VERIFIED Carbon Standard

ALTO XINGU GROUPED REDD+ PROJECT

Ecológica

Document Prepared by Ecológica Assessoria Ltda.

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1 PROJECT DETAILS

1.1 Summary Description of the Project

In Brazil, 58.39% of its entire 851,034,553.8 ha territory[1] is covered by forests, representing almost 497 million hectares of forest area[2] and putting it in second place for nations with most forest area worldwide. Brazil has also been at times the country with the highest levels of deforestation in the world, having lost almost 15 million hectares of its forest area from 2010 to 2020[3]. The expansion of the agriculture frontier due to cattle ranching, soy farming, mining, timber collection, infrastructure and colonization by subsistence agriculturalists has contributed to this historically high deforestation rate, which is concentrated in the northern portion of the country, where the Amazon Rainforest lies.

The State of Mato Grosso is one of the main grain and meat producers in Brazil. Currently, the State is the 5th largest exporter, mainly with soy, cotton and beef[4]. Simultaneously, Mato Grosso also registers high deforestation rates, reaching in 2018 the highest in 10 years [5]; in 2019 in addition to the states of Pará, Amazonas and Rondônia, it accounted for 84.56% of all deforestation observed in the Brazilian Legal Amazon[6].

The primary objective of the Alto Xingu Grouped REDD+ Project is to avoid the unplanned deforestation (AUD), consisting of Amazon rainforest and Cerrado, the latter known as the Brazilian savannah. Such biomes are severely threatened by agriculture and cattle ranching, and, as a grouped project, offers the possibility to expand the conservation to other areas in the future. The project area occupies both biomes, and the first instance is composed by 4 private properties, with a project area of 15,256.33 ha, which are located in Paranatinga municipality, at Mato Grosso State, Southern Amazon.

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

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

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

[4] https://g1.globo.com/mt/mato-grosso/noticia/2021/07/21/valor-de-exportacoes-neste-ano-em-mt-aumenta-26percent-em-comparacao-com-2020.ghtml

[5] https://g1.globo.com/mt/mato-grosso/noticia/2018/12/10/mt-registra-o-maior-indice-de-desmatamento-da-amazonia-nos-ultimos-10-anos.ghtml

[6] http://www.inpe.br/noticias/noticia.php?Cod_Noticia=5465

Beyond the project's ecological and carbon benefits, a proportion of the carbon credits generated will be dedicated to improving the social and environmental conditions in the project region, specifically contributing to improving deforestation control, and developing environmental education and other social activities. The contribution to sustainability is being monitored through the application of the SOCIALCARBON® Standard, which is based on six main indicators: Biodiversity; Natural; Financial; Human; Social and Carbon Resources.

The present REDD project is expected to avoid a predicted 14,639 ha of deforestation, equating to 1,737,032 tCO_2e in emissions reductions over the 30-year project lifetime (19-July-2021 to 18-July-2051), with an annual average of 57,902 tCO_2e.

1.2   Sectoral Scope and Project Type

Sectoral Scope: 14 - Agriculture, Forestry, Land Use

Project Category: Avoided Unplanned Deforestation (AUD project activity)

This is a grouped project.

1.3   Project Eligibility

According to the VCS Methodology Requirements v4.1[7], for Reduced Emissions from Deforestation and Degradation (REDD) projects, eligible activities are those that reduce net GHG emissions by reducing deforestation. Thus, the project is eligible under the scopes of the VCS Program Version 4.2[8]:

- The project meets all applicable rules and requirements set out under the VC Program;
- The project applies a methodology eligible under the VCS Program;
- The implementation of this project activity 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;
- 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;
- This project does not occur on wetlands and does not drain native ecosystems or degrade hydrological functions;

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[7] https://verra.org/wp-content/uploads/2022/01/VCS-Methodology-Requirements_v4.1.pdf

[8] https://verra.org/wp-content/uploads/2022/02/VCS-Standard_v4.2.pdf

- Non-performance risk will be analyzed in accordance with the VCS Program document AFOLU Non-Permanence Risk Tool.

1.4   Project Design

☐ The project includes a single location or installation only

☐ The project includes multiple locations or project activity instances, but is not being developed as a grouped project

☒ The project is a grouped project

This project has been designed as an Avoided Unplanned Deforestation applying VM0015 methodology, Version 1.1 from December 3rd, 2012.

Eligibility Criteria

A set of eligibility criteria for the inclusion of any new areas as instances willing to participate within the grouped project are described below.

As Alto Xingu Grouped REDD+ Project is a grouped project, all instances implemented after validation shall meet the elements mentioned in Sections 3.5.15 and 3.5.16 of VCS Standard v4.2.

In addition, new areas willing to become instances of the project shall comply with the applicability conditions of the selected methodology, including conditions applicable to each activity, as described in Section 3.2.

Table 1. Grouped Project eligibility criteria

VCS Standard Eligibility criteria for the inclusion of new project activity instances	Alto Xingu Grouped REDD+ Project	Instance 1
Projects shall meet the applicability conditions set out in the methodology applied to the project.	The GHG emission reductions shall be calculated according to the approved VCS Methodology VM0015: Methodology for Avoided Unplanned Deforestation, version 1.1, published on 03-December-2012.	The Instance 1 complies with this requirement because it adopts the Methodology VM0015: Methodology for Avoided Unplanned Deforestation, version 1.1, published on 03-December-2012.

Projects shall use the technologies or measures specified in the project description. Projects shall apply the technologies or measures in the same manner as specified in the project description.	All new instances shall use and apply the same technologies or measures specified in the Project description - forest conservation by avoiding unplanned deforestation, with or without forest management in project scenario.	The Instance 1 project activity complies with this criterion because it was the instance that originated the baseline scenario and the development of the Alto Xingu Grouped REDD+ Project. Also, this instance is in the same reference region described in the VCS PD. Instance 1 applies the same technologies or measures specified in the Project description: forest conservation by avoiding unplanned deforestation, with forest management in project scenario.
Projects are subject to the baseline scenario determined in the project description for the specified project activity and geographic area.	The Project shall be in accordance with the same baseline scenario established in Section 3.4. of the VCS PD: "In the baseline scenario, forest is expected to be converted to non-forest by the agents of deforestation acting in the reference region, project area and leakage belt. Therefore, the project falls into the AFOLU-REDD"	The Instance 1 Project Activity complies with this criterion because it was the instance that originated the baseline scenario and the development of the Alto Xingu Grouped REDD+ Project. Therefore, this instance is in accordance with the same baseline scenario determined in Section 3.4 of the VCS PD.
Projects must 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	All instances must be additional to be included in the Grouped Project. The project activity must be consistent with Grouped Project Description: forest conservation by avoiding unplanned deforestation. In this case, the project activity may or may not include Sustainable Forest Management Plan. In additionality assessment, each instance shall determine the appropriate analysis method, whether to apply simple cost,	Since the PD was developed based on the characteristics, reference region and activity of the initial instance, Instance 1 complies with this additionality criterion. The additionality analysis for Instance 1 was made according to Option II of VCS VT0001 v 3.0, as detailed in section 3.5.

size/scale of the instances) consistent with the initial instances, or face the same investment, technological and/or other barriers as the initial instances.	investment comparison or benchmark analysis, according to STEP 2 of VCS VT001 v 3.0 tool. 1) Instances may or may not include Sustainable Forest Management Plan. 2) In case the project activity does not involve Sustainable Forest Management Plan: - The instance should have financial, technical and scale consistent with the described in the VCS PD, facing similar investments, technological and/or other barriers as the initial instance. As the VCS AFOLU project generates no financial or economic benefits other than VCS related income, the simple cost analysis (Option I) shall be applied. 3) In case the project activity includes a Sustainable Forest Management Plan: - A new additionality analysis shall be provided. In this case, the investment comparison analysis (Option II) or the benchmark analysis (Option III) of the Tool VCS VT001 v 3.0 shall be used. - In addition, a new AFOLU non-permanence risk analysis shall be provided.	
New Project Activity Instances shall occur within one of the designated geographic areas specified in the project description.	Projects must be located within the Reference Region described in Section 3.4 of the VCS PD. The areas to be included must evidence the ownership of the property in accordance with Brazilian legislation, even if overlapping public areas such as Conservation Units. - As per the VCS Standard, new AFOLU non-permanence shall be assessed for each geographic area specified in the project description (for requirements related to geographic areas of grouped projects see the VCS Standard). Where risks are relevant to only a portion of each geographic area,	The area referring to instance 1 - project activity is within the project's reference region as described in section 3.4 of the VCS PD.

	the geographic area shall be further divided such that a single total risk rating can be determined for each geographic area. Where a project is divided into more than one geographic area for the purpose of risk analysis, the project's monitoring and verification reports shall list the total risk rating for each area and the corresponding net change in the project's carbon stocks in the same area, and the risk rating for each area applies only to the GHG emissions reductions generated by project activity instances within the area.	
Instances shall 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 instances must comply with the complete set of eligibility criteria for the inclusion of new project activities instances.	Instance 1 complies with all eligibility criteria for the inclusion of new project activity.
Instances must 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.	The Project activity instances must 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.	Instance 1 complies with this criterion, as it is included in this Joint PD as the first project activity instance.
New Project Activity Instances must be validated at the time of verification against the applicable set of eligibility criteria	The addition of new Project activity instances shall be made in the monitoring report for the Grouped Project, being validated at the time of verification.	Instance 1 complies with this criterion, as it is included in this Joint PD as the first project activity instance.

New Project Activity Instances must 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 upon which the project activity instance began reducing or removing GHG emissions).	All Project activity instances must provide evidence of Project ownership (land title and related documents) and Project start date (agreements, protection or management plan, or others in accordance with the applicable VCS Standard definitions).	Instance 1 is in accordance with this criterion. The evidence of Project ownership and Project start date were provided, as described in sections 1.7 and 1.8 of the VCS PD.
New Project Activity Instances must have a start date that is the same as or later than the grouped project start date	The start date of the activity of each instance shall be the same as or after the start date of the grouped project, as established in Section 1.8 of the VCS PD.	Instance 1 project activity has the same start date of the grouped Project, as described in section 1.8 of the VCS PD.
Instances shall be eligible for crediting from the start date of the instance through the end of the project crediting period (only). Note that 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.	Instances shall be eligible for crediting from the start date of the instance activity until the end of the grouped project crediting period, i.e., the instance shall not generate credits after the end date of the Grouped Project. 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.	Instance 1 project activity crediting period has the same start and end date of the grouped Project, as described in section 1.8 of the VCS PD

1.5 Project Proponent

Organization name	Ecológica Assessoria Ltda.
Contact person	Marcelo H. S. Haddad
Title	Technical Consultant
Address	Quadra 103 Norte, Av. LO-2, Lote 56, Sala 14, Ed. Olympia Plano Diretor Norte, Palmas – TO, Brazil Postal Code: 77001-022
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1.6 Other Entities Involved in the Project

Organization name	KPM Empreendimentos e Participações Ltda.
Role in the project	Instance 1 properties' owner
Contact person	Iara Nunes de Oliveira Luiz Piccinin
Title	Legal representatives
Address	Avenida Dr. Hélio Ribeiro, 525, andar 12 Bairro Residencial Paiaguas – Cuiabá, Mato Grosso, Brazil Zip Code: 78048-250
Telephone	Not available
Email	iara.nunes@astermaquinas.com.br

1.7 Ownership

The project area is located at Paranatinga municipality, in the State of Mato Grosso, and is composed by the following areas:

1. Fazenda Caçador
2. Fazenda Villas Boas do Xingu – XII
3. Francolândia

4. Fazenda Villas Boas do Xingu - VBX

These properties are owned by the KPM Empreendimentos e Participações Ltda (henceforward, "KPM)", as informed in the section 1.6. The legal documents proving the land title and ownership of the property (Environmental Registry for Rural Properties, Land Registry Certificate, Certificate from the Institute for Agrarian Reform) will be made available to the auditors during the validation process.

As per the rules stated at Section 3.6 Ownership of the VCS Standard v.4.2, an enforceable and irrevocable agreement was set between KPM – the holder of the statutory, property and contractual right in the land, vegetation or conservational or management process that generates GHG emission reductions or removals – and Future Carbon Holding S.A., which vests project ownership in the project proponent (Future Forest[9]). Evidence of such agreement will also be made available at the audit.

Such evidences mentioned in the present section will also be available regarding new instances.

1.8 Project Start Date

According to Methodology VM0015, section 1.2.2, the project start date is the date which additional activities have started or will be started to avoid unplanned deforestation.

In the dry months of 2020, the owner's farms suffered from forest fires. Some originated in neighboring farms and another within the Xingu National Park, which borders one of the farms. These fires eventually spread to the owner's farms. The fire that occurred on 09/15/2020, originating within the Xingu National Park, reached approximately 400 ha of one of the properties. Throughout 2020, three incident reports of fire were made between July and September 2020, months of drought in the region. It is worth highlighting that fire outbreaks are the common initial illegal deforestation technique, followed by the use of heavy machines, chainsaw, etc. Thus, before the land-use for economic purposes, fire is very often applied for saving time and resources, but consequently causing several impacts such as GHG emissions, environmental degradation, and when it gets out of control, threatening surrounding areas.

As mentioned in this section, KPM experienced events with fire outbreaks, and most of them started in neighbor areas. Despite the cause was not identified, the events started in neighbor areas and crossed to KPM areas since the initial fire lost control, regardless it was intentional or not. In the case of unintentional fire outbreaks, it is a common phenom in dry months, which demands resources from landowners to fight and control unintentional fire outbreaks.

Thus, in order to control fire outbreaks caused in the surroundings of the properties and prevent them from entering the farms, the owner acquired on 19-July-2021 a water tank to be coupled to

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[9] Future Forest (Future Carbon Consultoria e Projetos Florestais Ltda.) is a company controlled by Future Carbon Holding S.A. Therefore, partnership agreements for project developments are signed on behalf of Future Carbon Holding.

the truck they have. It is worth highlighting the water tank acquisition occurred in the beginning of the dry season, where forest fire historically happens more often.

The water tank acquisition to be coupled to the truck and thus having a water truck does not generate additional incomes for the property owner and was carried out only for avoiding forest degradation and unplanned land-use change within the property. The acquisition of the water truck was an action aiming the conservation of the forest, preventing the fire from spreading and affecting the native forest area. Thus, it was considered to be the date on which activities that led to the generation of GHG emission reductions or removals were implemented. Thus, for the AUD REDD Project, the Project Start Date was defined on 19-July-2021.

	Project Start Date
AUD	19 July 2021

1.9 Project Crediting Period

The project has a crediting period of 30 years, from 19-July-2021 to 18-July-2051.

