map with fire alert data from INPE-BDQUEIMADAS¹³⁶.

¹³⁶ Source: <http://www.inpe.br/queimadas/abasFogo.php> (last visited on 04/07/2021))

Regarding the land use / land change map for the monitoring period, as previously mentioned: data to be collected consists of annual land use cover processed by Mapbiomas project for the entire land coverage of Project Area and other such as Leakage belt and reference region.

The validation will be performed by using satellite images from Landsat 8 TM (orbits 230/65, 230/66, 231/65 and 231/66) to cover the total geographic scope of the Project Area and Reference Region. Other optical sensors could be used for accuracy assessment in case of cloud cover such as Sentinel 2 and CBERS.

Additionally, on-the-ground monitoring of deforestation will complement the remote sensing activities mentioned above, to detect areas undergoing natural disturbance. These will be performed by means of evaluations of the surveillance rounds and using satellite imagery to continuously inspect the forest condition within the Project Area. All images, maps and records generated during project implementation should be conserved and made available to VCS verifiers at verification for inspection, to demonstrate that the AUD project activity has actually been implemented.

d) Quality control and quality assurance procedures:

Regarding the GIS components mentioned above, the QA/QC procedure is as follows: The validation of land-use data used for modeling of land use will be performed by using the confusion matrix, in order to calculate the overall index of success by period and by class. Three specific classes will be used: forest, accumulated deforestation and other (hydrography, not forest, clouds, roads, residues, unclassified objects, and others).

The validation will be performed by using satellite images from Landsat 8 TM (orbits 230/65, 230/66, 231/65 and 231/66) to cover the total geographic scope of the Project Area and Reference Region. Other optical sensors could be used for accuracy assessment in case of cloud cover such as Sentinel 2 and CBERS.

With the help of the "Create Random Points" tool in ArcGIS 10.0, at least 100 random points will be generated for each class / year as samples for evaluation, using satellite images as reference, making it possible to generate a confusion matrix for calculation of the accuracy indexes, and the Kappa index (indicators for validation of mapping accuracy). Land-use classification accuracy must be over 90%, as required by the VMD0007 3.3 module.

Regarding the on-the-ground patrolling aspects the procedure is: The project proponent will train personnel to collect and keep all documentation in a sure place. All electronic documentation should also be sent to CARBONEXT to further security and checking.

e) Data archiving:

All maps and records generated during project implementation will be conserved and made available to VCS verifiers at verification for inspection to demonstrate that the AUD project activity has actually been implemented.

Regarding on-the-ground monitoring, all maps and records generated during project implementation will be conserved and made available to VCS verifiers at verification. Backup copies of files should be available in the project proponent facilities, as well as in CARBONEXT facilities.

Regarding all aspects above, all documents and records will be kept in a secure retrievable manner for at least two years after the end of the project crediting period.

f) Organization and responsibilities of the parties involved in all the above:

All satellite imagery assessments will be performed either in-house by CARBONEXT or by a third-party partner company specialized in GIS. CARBONEXT is responsible for reporting and data archiving, according to the VM0007 requirements, and for providing assistance during verification audits.

5.3.8. Degradation through extraction of trees for illegal timber or fuelwood and charcoal

a) Technical description of the monitoring tasks:

It is noted that forest degradation is not included in the scope of the monitoring and remote sensing activities of the Evergreen REDD Project. The Project Area, Reference Region, and Leakage Belt are subject to the monitoring activities, which utilize primarily MapBiomas sources, described in the present section of this MR as well as the Evergreen VCS PD.

Therefore, the present parameter is not monitored.

5.3.9. Monitoring forest degradation

a) Technical description of the monitoring tasks:

As above, forest degradation is not included in the scope of the monitoring and remote sensing activities of the Evergreen REDD Project, therefore the present parameter is not monitored. This practice has been adopted for conservativeness purposes and to avoid inaccuracy of degradation measurements.

