THE ARR HORIZONTE CARBON PROJECT

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1 PROJECT DETAILS

1.1 Summary Description of the Project

The ARR Horizonte Carbon Project is located at the Cerrado Biome, in the state of Mato Grosso do Sul, Brazil. It is an AFOLU project, and therefore is classified within scope 14. More specifically, the project falls under the ARR category.

The ARR Horizonte Carbon Project's purpose is to remove and reduce GHG emissions through an increase in forestry area in the state of Mato Grosso do Sul, at the Cerrado biome, initially near the city of Três Lagoas. The carbon credits are a result of the change of land use in previous pasture areas, through the plantation of Eucalyptus species in an area of 14,457 ha, considered as the first project activity, as well as a result of the recovery of sandy areas, through the plantation of native vegetation most adequate for each case in an area of 1,204 ha, considered as the second project activity, both classified under the ARR category.

In addition, the credit's revenue will allow for an additional restoration of native vegetation on Legal Reserves (RL – Reservas legais, in Portuguese) and Permanent Protection Areas (APP – área de preservação permanente, in Portuguese). Although this activity will not result in carbon credits for this project, it has a great importance considered the State of Mato Grosso do Sul has the highest deforestation rates under the Cerrado biome, which has been the second most impacted biome by deforestation in the country, with 33,5% of the deforested areas[1].

Under the social sphere, the project also brings benefits for the region, with the implementation of additional social activities (programs named Inclusive Recycling and the Nursery for Native and Ornamental Seedlings), beyond those already implemented by Suzano where it operates, which will be implemented due to the credit's revenue.

[1] MapBiomas, 2021. Relatório anual do desmatamento no Brasil - 2020. Available at: <https://s3.amazonaws.com/alerta.mapbiomas.org/rad2020/RAD2020_MapBiomasAlerta_FINAL.pdf>. Last access on 25 November 2021.

The project activities started on 02-11-2017 with soil preparation activities. This is the start date of the project, which will have a renewable crediting period of 30 years, from 02-11-2017 to 01-11-2047.

1.2 Sectoral Scope and Project Type

The sectoral scope applied to the ARR Horizonte Carbon Project is scope 14 - Afforestation, Forestation and Other Land Use (AFOLU), specifically under the Afforestation, Reforestation and Revegetation (ARR). This is not a multiple activity project. This is a grouped project.

1.3 Project Eligibility

The ARR Horizonte Carbon Project meets all the eligibility criteria and requirements set by the VCS Program for the AFOLU sectorial scope. The project includes areas subject to the afforestation, reforestation and revegetation (ARR) category.

- The project falls under the Afforestation, Reforestation and Revegetation category;
- The project is not located in REDD + program zones. So far, Brazil has REDD+ program zones in the Amazon biome, and a REDD+ program for the Cerrado biome, located in another state, Mato Grosso;
- The project area, where the plantation of trees will be implemented, was identified as degraded pasture or sandy soil before the start of the project activity and was not cleared of native ecosystems for the development of the project activity. Hence, there has not been a change in land use in the project activity area within the last 10 years prior to the project start date. Images below show the project activity areas 10 years before the project start date. On one farm, 5 ha were converted to non-forest between 2006 and 2007. Nevertheless, this area will be recovered by the project with native vegetation, as a part of APPs and RLs reconstitution.