1.10 Project Scale and Estimated GHG Emission Reductions or Removals

The estimated annual GHG emission reductions/removals of the project are:

☐ <20,000 tCO_2e/year

☒ 20,000 – 100,000 tCO_2e/year

☐ 100,001 – 1,000,000 tCO_2e/year

☐ >1,000,000 tCO_2e/year

Project Scale	
Project	x
Large project	

Year	Estimated GHG emission reductions or removals (tCO$_2$e)
19/07/2021 - 31/12/2021	28,870
2022	53,732
2023	54,787
2024	55,861
2025	56,957
2026	58,073
2027	59,213
2028	60,374
2029	61,559
2030	62,765
2031	55,708
2032	56,890
2033	58,006
2034	59,143
2035	60,302
2036	61,486
2037	62,692
2038	63,922

Year	Estimated GHG emission reductions or removals (tCO₂e)
2039	65,175
2040	66,454
2041	55,840
2042	57,061
2043	58,181
2044	59,322
2045	60,486
2046	61,673
2047	62,882
2048	64,116
2049	65,374
2050	30,132
01/01/2051 - 18/07/2051	28,870
Total estimated ERs	1,737,032
Total number of crediting years	30
Average annual ERs	57,902

1.11   Description of the Project Activity

The main objective of the present REDD project is the conservation of 15,256.33 ha of Amazon rainforest and Cerrado biomes within the area described in section 1.12 of the present VCS PD. This will be achieved through avoidance of unplanned deforestation.

It is important to note that this project is not located within a jurisdiction covered by a jurisdictional REDD+ program that meets VCS requirements. Therefore, the project complies with the applied methodology, as no local Jurisdictional Programs exist, as defined by VM0015: "If sub-national or national baselines exist, that meet VCS specific guidance on applicability of existing baselines, such baselines must be used. Any pre-existing baseline should be analyzed and if it meets the criteria listed in table 2, it should be used. In both cases, the existing baseline will determine the boundary of the reference region."

The present REDD project is expected to avoid deforestation, equating to 2,114,559 tCO2e in emissions reductions over the 30 year project lifetime (19-July-2021 to 18-July-2051), including buffer (RF), leakage (DLF) and project efficiency (EI) reductions.

The main deforestation agents within the Alto Xingu Grouped REDD+ Project region are: cattle ranching, timber extraction, mining, soy, and corn harvesters, acting both legally and illegally. The Alto Xingu Grouped REDD+ project is committed to conserving the property, despite a consistently negative financial balance. For this reason, and because of competition pressures described along the present document, the revenue from the present REDD project is essential for the continued conservation of the rainforest area. Conservation activities involve the prevention of invasion by outside agents and banning of logging and other unpermitted degradation within the project area, by intensifying monitoring controls. Such invaders and their illegal activities would emit GHG from land-use change since the forest cover would be converted in pasture or other common activities in the region.

In addition to the impacting activities that might put the local population and biodiversity at risk, the project area is also located in a region known for its historic of frequent deforestation. In recent years, the expansion of agricultural, and livestock activities, mainly due to the advancement of the so-called arc of deforestation from the south of the Amazon biome has been promoting high rates of deforestation and degradation to clear space for such economic activities, small-scale subsistence farming, logging, and, increasingly, soybean production for world markets[10]. This pressure is expected to continue, given the globalization of markets in the Amazon region and international development policies planned for the region[11].

The characteristic savanna vegetation is also found in the Project Area. In addition, the biodiversity richness and vulnerability are the same. Known as Brazilian Savana, The Cerrado

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[10]   Deforestation   patterns   in   the   Amazon   –   Available   at   < https://www.earthobservatory.nasa.gov/images/4385/deforestation-patterns-in-the-amazon> Last visited on 29/04/2022.

[11] Nepstad, D. C.; C. M. Stickler e O. T. Almeida. 2006. Globalization of the Amazon Soy and Beef Industries: Opportunities for Conservation. Conservation Biology 20(6):1595-1603.

biome has diversified fauna and flora, being inserted in a region of approximately 2.036.448 km² throughout South America. It is located in the central region of the country and the uncontrolled deforestation removing the forest for the same reasons mentioned for the Amazon biome. However, only 8% of Cerrado coverage is still preserved inside Unit Conservations. Without necessary care, entire regions of fauna and old centers of species have the risk of being extinct.[12]

According to NASA, deforestation in the Amazon Rainforest is occurring most rapidly along a curve that hugs the southeastern edge of the forest that scientists and resource managers have come to call the "Arc of Deforestation" (Figure 1), where both Amazonian and Cerrado biomes are present.

Figure 1. Project Area and Arc of Deforestation
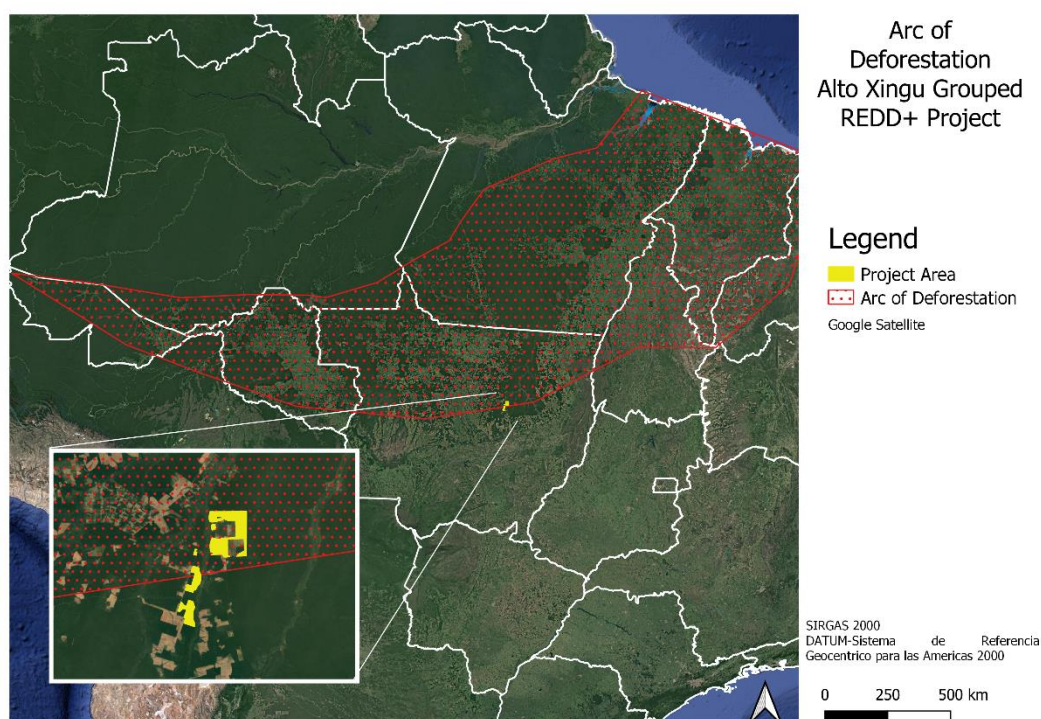
Thus, conservation actions are essential in the region, establishing a barrier against the advancement of deforestation, making an important contribution to the conservation of Southern Amazon biodiversity and also to climate regulation in Brazil and South America.

The revenue from the sales of the Verified Carbon Units (VCUs) is essential for the project activity to compete with profitable alternative land use scenarios. In addition, the carbon credit revenue is important to mitigate encroachment and illegal actions within and around the Project Area. This surveillance allows the management of the environmental situation of the property during

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[12] Available at: <https://antigo.mma.gov.br/biomas/cerrado.html> Last visit on 28/04/2022.

the development of the forest exploration work, in addition to ensuring compliance with the requirements set out in the current legislation.

Environmental education and other social activities that benefit the local community will be supported, as well as improving the control of deforestation. The SOCIALCARBON® Standard is being applied to assess and monitor the project's contribution to sustainability using six key indicators: Biodiversity; Nature; Financial; Human; Social and Carbon Resources, thus improving the social and environmental conditions in the project region.

1.12 Project Location

The Alto Xingu Grouped REDD+ Project is located in Paranatinga municipality, which belongs to Mato Grosso state. This municipality is located around 500 km from Cuiabá, capital of the State of Mato Grosso. The project location is also close to Nova Ubiratã and Feliz Natal municipalities. Since the project is in the south of Mato Grosso do Sul state, it is considered Southern Amazon. From a biodiversity perspective, the biomes covered by the project area are Amazonian rainforest and Cerrado biome, composed by 15,256.33 ha of native vegetation.

Figure 2. Project Location and surrounding municipalities

1.13 Conditions Prior to Project Initiation

General characteristics of the project area and reference region

Alto Xingu Grouped REDD+ Project makes an important contribution to the conservation of Southern Amazonia's biodiversity as well as to climate regulation in Brazil and South America. The region is important agriculture and cattle ranching center, where native forest is vulnerable to the advancement of such plantations, mining, cattle ranching and timber extraction.

It is worth highlighting the project area is formed forest areas for 10 years before the project start date, despite the pressure for land-use change in the zone. Furthermore, despite being subject to deforestation and the common economic activities such as forest management plan, livestock, among others, such activities were not carried out in the project area for the last 10 years prior to the project start date. Thus, the project activity meets the VCS criteria as described at the VM0015 Applicability conditions: "At project commencement, the project area shall include only land qualifying as "forest" for a minimum of 10 years prior to the project start date."

The general characteristics of the project area and reference region are described below.

Aspect	Characteristics
Climate	The project region is classified as Tropical, dry climate type – Aw category – according to the Köppen climate classification[13] (Figure 3). The dry season is defined between May and September[14.] Considering Paranatinga municipality climatology[15], which can be considered similar to Nova Ubiratã[16] and Feliz Natal[17] municipalities, the maximum temperature reaches 32ºC, and the minimum is 18ºC, while the average annual range is from 20.2ºC to 30.1ºC. The biggest thermal differences (amplitude) are associated with the day and night cycle and not with the seasonal cycle. The daily thermal amplitude of this unit varies between 8º and 13º, while the annual amplitude is between 2ºC and 3ºC. The annual rainfall is around 1,500mm. As stated before, the dry season occurs from May to September (5 months) with 200 mm of total water deficiency. Considering a study for Mato Grosso state that includes Paranatinga municipality[18,] the total water surplus is 800 mm, with a duration of 7 months (October to April). Graphs below represents climatology for municipalities around Alto Xingu Grouped REDD+ Project.

[13] KÖPPEN, W.; GEIGER, R. Klimate der Erde. Gotha: Verlag Justus Perthes. 1928. < https://en.wikipedia.org/wiki/K%C3%B6ppen_climate_classification>

[14] Availabe at: http://www.dados.mt.gov.br/publicacoes/dsee/climatologia/rt/DSEE-CL-RT-002.pdf. Last Visits on April 7th, 2022.

[15] Available at: https://www.climatempo.com.br/climatologia/2776/paranatinga-mt. Last visit on April 18th, 2022.

[16] Available at: https://www.climatempo.com.br/climatologia/5483/novaubirata-mt. Last visit on April 18th, 2022.

[17] Available at: https://www.climatempo.com.br/climatologia/4922/feliznatal-mt. Last visit on April 18th, 2022.

[18] Available at: http://www.dados.mt.gov.br/publicacoes/dsee/climatologia/rt/DSEE-CL-RT-002.pdf. Last visit on April 18th, 2022.

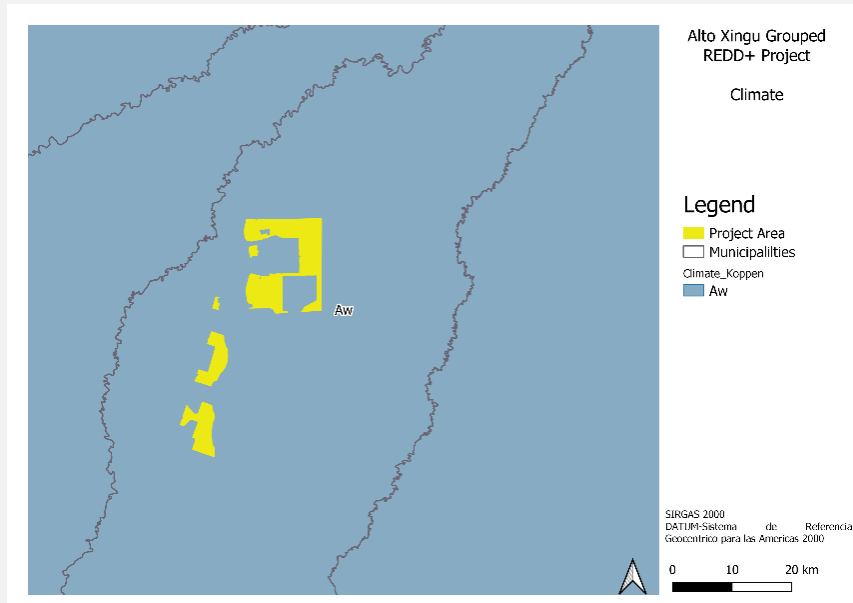**Figure 3. Climate Köppen classification**

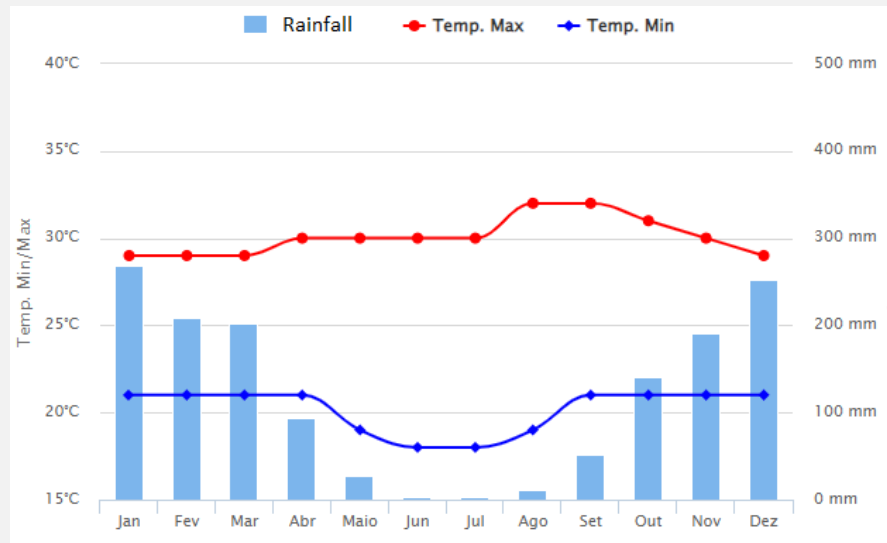**Figure 4. Paranatinga municipality rainfall and temperature graph**