5.3.10 Revisiting the Baseline Projections for Future Fixed Baseline Period

According to VM0007, the baseline will be revisited every 10 years. Thus, the first revision of the baseline is scheduled for 2030. For this purpose, the following tasks will be carried out:

- Updating information on agents, drivers and underlying causes of deforestation, which involves the following sub-tasks:
 - Collecting information that is relevant to understand deforestation agents, drivers and underlying causes;

- Redoing step 3 of the ex-ante methodology, as specified in the methodology;
- Recalibrating the model for projection of future deforestation, using new “Factor Maps” for the subsequent fixed baseline period.
- Adjusting the land-use and land-cover change component of the baseline, which involves reassessing the following components of the baseline projections:
 - The annual areas of baseline deforestation.
 - The location of baseline deforestation.
 - Adjustment of the annual areas of baseline deforestation.
 - Adjustment of the location of the projected baseline deforestation.
- Adjusting, as needed, the carbon component of the baseline (this task will only be carried out if more accurate methods for carbon stocks estimates are available in the occasion of baseline revision).

APPENDIX

APPENDIX 1: BIBLIOGRAPHY

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APPENDIX 2: CALCULATION OF TOTAL VCUS

Year	Project year t	Ex ante net		Ex ante VCUs tradable		Ex ante
		anthropogenic GHG emission reductions				buffer credits
		annual	cumulative	annual	cumulative	annual
		ΔREDD _t	ΔREDD	VCU _t	VCU	VBC _t
		tCO ₂ -e	tCO ₂ -e	tCO ₂ -e	tCO ₂ -e	tCO ₂ -e
2020	0	127.088,9	127.088,9	114.201,0	114.201,0	12.887,5
2021	1	1.251.351	1.378.440	1.124.456,0	1.238.657	126.895
2022	2	2.925.193	4.303.632	2.630.947,0	3.869.604	294.246
2023	3	4.599.467	8.903.100	4.137.826,0	8.007.430	461.641
2024	4	4.577.052	13.480.151	4.117.683,0	12.125.113	459.369
2025	5	4.555.053	18.035.205	4.097.916,0	16.223.029	457.137
2026	6	4.533.464	22.568.669	4.078.516,0	20.301.545	454.948
2027	7	3.813.661	26.382.330	3.430.723,0	23.732.268	382.938
2028	8	1.097.253	27.479.583	985.985,0	24.718.253	111.268
2029	9	1.076.846	28.556.429	967.647,0	25.685.900	109.199
2030	10	1.056.818	29.613.247	949.650,0	26.635.550	107.168
2031	11	1.037.163	30.650.410	931.988,0	27.567.538	105.175
2032	12	1.017.874	31.668.284	914.655,0	28.482.193	103.219
2033	13	998.943	32.667.227	897.644,0	29.379.837	101.299
2034	14	980.364	33.647.591	880.949,0	30.260.786	99.415
2035	15	962.131	34.609.723	864.565,0	31.125.351	97.566
2036	16	944.237	35.553.960	848.486,0	31.973.837	95.751
2037	17	926.676	36.480.636	832.705,0	32.806.542	93.971
2038	18	909.441	37.390.077	817.218,0	33.623.760	92.223
2039	19	892.527	38.282.605	802.019,0	34.425.779	90.508
2040	20	875.928	39.158.532	787.103,0	35.212.882	88.825
2041	21	859.637	40.018.169	772.464,0	35.985.346	87.173
2042	22	843.649	40.861.819	758.098,0	36.743.444	85.551
2043	23	827.959	41.689.778	743.999,0	37.487.443	83.960
2044	24	812.560	42.502.338	730.161,0	38.217.604	82.399
2045	25	797.448	43.299.786	716.582,0	38.934.186	80.866
2046	26	782.617	44.082.403	703.254,0	39.637.440	79.363
2047	27	768.061	44.850.464	690.175,0	40.327.615	77.886
2048	28	753.777	45.604.241	677.339,0	41.004.954	76.438
2049	29	739.758	46.343.999	664.742,0	41.669.696	75.016
2050	30	652.405	46.996.404	586.247,0	42.255.943	66.158