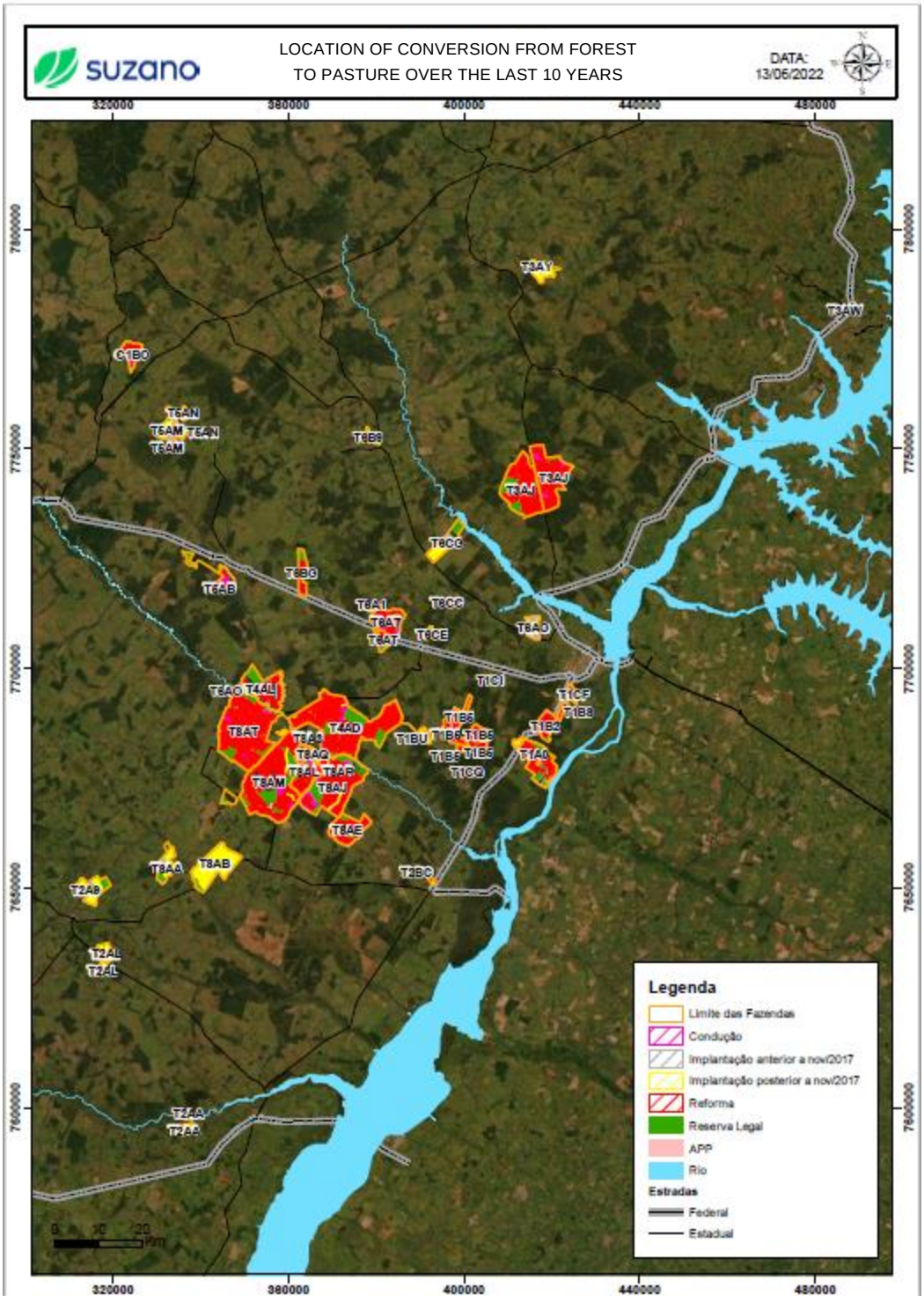

Figure 1 – Project activity map, evidencing were project activities will be implemented