Figure 5. Nova Ubiratã municipality rainfall and temperature graph
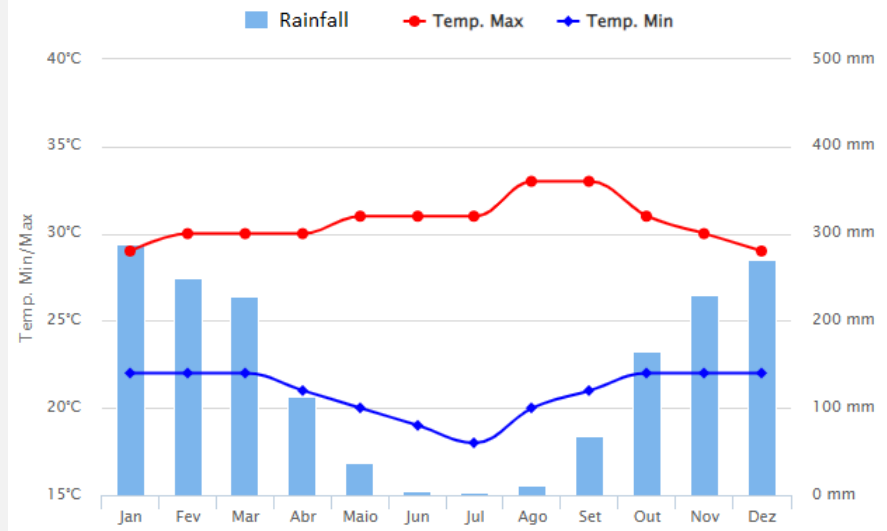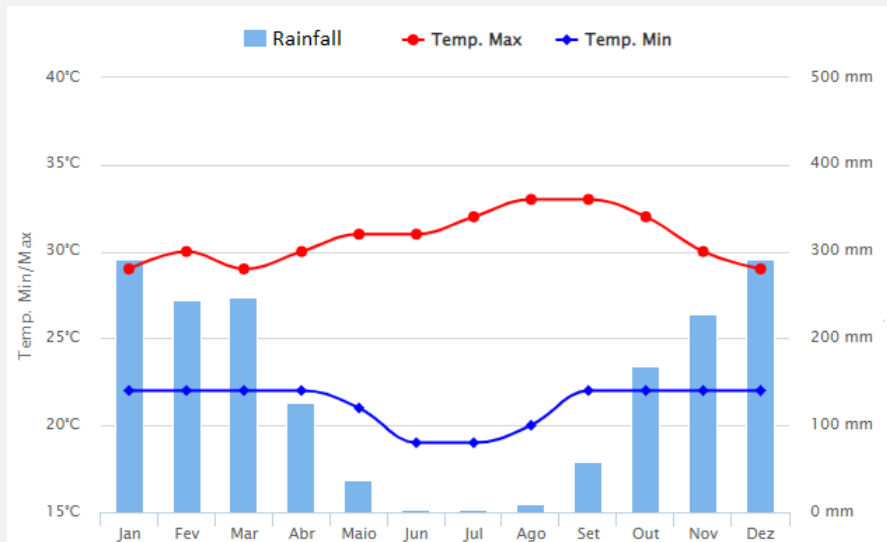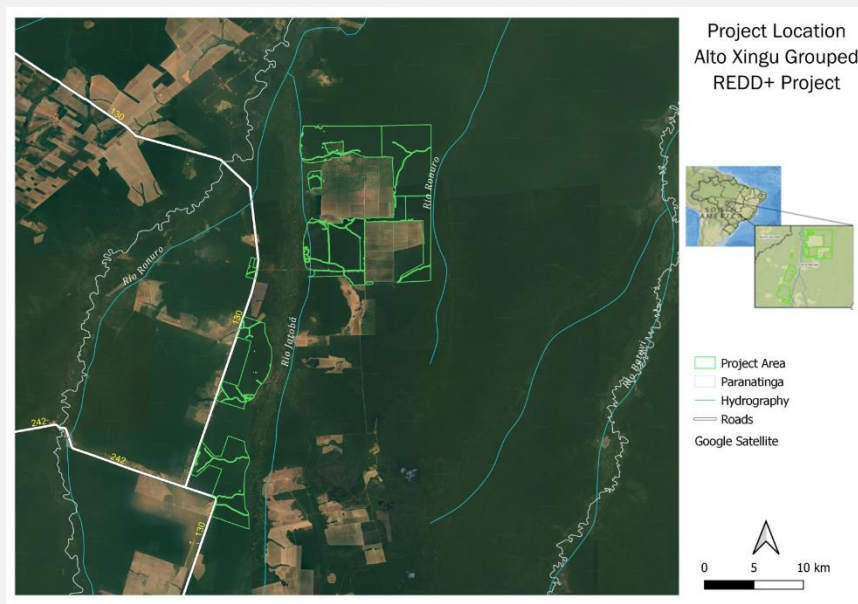
Figure 6. Feliz Natal municipality rainfall and temperature graph

Territory	The Alto Xingu Grouped REDD+ Project area and surrounding municipalities are shown in the following image:

Figure 7. Project Area and location

The following table details each municipality area:

Municipality	Area (km²)
Paranatinga	24,166.632
Nova Ubiratã	12,460.736
Feliz Natal	11,661.514

Alto Xingu Grouped REDD+ Project is located in the eastern portion of Mato Grosso state, which has 903,357,908 km² and it's the third largest state in Brazil, behind only Amazonas and Pará, both also located in the Amazon biome. However, as stated before, Alto Xingu Grouped REDD+ Project also covers Cerrado biome. The State Capital, named 'Cuiabá', is located exactly midway between the Atlantic and the Pacific, which makes the state the focal point of the South American continent in a horizontal position.

Mato Grosso is a state with modest altitudes, the relief presents large, flattened surfaces, carved in sedimentary rocks and covers three distinct regions: in the north-central portion of the state, the sedimentary plateaus and crystalline plateaus (with altitudes between 400 and 800m), that make up the central Brazilian plateau. The sandstone-basalt plateau, located in the south, is a simple portion of the southern plateau[19].

Biodiversity	In the Mato Grossense Amazon biome, there are two types of forests: the Amazon Forest and the Seasonal Forest. They occupy about 50% of the State territory. Concentrated in the north of the state, the Amazon is the most complex in terms of biodiversity in the world. Due to the difficulty of light entry, due to the abundance and thickness of the crowns, ground vegetation and land animals are very scarce in the

[19] Available at: http://www.mt.gov.br/geografia. Last visited on January 7th, 2022.

Amazon. Most of the endemic fauna is made up of animals that inhabit the treetops. Among the birds in the canopy are parrots, toucans and woodpeckers. Among the mammals are bats, rodents, monkeys and marsupials.

The Brazilian Cerrado is recognized as the richest savanna in the world, home to more than 10,000 species of native plants. There is a great diversity of habitats, which determine a remarkable alternation of species between different phytophysiognomies. Nearly 200 species of mammals are known, and the rich avifauna comprises over 800 species. Diversity is also abundant for fish (1200 species), reptiles (180) and amphibians (150).[20]

| Native Vegetation Cover | Mato Grosso is the only Brazilian state with three biomes: Amazon Rainforest, Cerrado and Pantanal. This makes the state unique, with great diversity and conservation importance. Out of 141 municipalities, 86 are covered by the Amazon biome, corresponding to 480,215 km² (54%). In the center of the state, the Cerrado biome covers 354,823 km² (39%), and a smaller area is occupied by the Pantanal biome, at the south, corresponding to 60,885 km² (7%). The region is covered by Amazonian Rainforest and Cerrado biomes and is composed mainly by the phytophysiognomy open submontane tropical rainforest. |

Figure 8. Vegetation in Project Area

As stated before, the project activity is composed by forest areas 10 years prior to the project start date, meeting VCS criteria as describer at the VM0015 Applicability conditions: "At project commencement, the project area shall include only land qualifying as "forest" for a minimum of 10 years prior to the project start date."

| Protected Areas | There are 111 protected areas in Mato Grosso State, 23 of them are federal, 43 are managed by the State and 45 by the municipalities[21]. As for the classification of the federal units, we have: |

[20]Available at: https://antigo.mma.gov.br/biomas/cerrado.html. Last visited on 28/04/2022.

[21] Available at <http://www5.sefaz.mt.gov.br/-/unidades-de-conservacao-uma-proposta-para-conter-a-destruicao-dos-

- 16 Sustainable Use Areas (US), 15 of them are Private Natural Heritage Reserves (RPPN) and 01 is an Environmental Protection Area (APA);
- 07 Full Protection Areas (PI), 04 of them are National Parks (PARNA) and 03 are Ecological Stations (ESEC).[22].

Close to the project area it is located Xingu reserve (Figure 9), one of the greatest reserves in Brazil. Its total population is 6,090 indigenous inhabitants divided in 16 tribes, living in 2,642,003 hectares.[23]

There are other indigenous areas distributed in other municipalities in the neighborship, with around 20 different indigenous tribes in such reserves, representing a rich pre-Colombian culture in the region.

Figure 9. Protected Areas
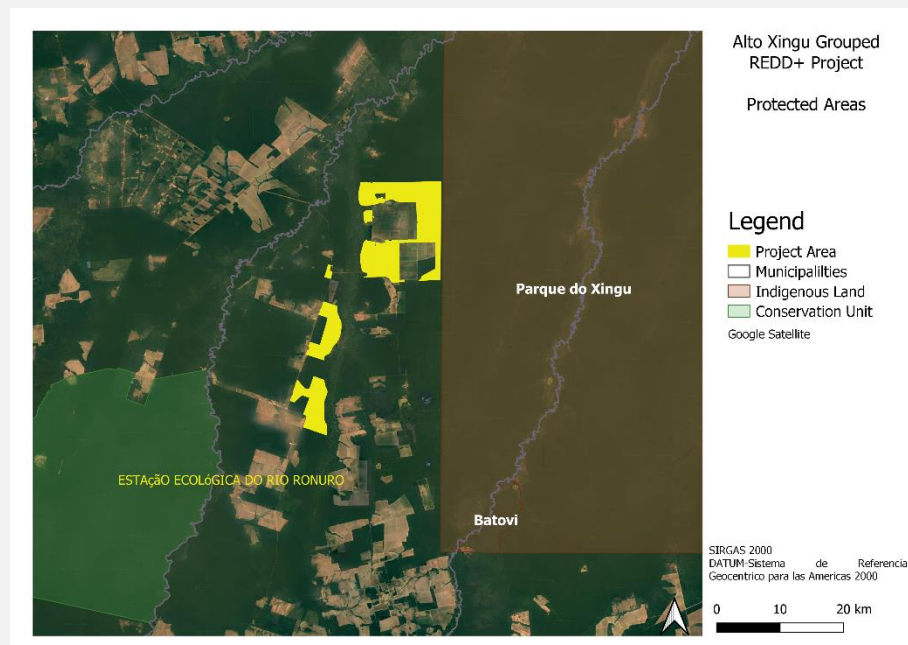
Water resources	The State of Mato Grosso is one of the main reserves of fresh water in the world. The main sub-basins in the state are Guaporé, Aripuanã, Juruena-Arinos, Teles Pires and Xingu. Rivers from the Amazonas River Basin drain 2/3 of the state's territory[24]. Project area belongs to the Amazonas River Basin, which presents an annual flow between 20,000 - 40,000 hm³. Paranatinga municipality area has a generous hydrographic complex, with several rivers such draining in the south-north direction.

ecossistemas#:~:text=UNIDADE%20DE%20CONSERVA%C3%87%C3%83O%20Atualmente%2C%20existem,s%C3%A3o%20estaduais%20e%2045%20municipais.>
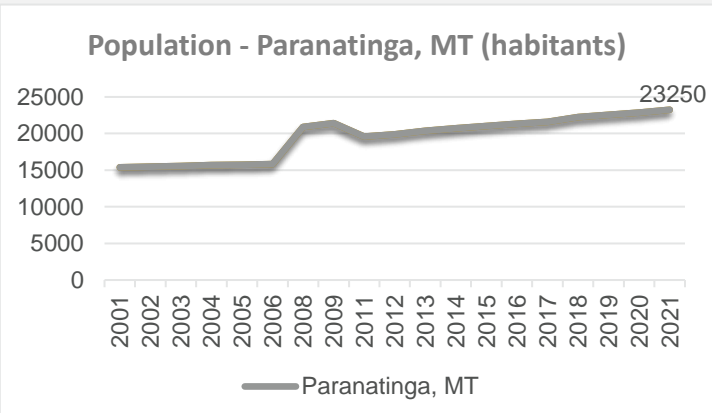
[22] Available at <http://www.sema.mt.gov.br/site/index.php/component/content/article/244-unidades-administrativas/unidades-de-conserva%C3%A7%C3%A3o/unidades-de-conserva%C3%A7%C3%A3o-federais/137-unidades-de-conserva%C3%A7%C3%A3o-federais?Itemid=474>

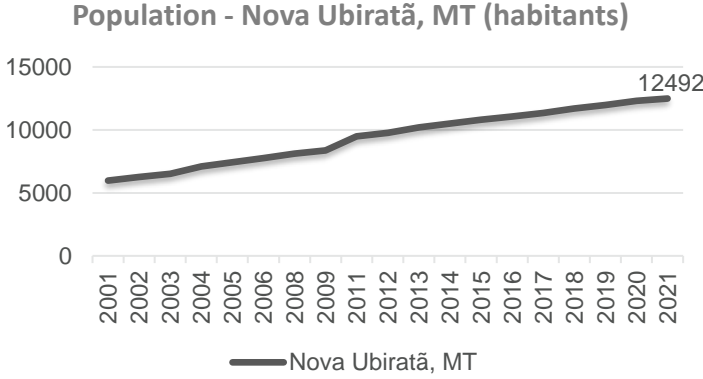[23] Available at https://terrasindigenas.org.br/pt-br/terras-indigenas/3908. Last visit on April 19th, 2022.

[24] Information available at < http://www.mt.gov.br/geografia>

Figure 10. Hydrology and rivers
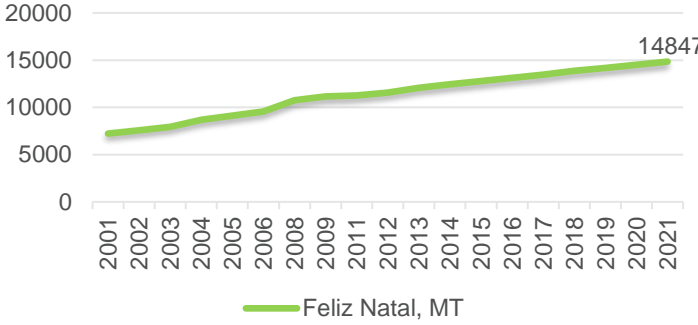
Socio-economic conditions	**Municipality**	Paranatinga[25]
	Population	Estimated (2021): 23,250 habitants. Based on Brazilian Census (2010). The following graph represents the historical Paranatinga population:

Figure 11. Paranatinga population

	Land occupation	The demographic density is 0.962 hab/km², considering 2021 population projection.
	Economy	GDP per capita is R$47,321.97. The average income is of 2.1 minimum wages, and 19.4% of the population is categorized to carry out a professional activity (formal or informal, paid or not), which places the city far away from first positions in the State ranking for such indicators: 87 out of 141 cities and 38/141, respectively. Considering families with monthly income up to half a minimum wage per person, 36.4% of Paranatinga population live in such conditions (state ranking: 85/141).
	Education	The municipality has 94.9% of its 6-14 years population in school. State and national Education ranking places city in 117/141 and 5043/5570.
	Health	The average infant mortality rate in the city is 8.7 deaths per thousand live births.
	Infrastructure	18.6% of households have adequate sanitation; 67.7% of urban households are located on public roads with trees and 4.8% on public roads with adequate urbanization (presence of manhole, sidewalk, paving and curb).
	HDI	0.667

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[25] Available at: https://cidades.ibge.gov.br/brasil/mt/paranatinga/panorama. Last visit on April 19th, 2022.

Municipality	Nova Ubiratã[26]
Population	Estimated (2021): 12,492 habitants. Based on Brazilian Census (2010). The following graph represents the historical Nova Ubiratã population: **Figure 12.Nova Ubiratã population** Population - Nova Ubiratã, MT (habitants)
Land occupation	The demographic density is 1.003 hab/km², considering 2021 population projection.
Economy	GDP per capita is R$108,284.61. The average income is of 2.5 minimum wages, and 17.5% of the population is categorized to carry out a professional activity (formal or informal, paid or not), which places the city far away from first positions in the State ranking for such indicators: 27/141 cities and 47/141, respectively. Considering families with monthly income up to half a minimum wage per person, 36% of Nova Ubiratã population live in such conditions (state ranking: 92/141).
Education	The municipality has 96.6% of its 6-14 years population in school. State and national Education ranking places city in 83/141 and 4099/5570.
Health	The average infant mortality rate in the city is 30.61 deaths per thousand live births.
Infrastructure	4.8% of households have adequate sanitation; 60.3% of urban households are located on public roads with trees and 1.1% on public roads with adequate urbanization (presence of manhole, sidewalk, paving and curb).
HDI	0.669

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[26] Available at: https://cidades.ibge.gov.br/brasil/mt/nova-ubirata/panorama. Last visit on April 19th, 2022.

Municipality	Feliz Natal[27]	
Population	Estimated (2021): 12,492 habitants. Based on Brazilian Census (2010). The following graph represents the historical Paranatinga population:	

Figure 13. Feliz Natal population

Population - Feliz Natal, MT (habitants)

Land occupation	The demographic density is 1.273 hab/km², considering 2021 population projection.	
Economy	GDP per capita is R$36,809.85. The average income is of 2.2 minimum wages, and 14.2% of the population is categorized to carry out a professional activity (formal or informal, paid or not), which places the city far away from first positions in the State ranking for such indicators: 71/141 cities and 71/141, respectively. Considering families with monthly income up to half a minimum wage per person, 35.4% of Feliz Natal population live in such conditions (state ranking: 100/141).	
Education	The municipality has 96.6% of its 6-14 years population in school. State and national Education ranking places city in 83/141 and 4099/5570.	
Health	The average infant mortality rate in the city is 19.14 deaths per thousand live births.	
Infrastructure	6% of households have adequate sanitation; 45.6% of urban households are located on public roads with trees and 2.1% on public roads with adequate urbanization (presence of manhole, sidewalk, paving and curb).	
HDI	0.692	

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[27] Available at: https://cidades.ibge.gov.br/brasil/mt/feliz-natal/panorama. Last visit on April 19th, 2022.

1.14 Compliance with Laws, Statutes and Other Regulatory Frameworks

In the federal legislation level, the following definitions of the Brazilian Forest Code (Law nᵒ 12,651, of May 25, 2012) 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 13ºS, in States of Tocantins and Goiás, and to the West of meridian 44ºW, of the State of Maranhão.

Figure 14. The Brazilian Legal Amazon States: Acre (AC), Amapá (AP), Amazonas (AM), Maranhão (MA), Mato Grosso (MT), Pará (PA), Rondônia (RO), Roraima (RR), Tocantins (TO) (ancient North of Goiás). Source: IBGE (2019)
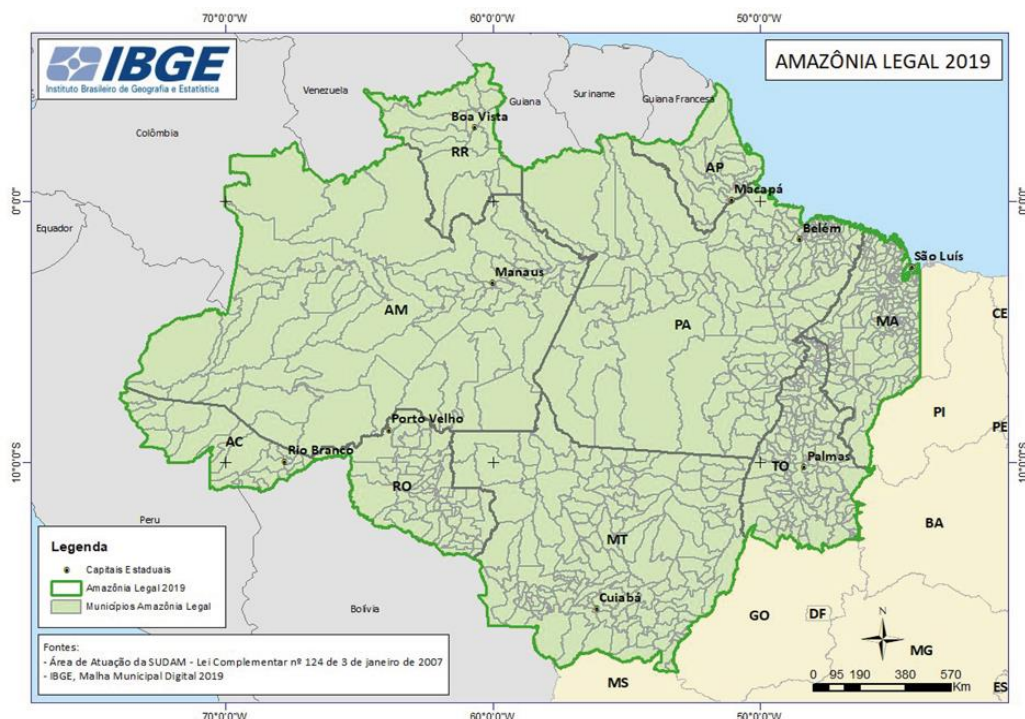
The Legal Reserve (LR) must be registered in property deed in the Real Estate Registry Office: its location must be publicly known, and future landowners must know where it is located, its boundaries and frontiers. The LR can be located anywhere inside a rural estate. Brazilian Forest Code determines that, once allocated, LR may not be changed even in cases of real estate transfer, land dismembering or area rectification.

The LR allocation is a prerequisite to obtaining permission to exploit the native vegetation existing inside the rural estate. In order 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 24th, 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.

In spite of 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 commodities production 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 that, to cover vast distances of areas with low demographic density makes tracking of illegal activities and land surveillance very 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).

In the state of Mato Grosso[28], the Secretariat for the Environment (Sema/MT) is the body responsible for environmental licensing. At the collegiate decision level, there is the State Environment Council (Consema/MT) and the State Water Resources Council (Cehidro). Among the Licensing Instruments and authorizations for environmental intervention in the state of Mato Grosso, the "Exploration Authorization" (Autex) applies to sustainable forest management activities, which is the document issued by the competent agency that authorizes the exploration of the "Annual Production Unit" (UPA) and specifies the maximum volume per species allowed for exploration, valid for 12 months, and may be extended for another 12 months, as long as duly justified in a technical exploration report. Each "Annual Production Unit" (UPA) corresponds to a subdivision of the "Forest Management Area" (AMF), destined to be explored each year. The "Forest Management Area" (AMF), in turn, is the area of the rural property to be used through

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[28] http://sema.mt.gov.br/site/index.php/servicos (accessed in 29/04/2022)

forest management. The context for obtaining "Autex" is explained as follows (Decree n° 2152 of 12/02/2014)[29]:

> Section II
>
> Forest License
>
> Art. 3 The Forest License will be issued with the approval of the Sustainable Forest Management Plan (PMFS), valid according to the cutting cycle.
>
> Art. 4 The technical procedures for the elaboration, presentation, execution, analysis and technical evaluation of the Forest License in the native forests of the State of Mato Grosso and their forms of succession, shall observe the provisions of this decree and the following requirements:
>
> I - The documentary and technical pieces listed in the Normative Instruction;
>
> II - Rural Environmental Registry - CAR;
>
> III - The georeferenced location of the area covered by the license.
>
> Single paragraph. A Forest License will be issued by the Rural Environmental Registry, with only one PMFS being allowed, regardless of the number of annual production units.

For this project activity, the Sustainable Forest Management Plan on a Business Scale (PMFS-EE) is not considered once the owners do not plan to implement it. Nevertheless, all applicable documents in their entirety are available for consultation by the audit team.

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 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. This project is not requesting registration in any other GHG Programs nor has the project been rejected by any other GHG programs.

1.16 Other Forms of Credit

1.16.1 Emissions Trading Programs and Other Binding Limits

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[29] http://extwprlegs1.fao.org/docs/html/bra135748.htm (accessed in 29/04/2022)

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.

The project will also monitor its contribution to sustainability by the application of the SOCIALCARBON® Standard, which is based on six main indicators: Biodiversity; Natural; Financial; Human; Social and Carbon Resources. The use of such Standard is for sustainability monitoring only, thus does not generate extra credits to be sold.

1.17 Sustainable Development Contributions

Although there is a risk of leakage, the proponents believe that the project activity will have positive impacts on surrounding areas. This project activity might be a successful benchmark of the following technical and economic aspects:

I.   Sustainable management of forest resources generating success and profit;

II.   Additional return to forest management, thanks 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.

Moreover, the project activity complies with the Environmental priorities logic 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 greenhouse gas emissions offsetting originating from legal removal of vegetation. The latter are elements of the Brazilian Nationally Determined Contribution (NDC), which the country aims to adopt within the framework of the Paris Climate Agreement (COP-21)[30]. In order to attain this goal, it will be

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[30] http://redd.mma.gov.br/pt/redd-e-a-indc-brasileira (accessed in 29/04/2022)

necessary to join government initiatives with independent actions (such as that proposed under the present project).

The map below shows the strategic zone for "Containment of the expansion fronts with protected areas and alternative uses", which was established by the Macro ZEE/AL (Macrozoneamento Ecológico-Econômico da Amazônia Legal; Ecological and Economic Macro-zoning of Amazon) from the Brazilian Ministry of Environment[31]. The Macro ZEE/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, this project activity aligns with the strategies set up by the Macro ZEE/AL of the Brazilian Ministry of Environment.

Figure 15. Containment of the expansion fronts with protected areas and alternative uses (Source: Brazilian Ministry of the Environment – MMA)[32]

Although the project is not located within the containment area of the expansion fronts, the REDD+ mechanism works as a barrier to contain deforestation. Thus, the development of the present REDD+ project and other carbon credit projects in the region can not only contribute to

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[31] http://www.mma.gov.br/component/k2/item/8200-figuras (accessed in 29/04/2022)

[32] https://antigo.mma.gov.br/component/k2/item/8200-figuras.html (accessed in 29/04/2022)

reducing predatory deforestation in the Amazon biome, but also expand the official containment area.

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. This project activity is in line with main PPCDAm premises[33].

This project therefore represents an enormous potential to continue the work started by other REDD+ projects in the region: assisting the Federal Administration and State agencies to attain these goals and leverage further pilot REDD projects in the municipalities, which are facing critical deforestation levels.

1.18 Additional Information Relevant to the Project

Leakage Management

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+.

The main leakage management activities are outlined below:

- Surveillance activities designed to mitigate illegal logging and land occupation in the area will be achieved through the project activity. 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. The main condition for execution of this activity is the approval and validation of this project activity, which will be a further important benchmark for engagement of all potential private landowners in Paranatina, Nova Ubiratã, and Feliz Natal.

- Replication of project concept to other areas: 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.

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.

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[33] 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 (accessed in 29/04/2022)

Commercially Sensitive Information

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

Further Information

No further information to disclose.

2   SAFEGUARDS

3   APPLICATION OF METHODOLOGY

3.1   Title and Reference of Methodology

Approved VCS Methodology VM0015 "Methodology for Avoided Unplanned Deforestation", Version 1.1, 3 December 2012. At: http://www.v-c-s.org/methodologies/VM0015 (last visited 29/04/2022).

Tool for the demonstration and assessment of additionality in VCS agriculture, forestry and other land use (AFOLU) project activities Version 3.0, 1 February 2012. At: http://www.v-cs.org/methodologies/VT0001 (last visited 29/04/2022).

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 29/04/2022).

3.2   Applicability of Methodology

VM0015	
Applicability Conditions	**Instance 1 Project Activity Justification of Applicability**
a) Baseline activities may include planned or unplanned logging for timber, fuel-wood collection, charcoal production, agricultural and grazing activities as long as the category is unplanned deforestation according to the most recent VCS AFOLU requirements.	None of the baseline land-use conversion activities are legally designated or sanctioned for forestry or deforestation, and hence the project activity qualifies as avoided unplanned deforestation. This is in accordance with the definition of unplanned deforestation under the VCS Standard v4. 2.

	The primary land uses in the baseline scenario are: cattle ranching, mainly for producing beef cattle; timber harvesters, mining; and finally plantations, acting both legally and illegally. These unplanned deforestation and degradation agents have been attracted due to infrastructure expansion, such as waterways and roads. Therefore, the present criteria are fulfilled.
b) Project activities may include one or a combination of the eligible categories defined in the description of the scope of the methodology (table 1 and figure 2).	The instance 1 project activity falls within category A, "Avoided Deforestation without Logging in the Project Case". The project area contains 100% native vegetation, and forest management plan is not included. In addition, it is important to note that degradation is not included in either the baseline or project scenario.
c) The project area can include different types of forest, such as, but not limited to, old growth forest, degraded forest, secondary forests, planted forests and agro-forestry systems meeting the definition of "forest".	The forest classes that compose the project area are named as per Technical Manual for Brazilian Vegetation[34]. The area is considered forest as per the definition of forest adopted by FAO[35]: Land spanning more than 0.5 hectares with trees higher than 5 meters and a canopy cover of more than 10%, or trees able to reach these thresholds in situ. No deforested, degraded or areas otherwise modified by humans were included in the project area at Project Start Date.
d) At project commencement, the project area shall include only land qualifying as "forest" for a minimum of 10 years prior to the project start date.	The project area consisted of 100% tropical rainforest in 2011 – 10 years prior to the project start date – all of which conformed to the Brazilian definition of forest[36]. This was ascertained using satellite images, as described in the section Project Location of the present VCS PD.

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[34]   Available at <https://www.terrabrasilis.org.br/ecotecadigital/pdf/manual-tecnico-da-vegetacao-brasileira.pdf>

[35] Available at < https://www.fao.org/3/y4171e/y4171e10.htm#:~:text=FAO%202000a%20(FRA%202000%20Main,of%20other%20predominant%20land%20uses.>

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

e) The project area can include forested wetlands (such as bottomland forests, flood plain 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 a forested wetlands growing on peat (e.g. peat swamp forests), this methodology is not applicable.	Project Area is composed of Red-Yellow latosol and Haplic Glaysol. Therefore, none of the project region grows on peat, satisfying this applicability criterion. Project area does not contain any wetlands, as detailed in section 3.3 Project Boundary.

VT0001	
Applicability Conditions	**Instance 1 Project Activity Justification of Applicability**
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;	The activities in the proposed project boundary does not lead to violation of any applicable law even if the law is not enforced. The sustainable forest management, whenever applicable, plan is an activity authorized and endorsed in Brazil, and the landowner could submit all the environmental and legal authorizations necessary to conduct the activity.
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 methodology provides a stepwise approach to justify determination of the most plausible baseline scenario.

3.3   Project Boundary

The Project Area is in Paranatinga municipality and is composed by four properties, as described at section 1.7 and shown below.

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Figure 16. Project Area

Project Location
Alto Xingu Grouped
REDD+ Project

Project Area
Paranatinga
Hydrography
Roads
Google Satellite

Project Area

In accordance with VCS requirements defined in the Approved VCS Methodology VM0015, version 1.1, the project area may only include areas composed of "forest"[37] for a minimum of ten years prior to the project start date. Therefore, satellite images between 2011 and 2021 were analyzed and classified. The areas within the properties that were defined as forest in 2011 and in 2021 were identified and utilized to compose the project area. In addition, some non-forest areas were also excluded, such as rivers, rocks, and non-forest vegetation.

Therefore, the estimated Project is 15,256.33 ha to avoid the unplanned deforestation (AUD).

Table 2. Sources and GHG included or excluded within the boundary of the proposed AUD project activity

Source		Gas	Included?	Justification/Explanation
Baseline	Biomass burning	CO_2	Excluded	Excluded as recommended by the applied methodology. Counted as carbon stock change.
		CH_4	Included	Included as non-CO2 emissions from biomass burning in the baseline scenario, according to the methodology.

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[37] Brazilian Forestry Service. Brazil adopts FAO forest definition: "Land with tree crown cover (or equivalent stocking level) of more than 10 percent and area of more than 0.5 hectares (ha). The trees should be able to reach a minimum height of 5 meters (m) at maturity in situ." http://www.florestal.gov.br/snif/recursos-florestais/index.php?option=com_k2&view=item&layout=item&catid=14&id=158.
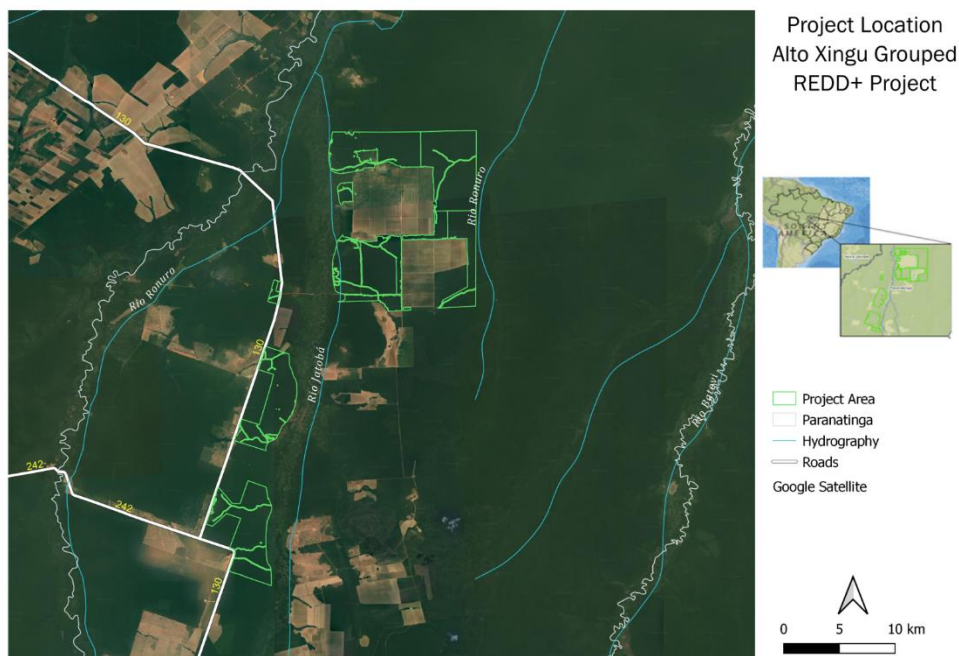
Source		Gas	Included?	Justification/Explanation
		N_2O	Included	Included as non-CO2 emissions from biomass burning in the baseline scenario, according to the methodology.
		Other	Excluded	No other GHG gases were considered in this project activity.
	Livestock emissions	CO_2	Excluded	Not a significant source
		CH_4	Excluded	Excluded for simplification. This is conservative.
		N_2O	Excluded	Excluded for simplification. This is conservative.
		Other	Excluded	No other GHG gases were considered in this project activity.
Project	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-CO2 emissions from biomass burning in the project scenario, according to the methodology.
		N_2O	Included	Included as non-CO2 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_2O	Excluded	As above.
		Other	Excluded	No other GHG gases were considered in this project activity.

<u>Reference Region</u>

The reference region (RR) is an analytical domain through which information on rates, agents, drivers and underlying causes of land-use and land-cover (LU/LC) change are obtained, and subsequently used for future projection and monitoring.

According to the applied methodology, as no applicable sub-national or national baseline is available, and the country or subnational region has not been divided in spatial units for which deforestation baselines will be developed, a baseline must be developed for a reference region.

The Reference Region must encompass the project area, the leakage belt and any other geographic area that is relevant to determine the baseline of the project area.

A geographic area with agents, drivers and overall deforestation patterns observed during the 10-year period preceding the start date, i.e. July-2011 to July-2021, was determined, representing a credible proxy for possible future deforestation patterns in the project area.

The RR will be defined in accordance with two criteria:

● The methodology recommends that projects under 100,000 ha in size should have RRs 20 – 40 times bigger than the project area.

● The conditions determining the likelihood of deforestation within the project area being similar or expected to become similar to those found within the reference region, depending on: the landscape configuration and ecological conditions (elevation, slope, vegetation, and rainfall), socio-economic and cultural conditions, and agents and drivers of deforestation (agent groups, infrastructure or other drivers). The latter condition was the most important for adjusting the RR in order for it to more accurately represent the land-use dynamics. Specifically, this was based on the waterways (watersheds) and infrastructure (roads), which are the principal means of human and product transportation in the region. As such, from the areas directly surrounding the project, the RR was expanded to meet the nearest main waterways and roads.

It is possible to assume that the deforestation in the Project Area is likely to occur in a similar way to the observed in the Reference Region. The RR is yet to be defined.

Leakage Belt

The Leakage Belt (LB) is the land area or land areas surrounding or adjacent to the Project Area in which baseline activities could be displaced due to the project activities implemented in the project area. To define the boundary of the Leakage Belt, Opportunity cost analysis (Option I) will be applied, in accordance with Approved VCS Methodology VM0015 "Methodology for Avoided Unplanned Deforestation", Version 1.1, from December 3rd, 2012, Sectoral Scope 14.

The boundary of the Leakage Belt will be revisited at the end of each fixed baseline period, as opportunity costs are likely to change over time. In addition, this boundary of the Leakage Belt may have to be revisited if other VCS AFOLU projects are registered nearby the Project Area.

Opportunity cost analysis (Option I) is applicable where economic profit is an important driver of deforestation. In this context, literature studies, surveys and other credible and verifiable sources of information were used to demonstrate profitability of the main products of deforestation in the region: soy and corn plantation, wood and cattle.

The LB is yet to be defined.

Leakage Management Area

The leakage management area (LMA) complies non-forest areas located outside the project boundary in which the project proponent intends to implement the activities which reduce the risk of leakage in the project scenario. These activities must include the agents of deforestation and involve seeking new sources of income which contribute to forest conservation. Leakage management could involve agricultural, agroforestry, reforestation, education, or other activities.

The LMA is yet to be defined.

Forest

According to the Brazilian Forests at a Glance 2019, the Brazilian Forest Service considers as forests the lands that correspond to the vegetation typologies according to the Classification System of the Brazilian Institute of Geography and Statistics (IBGE), updated by the SIVAM project. Brazil endorses the definition of forest adopted by FAO: Land spanning more than 0.5 hectares with trees higher than 5 meters and a canopy cover of more than 10 %, or trees able to reach these thresholds in situ. It does not include land that is predominantly under agricultural or urban land use. The compliance of the project area with these definitions is further explained in section 1.13.

In addition, as per VM0015 methodology, the Minimum Mapping Unit (MMU) size of the LULC maps created using RS imagery shall not be more than one hectare irrespective of forest definition. Thus, the 30 m resolution LANDSAT images used for mapping have the minimum mapping unit defined at 30x30m (0.09ha), therefore falling easily to the methodology requirement.

Temporal boundaries

● Starting date and end date of the historical reference period

The adopted historical reference period is July 2011 to July 2021.

● Starting date of the project crediting period the AUD project activity

The project has a crediting period of 30 years, from 19-July-2021 until 18-July-2051.

● Starting date and end date of the first fixed baseline period

The first baseline period is from 19-July-2021 to 18-July-2031.

Carbon pools

The applied Methodology VM00015 considers six carbon pools. Their inclusion or exclusion within the boundary of the proposed AUD project activity, as well as the respective justification/explanation, are described in Table below.

Table 3. Carbon pools included or excluded within the boundary of the proposed AUD project activity

Carbon pools	Included / Excluded	Justification / Explanation of choice
Above-ground	Tree: Included	Carbon stock change in this pool is always significant
	Non-Tree: Excluded	No existence of perennial crops as final class
Below-ground	Included	Stock change in this pool is significant
Dead wood	Excluded	Excluded for simplification. This exclusion is conservative.
Harvested wood products	Included	Stock change in this pool is considered significant
Litter	Excluded	Excluded as it does not lead to a significant over-estimation of the net anthropogenic GHG emission reductions of the AUD project activity. This exclusion is conservative.
Soil organic carbon	Excluded	Recommended when forests are converted to cropland. Not to be measured in conversions to pasture grasses and perennial crop according to VCS Methodology Requirements, 4.0.

In accordance with the methodology, approximately 1/10 of the carbon stock in the below-ground pool of the initial "forest" class will be released in a ten-year interval. This is further discussed in the section Baseline Emissions.

3.4 Baseline Scenario

In the baseline scenario, forest is expected to be converted to non-forest by the agents of deforestation acting in the reference region, project area and leakage belt, as described below. Therefore, the project falls into the AFOLU-REDD category, specifically: Avoided unplanned deforestation (AUD). The revenue from the present REDD project is essential to maintain this area as standing forest, as described under additionality of the Project (section 3.5), as well as to carry out the present project's leakage management activities.

Degradation was not considered in the present REDD project, in accordance with methodology requirements, which define "forest" and "non-forest" as the minimum land-use and land-cover classes.

Analysis of historical land use and land cover change, as well as definition of classes and categories of LU/LC and the analysis of historical changes will be conducted as per VM0015 methodology.

ANALYSIS OF AGENTS, DRIVERS, AND UNDERLYING CAUSES OF DEFORESTATION

- ### Identification of agents of deforestation

As previously mentioned in "1.13 Conditions Prior to Project Initiation" of this VCS-PD, pasture accounts for virtually all the deforested land occupation in the project region.

The following information is provided for the identified agent of deforestation. Such assumptions were possible after data analysis from official sources: Brazilian Institute of Geography and Statistics (IBGE[38]) and the Deforestation Monitoring Project (PRODES[39]) developed by National Institute for Space Research (INPE):

a)   Cattle Ranchers

Description of the main features of the main agent of deforestation: Cattle ranching (pasture) is usually financed by means of initial capital obtained in wood logging. Deforestation is considered to occur through clear-cutting of forests for logging followed by pasture installation. This deforestation pattern may be caused by private landowners themselves and by professional land-grabbers, by means of invasions in unguarded areas. The final use of virtually all occupied lands would be cattle ranching (pasture). Thus, it can be affirmed that the deforestation agent group is composed by large and small-scale cattle ranchers supported by land-grabbers and loggers in the initial stage of deforestation. This group is composed by private owners and itinerant land-grabbers. It can also be affirmed that this group of deforestation agents is culturally and economically adapted to this "business cycle" of deforestation, whose results are clearly demonstrated in the Reference Region during the reference period.

Assessment of the most likely development of the population size of the deforestation agent group in the Reference Region, Project Area and Leakage Belt: as a significant deforestation agent in the region, cattle ranching (pasture) is expected to increase in the project region. In addition, annual deforestation presents same pattern than cattle ranching in the municipalities of Paranatinga, Nova Ubiratã and Feliz Natal, which surrounds the PA.

Figure 17. Annual deforestation and cattle herd production in surrounding municipalities

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[38] Available at https://cidades.ibge.gov.br/ Last visit on April 29th, 2022.

[39] Available at: http://www.dpi.inpe.br/prodesdigital/prodesmunicipal.php Last visit on April 29th, 2022
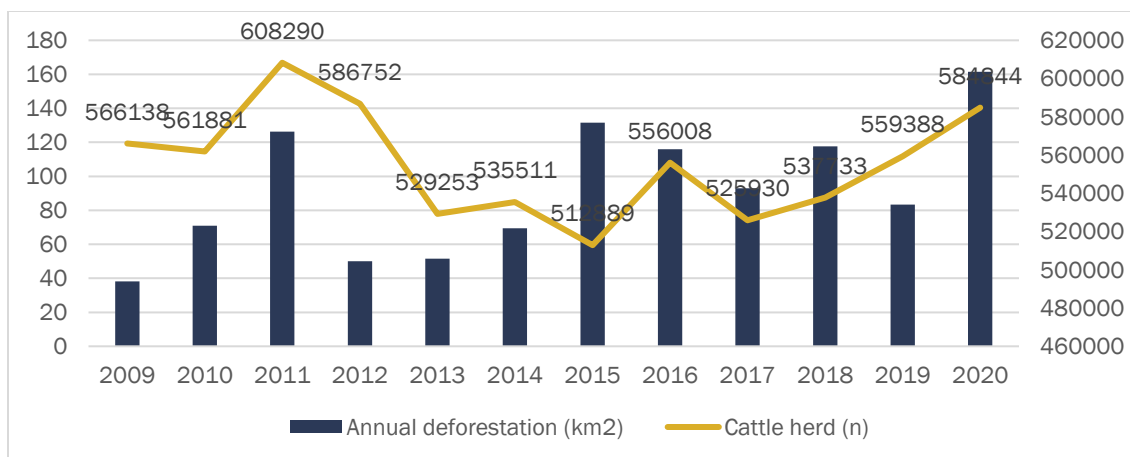
Given these dynamics, the herd size in the region is expected to determine deforestation rates. This significant pace of growth in cattle-related land uses will certainly impose considerable deforestation pressures in the future.

b) Timber harvesting

Timber harvesting can be regarded as the initial approach in a series of activities by deforestation agents, as it is the precursor of other economic activities. Official registration of formally documented logging for sale to sawmills has been in increasing over the last 10 years, according to official IBGE data, reaching 370,634 m^3 in 2019. Although the subsequent years are lower that the spike registered in 2019, the trend points to a significant increase in timber demand for the following years.

Figure 18. Annual deforestation and timber extraction in surrounding municipalities
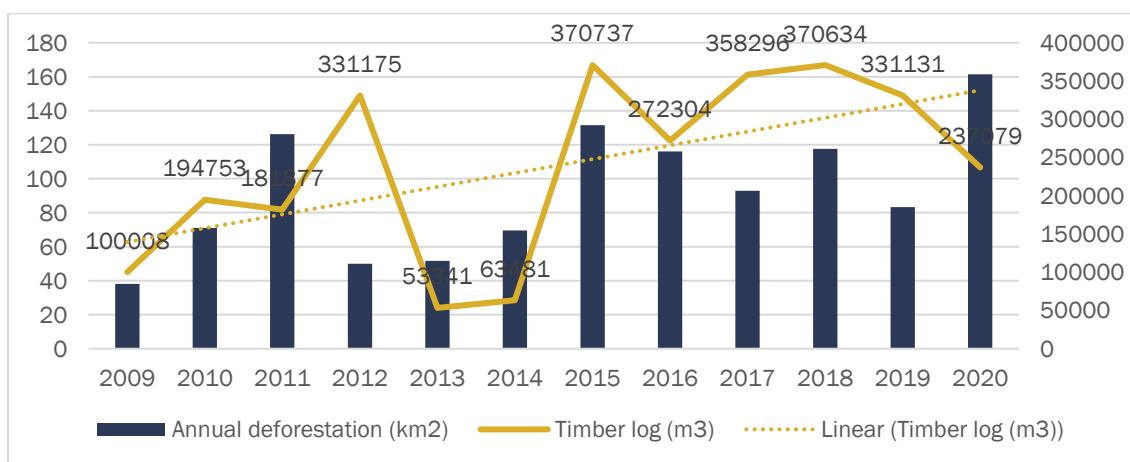
Like observed for cattle ranching, it is possible to note a correlation between deforestation and timber extraction. In addition, it is worth highlighting that IBGE data for timber extraction considers only legal timber, what suggests the overall timber extraction might represent a significant deforestation in the region.

c) Soybean and corn plantation

Soybean and corn are grown cultures in Brazil, especially in the Southern Amazon, where Alto Xingu Grouped REDD+ Project is located. According to official data extracted from IBGE, the amount of both products is consistently growing yearly. For that reason, this analysis was grouped for these cultures.

Figure 19. Annual deforestation and agriculture (soybean and corn) in region
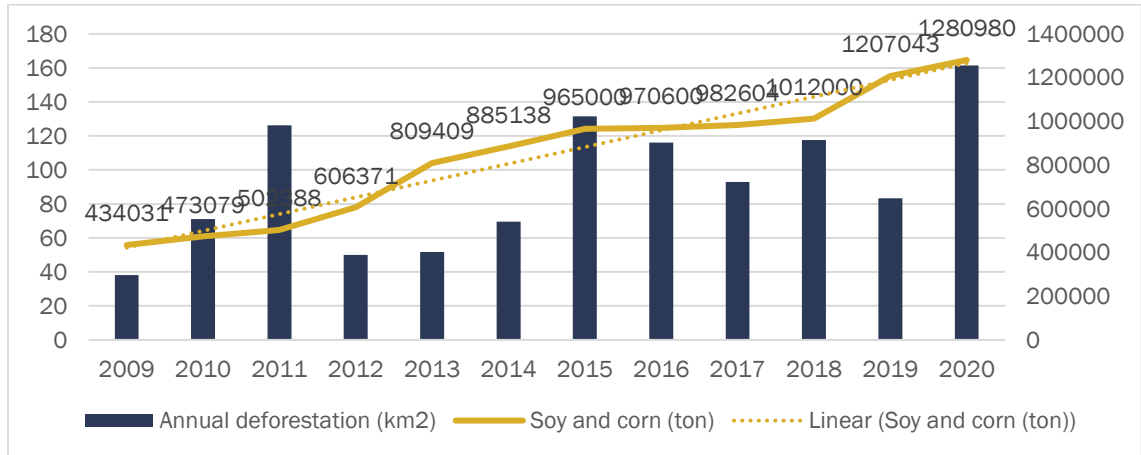
Statistics on historical deforestation attributable to the agent group: when analyzing only the deforestation data at the closest municipalities to the project area, the highest deforestation year for the last ten years occurred in 2020 (161.4 km^2). The total deforested area for the period is 1,109.1 km^2. During the historical reference period (2011 – 2021), the lowest deforestation occurred in 2012 (50 km^2). However, in the following years, the deforestation increased in the region, reaching its spike in the last monitored year, which was 2020.

Figure 20. Increasing annual deforestation – Paranatinga, Nova Ubiratã and Feliz Natal40
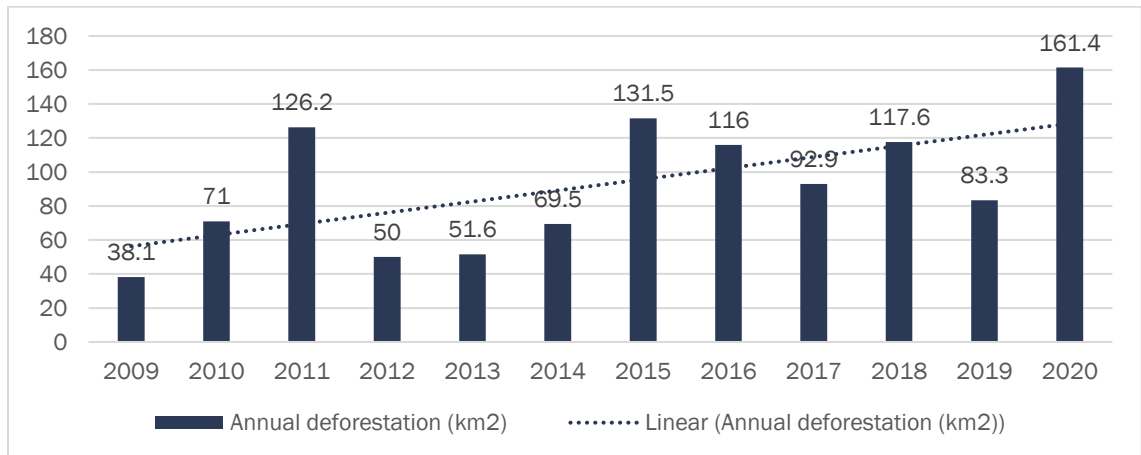
- <u>Identification of drivers of deforestation</u>

In the State of Acre there is a particularity in deforestation where the highest rates occur in vacant land and rural settlement projects. All related to population increase and cattle herd[41]. In this step, the factors that drive the land-use decisions of the agent group are analyzed to identify the immediate causes of deforestation. For this analysis, two sets of driver variables are distinguished:

a)   Driver variables explaining the quantity (hectares) of deforestation:

Cattle prices:

According to CEPEA (2021)[42], the price of cattle increased 245% over the 2010 (R$ 88.51 per arroba) to 2021 (R$ 305.46 per arroba) period. This economic phenomenon can be observed throughout the country. Young (1998) as cited in Rivero et al. (2009)[43], evaluating the mechanisms that cause deforestation in the Legal Amazon, found a positive relation between the expansion of agricultural areas and the variation of prices of agricultural products. For Margulis (2001) as cited in Rivero et al. (2009), the higher the agricultural prices, the higher is the migration to rural lands, which results in deforestation.

This key driver variable is likely to have a major impact on cattle ranchers' decision to deforest. Considering that the higher is the cattle price, the higher are the profits obtained with pasture for cattle ranching, instead of maintaining standing forests. This driver also plays an important

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[40] Available at: http://www.dpi.inpe.br/prodesdigital/prodesmunicipal.php. Last visit on April 29th, 2022

[41] http://www.journals.ufrpe.br/index.php/JEAP/article/view/2790/482483315

[42] https://www.cepea.esalq.usp.br/br/consultas-ao-banco-de-dados-do-site.aspx

[43] https://www.scielo.br/j/neco/a/jZHjd9B8ZghY7tG9G7qchTk/?format=pdf&lang=pt

role on the definition of economic radius for cattle activities, which also influences the distances of deforestation from consumption poles.

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 factor, China also contributed to the growth of imports, since it was the only major economy in the world 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 higher consumption of more expensive proteins, 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 ox is not something that can be solved immediately, because cattle is a multi-year production, as it begins to produce today to deliver animals in two, three, or four years[44]. 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% over the value of 2020[45], indicating a strong trend of increased in exports for the coming years. Beef exports have continued increased, growing by almost 7% in 2020 and close to 8% in 2021, increasing by more than 15% in the biennium 2020/2021[46]. Chinese importers have increased the purchases of Brazilian beef by more than 150% in 2020[47]. The dynamics of cattle prices are regulated by micro and macroeconomic scenario throughout the country and abroad, and there are no applicable measures that can be implemented to address this driver.

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[44] https://www.bbc.com/portuguese/brasil-55664305

[45]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

[46] https://www.avisite.com.br/index.php?page=noticias&id=21284

[47] https://www2.safras.com.br/eng/2020/09/23/meat-exports-in-brazil-will-be-an-important-differential-in-2021/

Figure 21. Cattle prices in Brazil (CEPEA, 2021)
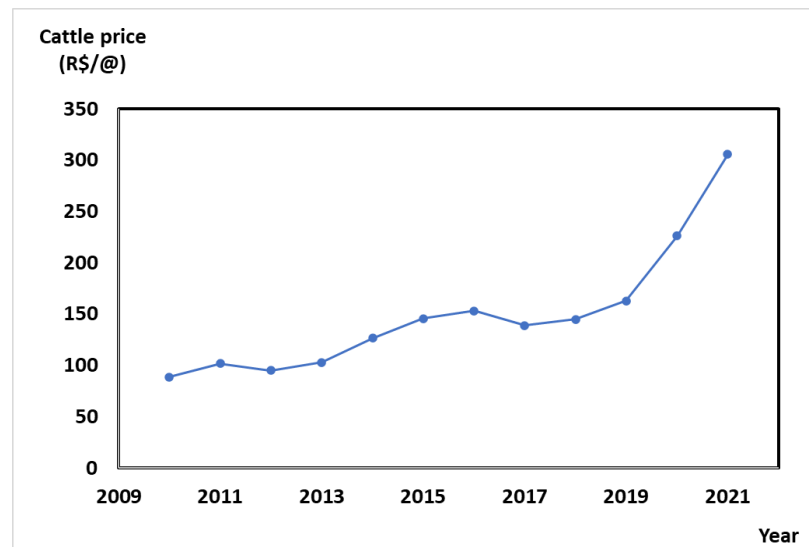
Population density:

This deforestation driver is associated with the dynamics of the local cattle market, as well as with the increase of potential deforestation agents working in the region. Several authors include population density as a prediction variable in deforestation models, which demonstrates that this driver has important impact on deforestation trends (Reis and Margulis, 1991; Reis, 1996; Andersen and Reis, 1997 as cited in Rivero et al. 2009).

This key driver variable provides an increasing pressure of deforestation by cattle ranchers, avid for mitigating poverty by means of a profitable business.

The estimate of population growth in the surrounding cities is not so expressive due to the low rate of development of the municipality. However, over the projection period, it is estimated that the population will increase by more than 20% (Figure 22). This estimate was made by means of a linear regression based on the past 10 years of official data on population, according to official IBGE data[48]. This population growth rate could represent a major driver to increase the deforestation in the region over upcoming decades.

Considering that the project activity cannot regulate the population density, there will be no project measures to address this driver.

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[48] https://ftp.ibge.gov.br/Estimativas_de_Populacao/

Figure 22. Projected population at Paranatinga (MT)

Figure 23. Projected population at Nova Ubiratã (MT)

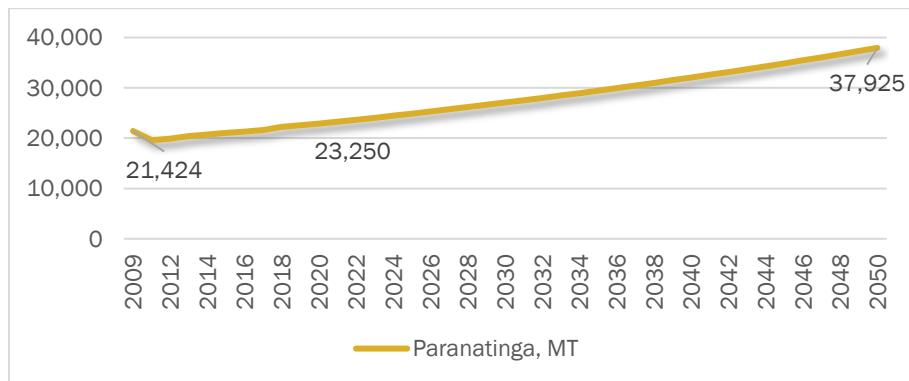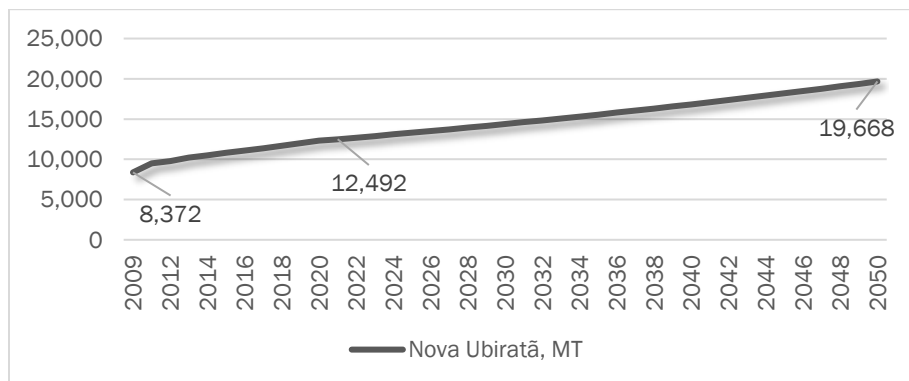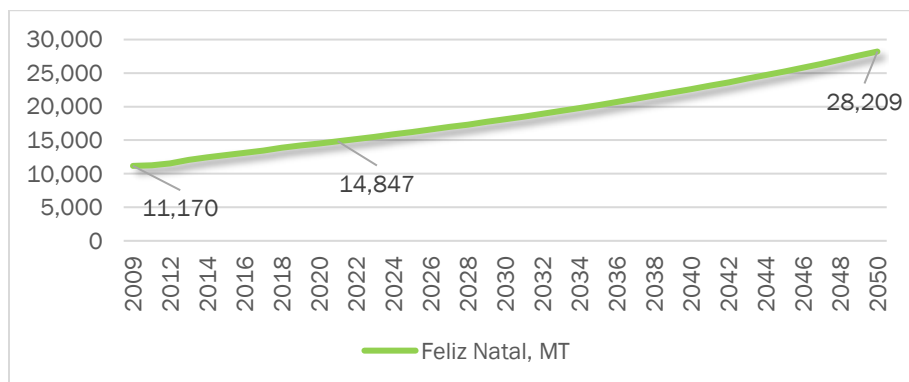**Figure 24. Projected population at Feliz Natal (MT)**

b)   Driver variables explaining the location of deforestation:

These driver variables were used in deforestation projection modelling, the results of which show that such variables can predict the location of deforestation variables explaining the quantity (hectares) of deforestation:

Access to forests (existing roads and navigable rivers):

Studies on historical location of deforestation in the Reference Region can evidence that this factor has been a driver for deforestation during the historical reference period. It is broadly recognized that deforestation is accelerated in regions that have denser road networks (IMAZON, 2021[49]).

The presence of roads and navigable rivers is a logical deforestation driver, since it facilitates the flow of wood and other products harvested from the forest. The capacity to transport wood logs, rapidly clear the land for pasture and place wood logs in sawmills, quickly obtaining revenues, certainly has a major impact on cattle ranchers' decision to deforest the most accessible forest areas.

The Reference Region holds a dense network of primary, secondary, and tertiary roads. The lands located near these roads are more likely to undergo deforestation, generating a progressive fishbone effect. This deforestation pattern may even increase exponentially in some cases, given that a single road may originate several other offshoot roads in the future, and so on. In a brief analysis of deforestation location, the existence of the fishbone deforestation patterns can be noted, which indicates the creation of secondary and tertiary roads in the Reference Region. Barber et al. (2014), in their study on deforestation drivers in the Amazon, conclude that proximity to transportation networks, particularly the rapidly growing unofficial road network, is a major driver of deforestation in the Amazon. Thus, it can be expected that the growth of the unofficial road network will increasingly affect the dynamics of deforestation over the project lifetime.

A similar line of reasoning is applicable to the navigable rivers surrounding the Project Area: as stated at section 1.13, the region is privileged from a hydrographic perspective, with several rivers such draining in the south-north direction close to the project area. The Jatobá River passes through the project area and is a valuable way for land-grabbers to easily invade the property and clear forests for logging and pasture. In the case of navigable rivers, the number of paths will be invariable across the project lifetime, as the creation of new navigable rivers is highly unlikely.

The project activity will result in the increase of the intensity of surveillance activities during the crediting period, in such a way that the main means of access to the Project Area will be continuously monitored and controlled.

Proximity to forest edges:

Studies on historical location of deforestation in the Reference Region provide evidence that this has also been a driver for deforestation over the historical reference period. Similarly, to the proximity to roads and navigable rivers, the effect of this driver on deforestation decisions is related to easier logistics when clearing areas and easier and quicker revenue from logging. The proximity to forest edges has been used in similar ways by other REDD projects, including the "Fortaleza Ituxi REDD Project", "The Suruí Forest Carbon Project", the "RMDLT Portel-Pará REDD

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[49] https://imazongeo.org.br/

Project", the "Florestal Santa Maria REDD Project", and others. Furthermore, this deforestation driver has been used to explain the dynamics of deforestation in similar analyses (LAURANCE et al. 2009[50]; ROSA et al. 2013[51]). According to ROSA et al. (2013), deforestation is contagious, such that local deforestation rates increase over time if adjacent locations are deforested.

The impact of this driver on cattle ranchers', corn and soybean harvesters' decision to deforest is similar to that explained for roads and navigable rivers: this proximity facilitates the logistics of wood and other products extracted from the forest.

This key driver variable will have increased impact during next years, owing to the advance of deforestation in the region, which will bring deforestation pressures gradually closer to the boundaries of the Project Area. As stated in several parts of the present project, deforestation for logging, agriculture, and cattle ranching is a common practice in the project region, and this behavior tends to continue in the future. Thus, it is expected that deforested areas will attract deforestation agents continuously, in a growing deforestation trend, provoked by a "contagious" process, as stated by ROSA et al. (2013).

The project measures that will be implemented to address this driver are the same measures that are being adopted to manage leakage in this project. These measures are described in detail in "1.17 Additional Information Relevant to the Project", subtopic "Leakage Management", of this PD, and involve increased surveillance, replication of project concepts to other areas (divulgation), engagement of local communities in inhibiting illegal occupation, and others.

- **Identification of underlying causes of deforestation**

According to literature surveys and local interviews, it is concluded that the underlying causes of deforestation are as follows:

Land-use policies and their enforcement:

As previously mentioned in this PD, in spite of the legal provisions intended to preserve at least 80% of the Amazon's forest cover, the lack of law enforcement by local authorities along with the increase in production and prices of cattle has 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 that, to cover vast distances of areas with low demographic density makes tracking of illegal activities and land surveillance very 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.

This key underlying cause has a strong effect on the decisions of the main deforestation agents, as they are at liberty to continue their illegal business activities with very low probability of being

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[50] https://doi.org/10.1016/j.tree.2009.06.009

[51] https://journals.plos.org/plosone/article/file?id=10.1371/journal.pone.0077231&type=printable

detained by authorities. There are several indications of loosening of environmental legislation in recent years, with emphasis on the following subfactors:

Greater conveniences for obtaining "forest clearing authorization": An example of this fact can be observed in the neighboring neighbor Goiás state, which reported a 1,100% increase in the number of permits for deforestation in 2020[52]. 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 effort in the analysis of applications, are responsible for increasing the number of deforestation permits in the State. According to data from Semad's Environmental Licensing Superintendence, there was an increase of area suppressed by 673%: 6.5 km^2 in 2019, to 43.8 km^2 in 2020. Thus, as occurred in the State of Goiás, the facilitation of the issuance of authorization for the suppression of native vegetation can occur at any time in the Mato Grosso state. In fact, attempts at facilitation have been sought recently (in 2020), as indicated in 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 maturity of term, that is, after a period stipulated for the government agency to manifest (120 days), was voted 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[53]. Fortunately, environmentalists have reedited the Provisional Measure 915, to prevent deforestation licensing for term expiration[54].

Loosening legislation for timber exports: As reported by Reuters, during 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 scrapping IBAMA's authorizations 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 the five shipments. In the neighboring Pará state, more than half of the roughly 3,000 officially registered shipments in the past year, containing an estimated 54,000

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[52] 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

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

[54] https://epbr.com.br/ambientalistas-alteram-mp-915-para-prevent-licensing-environmental-by-course-of-time/

m³ of wood that left one port, did not have authorization. Companies have requested authorizations from IBAMA for those shipments but exported them before the agency had time to respond. Beyond that, many shipments were exported without seeking approval from IBAMA. Shipments went to the US, the Netherlands, France, Germany, Belgium, and possibly other countries. Before the rules changed, IBAMA was required to give authorization to all wood exports before they leave port. Even though, most of the shipments needed only the proper paperwork to be given the green light, but only certain cargoes would be randomly selected for physical inspection[55]. Arbitrarily, the president of IBAMA ensured that all future unauthorized exports of wood, previously classified as illegal, became legal: he took advantage of the inattention of the press to the theme 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. With the repeal, the way was opened for large shipments of illegal timber from the Brazilian Amazon to go abroad[56]. It was also revealed that in February 2020, loggers from Pará asked IBAMA to change that rule: 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 serves to allow the transport of the goods to the port. This change has been immediately accepted by the president of IBAMA[57].

Legislation favoring landgrabbers. An analysis conducted by IPAM (Environmental Research Institute of the Amazon) showed that 35% of deforestation occurred in the Amazon between August 2018 and July 2019 was recorded in non-designated areas without information. About land regularization, environmental NGOs warn about two ongoing projects. While, in the Senate is presented Bill 510/21, in the House of Representatives it is considered to vote the Bill 2633/20[58]. Commonly, both derive from the original text of Provisional Measure 910, known as "*MP da Grilagem*" (Landgrabbers' Provisional Measure), for changing 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 2,500 hectares) to be titrated without the need for inspection. Indeed, given that the land grabbing 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 will be an incentive to intensify this practice in the coming years. Bill 2633/20 has a loophole that would allow to legalize, via bidding, public areas invaded after the deadline for occupation provided for by law

[55] https://www.businesslive.co.za/bd/world/americas/2020-03-04-brazil-may-be-exporting-illegally-deforested-wood/

[56] https://brasil.mongabay.com/2020/04/ao-afrouxar-leis-de-exportacao-brasil-permite-saida-de-madeira-ilegal-da-amazonia/

[57]https://g1.globo.com/natureza/noticia/2020/11/17/documentos-mostram-que-ibama-facilitou-exportacao-de-madeira-extraida-ilegalmente.ghtml

[58] https://ipam.org.br/35-do-desmatamento-na-amazonia-e-grilagem-indica-analise-do-ipam/

(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 of particular use, in the National System of Rural Environmental Registration (CAR). If the entire area registered to date as private property was 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 considering that deforestation is often greater than allowed. In recent years, grabbing of non-destined public forests has increased: in 2019, it was the land category where 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. Among the conditions defined by Provisional Measure 910, for appropriation of public lands by individuals, are: i) the area must be registered in the Rural Environmental Registry (CAR, "*Cadastro Ambiental Rural*"): as it is known, any information can be imputed in the "CAR" system until the current moment without any veracity checking, and ii) the claimant must be performing agricultural activities in the territory (i.e., should have preferably deforested the area)[59]. The Provisional Measure defines that for areas that meet the requirements and have up to 15 fiscal modules (areas with up to 1,650 hectares), the title will 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 (maximum 440 hectares). The exemption from the inspection may allow large illegally deforested areas to be taken over by individuals. This is because the Provisional Measure only prohibits the regularization of areas that have been subject to fines or environmental embargoes, and not all environmental violations are known and fined by the government[60]. Given that the Project Area is surrounded by public lands and that cases of land-grabbing can be evidenced in the Reference Region, an abnormal increase in deforestation in that region is expected in the coming years, because Brazilian legislation increasingly gives all indications that it is very inviting to land-grabbing acts, granting amnesty to landgrabbers and agents of illegal deforestation.

The problem of lack of command-and-control measures to contain deforestation in the Amazon Biome is a widespread issue, which has been getting worse and worse every year, due to lack of personnel and infrastructure of legal authorities, in addition to schemes of corruption and violence established by illegal agents to maintain the *status quo*. In this context, the lack of law enforcement can be assumed to be a constant underlying cause of deforestation during the project lifetime.

Although the project activity cannot solve the problem of lack of enforcement in Brazil, it can serve as a case of success, to encourage neighbors to adopt sustainable practices as a profitable land-use alternative.

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

[60] https://amazonia.org.br/como-a-mp-da-grilagem-pode-mudar-o-mapa-de-regioes-da-amazonia/

Poverty and wealth:

According to statistics on the municipalities of Paranatinga, Nova Ubiratã, and Feliz Natal (IBGE, 2021)[61], in 2018, the average monthly salary was 2.1, 2.5 and 2.2 minimum wages, respectively. The proportion of occupied people in relation to the total population was 19%, 17%, and 14%. In comparison with other municipalities in Mato Grosso state, they are ranked 38th, 47th, and 71st out of 141 towns, while in comparison with cities nationwide, they are ranked 1473rd, 1765th, and 2419th out of 5570. Considering households with monthly incomes of up to half a minimum wage per person, they had 36%, 36%, and 35% of the population in these conditions. These data show that the region faces poverty issues.

This key underlying cause has a major impact on deforestation decisions, as the main agents (cattle ranchers, soybean and corn producers, operationally supported by loggers and land-grabbers) can easily recruit cheap manpower, consisting of workers seeking to sustain their families by means of this short-term profitable activity, despite it being illegal, due to the inconsistency of law enforcement.

Over the coming years, it is not expected that the region will rapidly solve the poverty issue, as it is historically deeply rooted in the region. Given this context, poverty can be assumed to be a constant underlying cause during the project lifetime.

Although the project activity cannot solve the poverty issue, it aims to provide new jobs for local agents, who will be able to generate revenues for their families by means of a legal and sustainable initiative.

- **Analysis of chain of events leading to deforestation**

Based on the historical evidence collected, it is concluded that the implementation of the BAU activity (pasture and plantation) is usually financed by means of initial capital obtained through timber logging.

The lack of enforcement of policies and laws also affects land tenure and property rights. This aspect stimulates the action of land grabbers and squatters. Ineffective legal land registration and documentation is also a barrier to official registration of timber production from natural forests. In this scenario, a great portion of harvested wood logs can be regarded as illegal and official registration is not technically feasible.

All the above factors combine to result in uncontrolled land invasions and deforestation, followed by cattle ranching activities, a scenario which is substantiated by illegal trespassing events, and the fact that daily patrolling of the area is required by one or two employees on motorbikes, in order to combat the constant deforestation pressure.

- **Conclusion**

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[61] Available at: https://cidades.ibge.gov.br/brasil/mt/paranatinga/panorama. Last visit on April 29th, 2022

Available evidence about the most likely future deforestation trend within the Reference Region and Project Area is deemed to be "Conclusive". Meaning that the hypothesized relationships between agent groups, driver variables, underlying causes, and historical levels of deforestation have been verified via literature studies and other verifiable local sources of information.

The weight of the available evidence conservatively suggests that the overall trend in future baseline deforestation rates will be "Increasing". During the reference period, the deforestation rate in the Reference Region has consistently increased. In this context, the deforestation rate used in the projections was the Modelling ("c") approach (see step 4.1.1 of the VM0015 methodology: Selection of Baseline Approach).

3.5   Additionality

For the purpose of the present analysis, the VCS Tool for the Demonstration and Assessment of Additionality in VCS Agricultural, Forestry and Other Land Use (AFOLU) Project Activities - VT0001 version 3.0[62] was applied for the project activity of the Alto Xingu Grouped REDD Project.

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

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

Credible alternative land use scenarios to the present AFOLU project activity are:

The continuation of the current (pre-project) land use scenario: in this scenario, no REDD project is undertaken. The deforestation pattern identified in section 3.4 above, which describes the relationship among the agents, drivers and underlying causes present in the region during the historical period, will most likely continue to cause deforestation in the future.

This scenario involves the implementation of a sustainable forest management plan within the project boundaries of the proposed VCS REDD project, however without carrying out additional social and environmental activities, as well as activities to reduce unplanned deforestation. This scenario also complies with item iii of the methodological tool (activities similar to the proposed project activity on at least part of the land within the project boundary of the proposed VCS AFOLU project at a rate resulting from legal requirements).

Although this is a similar activity proposed by the present project, i.e. avoiding deforestation through conducting sustainable forest management activities, no other complementary activities to improve monitoring of deforestation would be carried out, such as: increased surveillance, monitoring and control by satellite images, REDD+ technical studies, social and environmental activities promoted, among others.

Implementation of additional activities: In this scenario, the Project activity would be carried out on the land within the project boundary, nevertheless performed without being registered as the

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[62] Available in <https://verra.org/wp-content/uploads/2017/11/VT0001v3.0.pdf>

VCS REDD project. This scenario would include avoiding deforestation through conducting sustainable forest management activities.

Additionally, complementary activities to improve the monitoring of deforestation caused by the agents (identified in section 3.4 above) would have to be carried out, such as: increased surveillance, monitoring and control by satellite images, REDD+ technical studies, social and environmental activities promoted, among others. These investments are usually not made by the Brazilian Government, nor are part of sustainable forest management plans, as they are financially unattractive and not necessary to legally perform the timber harvest. Therefore, the economic feasibility of this scenario would be reduced without additional revenues from the sale of VCUs.

Cattle ranching: In this scenario, the landowner would change its activity from forest management to cattle ranching. This is a plausible scenario since cattle is one of Brazil's main economic activities, as previously described in section above.

The State of Mato Grosso is the most expressive in the number of herds in Brazil, being responsible for the Middle West leadership nationwide. The Middle West region represents around 35% of the country's herd[63], as shown in the figures below.

**Figure 25. Cattle effective in Mato Grosso and Middle West region**
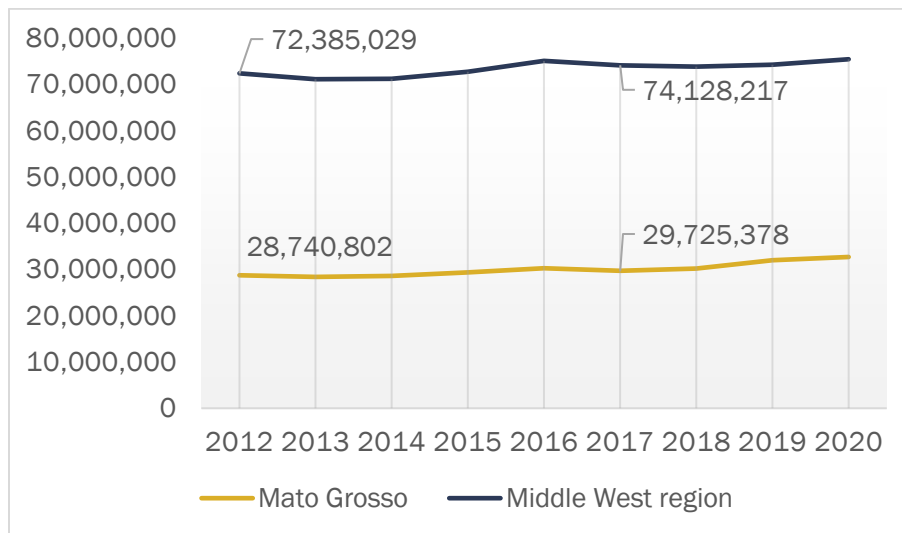
Figure 26. Cattle effective in Middle West region and Brazil
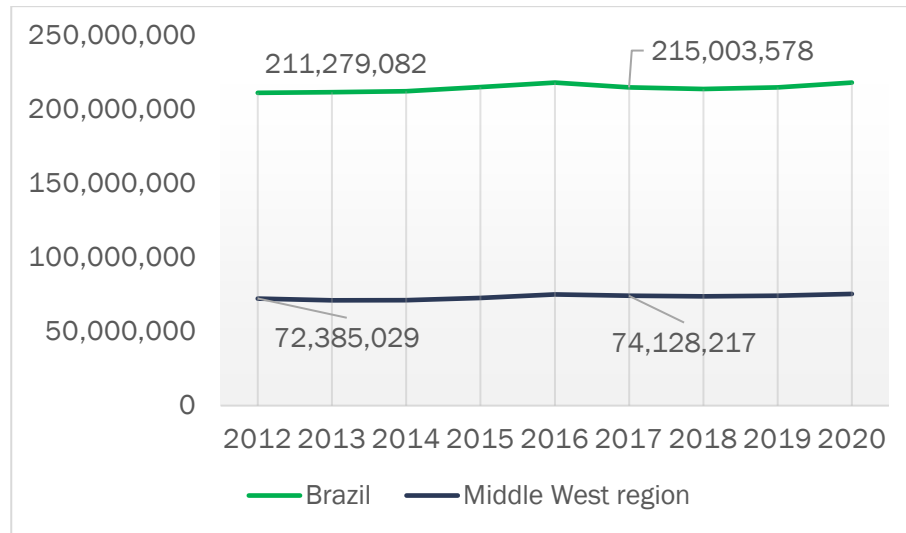
This magnificent number of herds over the years in the region can be observed by the type of land use on agricultural properties (Figure 27). In Mato Grosso state, more than 60% of the land are destined for pasture and are in good condition, while almost 40% of land is used for agricultural crops (permanent and temporary)[64], what reinforces the agriculture vocation for the region.

Figure 27. Land use in Mato Grosso state
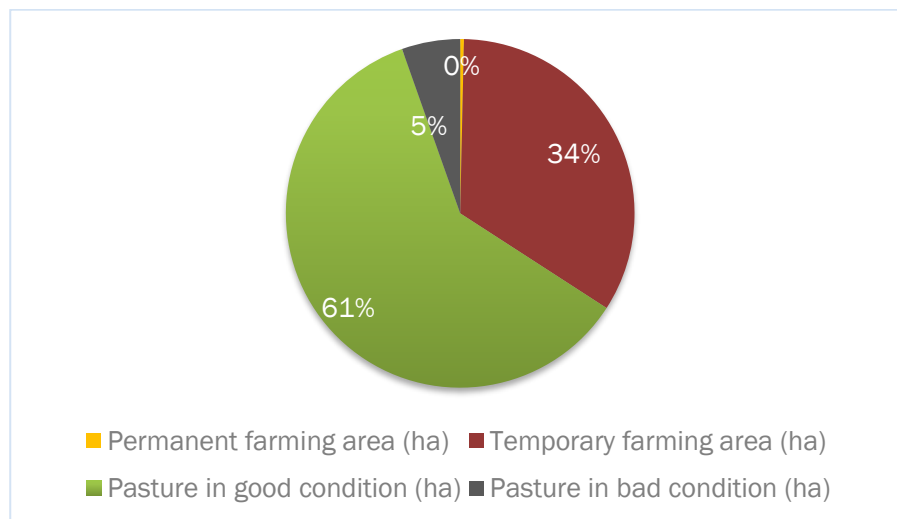
Plantation: as mentioned in the previous paragraph, the Middle West region and Mato Grosso have an agriculture vocation. This can be confirmed by the soybean and corn plantation at the state, which is growing consistently in the last years. In this scenario, the landowner would change

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[64]https://www.ibge.gov.br/estatisticas/economicas/agricultura-e-pecuaria/9107-producao-da-pecuaria-municipal.html?=&t=resultados

its activity to harvesting soybean and corn. This is a plausible scenario since plantation is one of Brazil's main economic activities, as previously described in section above.

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

Scenario I and II - The application of a sustainable forest management plan is regulated in Brazil by the laws Nº 12,651[65], decree Nº 5,975[66], in addition to Mato Grosso's legislation, with law 233/2005[67]. Despite the requirement to mitigate social impacts, social and environmental activities for the communities surrounding the management plan area are not required by law. According to Ribeiro[68], the main obstacles related to the approval of the sustainable forest management plan in the Amazon are: a) low investment capacity, financial and fiscal incentives. Although there is legal support that allows deforestation, the property owner does not plan to implement sustainable forest management plan in the project area. Nevertheless, if at some point during the project period such activity is implemented, the corresponding credits will be reconsidered in order to assure proper calculation.

As it does not contain social and environmental activities to control deforestation coming from communities surrounding the property, scenario I may contain activities that are illegal or of uncertain legal status, not being enforced namely due to the lack of control[69] and government capacity. This type of illegal deforestation, apart from planned deforestation, occurs mainly due to social pressure and low HDI in the Amazon and Cerrado regions. Although not being in compliance with applicable mandatory laws and regulations, this scenario results from systematic lack of enforcement of applicable laws and regulations. One of the goals of the present REDD project is to contribute to a solution to this problem by promoting the sustainable management of forest resources through increased monitoring and surveillance to avoid unplanned, illegal deforestation.

For instance, Government conservation units such as parks and sustainable use areas (APAs) are also affected by advancing deforestation and increased accessibility of the region to

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[65] Available at <https://www.planalto.gov.br/ccivil_03/_Ato2011-2014/2012/Lei/L12651.htm> Last visit: 29/04/2022

[66] Available at <http://www.planalto.gov.br/ccivil_03/_ato2004-2006/2006/decreto/d5975.htm> Last visit: 29/04/2022

[67] Available at < https://www.legisweb.com.br/legislacao/?id=132392> Last visit: 29/04/2022

[68] RIBEIRO, A.C.F. et al. O PLANO DE MANEJO FLORESTAL COMO INSTRUMENTO DE DESENVOLVIMENTO SUSTENTÁVEL NA AMAZÔNIA. Direito & Desenvolvimento, ISSN 2236-0859, 2020. Available at <https://periodicos.unipe.br/index.php/direitoedesenvolvimento/article/download/875/715/#:~:text=O%20Pl ano%20de%20Manejo%20Florestal%20Sustent%C3%A1vel%20%2D%20PMFS%20est%C3%A1%20intim amente%20relacionado,forma%20alcan%C3%A7armos%20um%20desenvolvimento%20ambiental>.

[69] MOUTINHO, P. *et al*. **REDD no Brasil:** um enfoque amazônico: fundamentos, critérios e estruturas institucionais para um regime nacional de Redução de Emissões por Desmatamento e Degradação Florestal – REDD. Brasília, DF: Instituto de Pesquisa Ambiental da Amazônia, 2011.

economic activities due to creation or improvement of infrastructure. Between 2000 and 2008, 2.25 million hectares were deforested in protected areas in Legal Amazon, and illegal exploitation of wood (degradation) has occurred in many of them.

One way to avoid increased accessibility and illegal exploitation of protected areas would be to increase the effectiveness of sanctions in cases of environmental malpractice.

The creation of protected areas is proven to be one of the most effective tools in forest conservation and the fight against deforestation. However, without management and investment, these important reserves do not attain their sustainable development goals, leaving them vulnerable to criminal activity such as land squatting, illegal wood harvesting and deforestation. This underlines the importance of REDD+ projects for forest conservation, despite being located in protected areas, because they are capable of contributing to the improvement of deforestation monitoring and control, promoting social, economic and environmental benefits in the region.

As Scenario II is the implementation of the SFMP with the addition of social environmental activities, as presented above, it is also in compliance with all applicable legal and regulatory requirements. Thus, there are no restrictions for SFMP within the areas where Alto Xingu Grouped REDD+ project's property is located.

Scenario III - Cattle raising in the Amazon Forest is legal as long as the owner follows the percentage of Legal Reserve and Permanent Preservation Areas restriction described in the Brazilian legislation. The landowner must also provide a deforestation authorization for clearing the area for pasture. This authorization is provided by the State's government[70], in the responsible Environmental agency.

Scenario IV – Plantation in the Cerrado and Amazon biomes is legal as long as the owner follows the percentage of Legal Reserve and Permanent Preservation Areas restriction described in the Brazilian legislation. Following the same rule as previous scenario, the landowner must also provide a deforestation authorization for clearing the area for pasture, issued by the state Environmental agency.

Sub-step 1c. Selection of the baseline scenario

Based on the scenarios presented, Baseline Scenario will be chosen.

STEP 2. Investment Analysis

Sub-step 2a. Determine appropriate analysis method

The Alto Xingu Grouped REDD+ Project generates financial benefits from the revenue of the VCUs sales. Thus, an investment comparison (Option II) will be carried out in order to determine the project's additionality, i.e, whether the proposed project activity, without the revenue from the

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[70] Available at < https://www.legisweb.com.br/legislacao/?id=132746>

sale of GHG credits, is economically or financially less attractive than the other land use scenarios.

Sub-step 2b. - Option II. Apply investment comparison analysis

An investment comparison analysis will be performed to demonstrate which of the scenarios identified above is more financially attractive.

Sub-step 2c. - Calculation and comparison of financial indicators

The following scenarios were analyzed as part of the investment analysis:

1. The implementation of a sustainable forest management plan within the project boundaries of the proposed VCS REDD project, however without carrying out additional social and environmental activities, as well as activities to reduce unplanned deforestation.

2. Implementation of a sustainable forest management plan, combined with the implementation of additional activities to reduce deforestation.

3. Land use change to cattle ranching.

Sub-step 2d. - Sensitivity analysis

The objective of this sub-step is to demonstrate that the conclusion regarding the financial attractiveness of the project is robust to reasonable variations in the critical assumptions. The investment analysis provides a valid argument in favor of additionality only if it consistently supports the conclusion that the proposed VCS AFOLU project without the financial benefits from carbon credits is unlikely to be financially attractive.

STEP 4. Common practice analysis

The previous steps shall be complemented with an analysis of the extent to which similar activities have already diffused in the geographical area of the Alto Xingu Grouped REDD+ Project activity. Similar activities to the proposed REDD project, i.e., that are of similar scale, take place in a comparable environment, inter alia, with respect to the regulatory framework and are undertaken in the relevant geographical area, shall be analyzed. Other registered VCS AFOLU Project activities shall not be included in this analysis.

3.6   Methodology Deviations

4   QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

5   MONITORING

APPENDIX