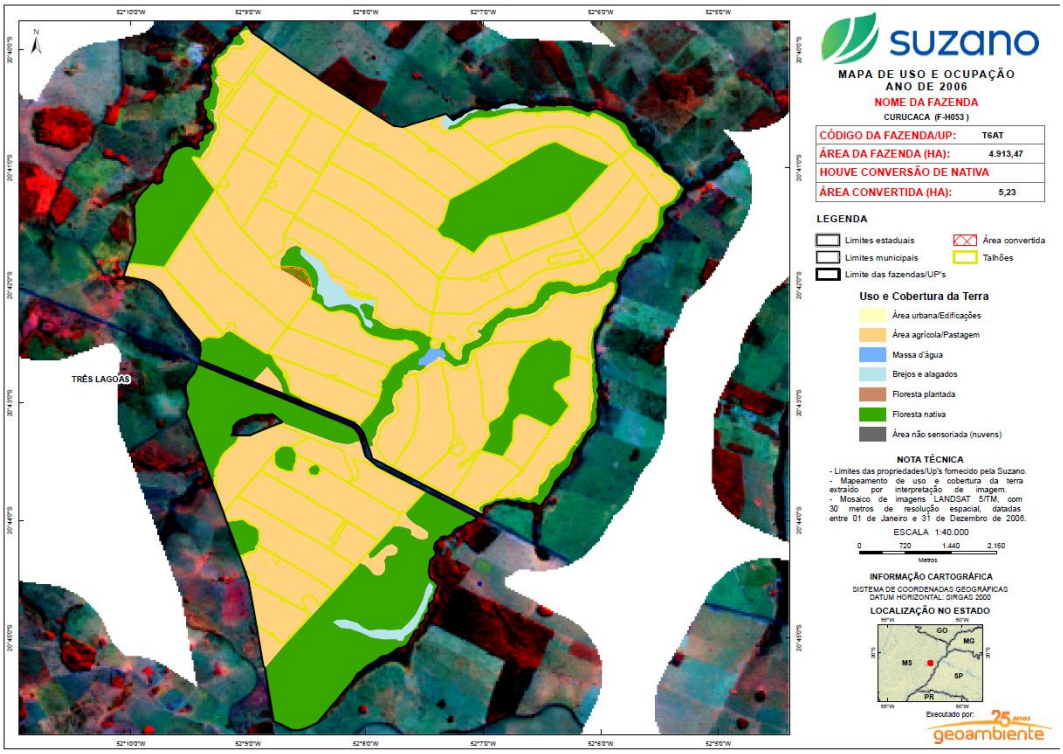

Figure 2 – Map evidencing the only converted area from forest to pasture in the 10 years preceding the project activity.

As aforementioned, before the implementation of the project, its area was characterized as degraded pasture or sandy areas. In addition, Suzano assumed a No Deforestation Policy, where it "reinforces its commitment to establish its plantations in areas previously anthropized by other uses, whose conversion has not occurred under its direct or indirect responsibility"[2]. Annual reports[3] are provided to guarantee transparency to the commitment and updates on the agenda. Therefore, the project activity does not drain native ecosystems.

- For the project development, there has not been nor will occur the degradation of any hydrological functions. In addition to restrictive laws, where a Permanent Preservation Area (APP) is created in the presence of water, there are no water courses within the project areas where commercial plantation will be implemented. Thus, the region and biome where the project area is located are not categorized as

[2] Suzano's No Degradation Policy.Available at: <https://storage.googleapis.com/stateless-site-suzano-en/2020/08/a6f0cae8-wood-supply-policy.pdf>. Last access on 10 December 2020.

[3] Zero Deforestation Annual Report, Suzano, 2020. Available at: <https://storage.googleapis.com/stateless-site-suzano-en/2020/10/bd710250-relato%CC%81rio-anual-de-desmatamento-zero-suzano-2020-contribuic%CC%A7o%CC%83es-ym-green-en-us.pdf>. Last access on 10 December 2020.

wet land areas and no draining activities will be conducted. The image below shows the water courses at the project region and APPs, where no project activity will be implemented.

Moreover, it is important to highlight how Suzano is concerned about water resources where it operates. There is a dedicated process to assess and analyze hydrological conditions, where monthly and annual reports are structured to control the ecosystems where operations occur. This procedure is based on qualitative and quantitative data measured on site to identify water quality, flow rate and rainfall.

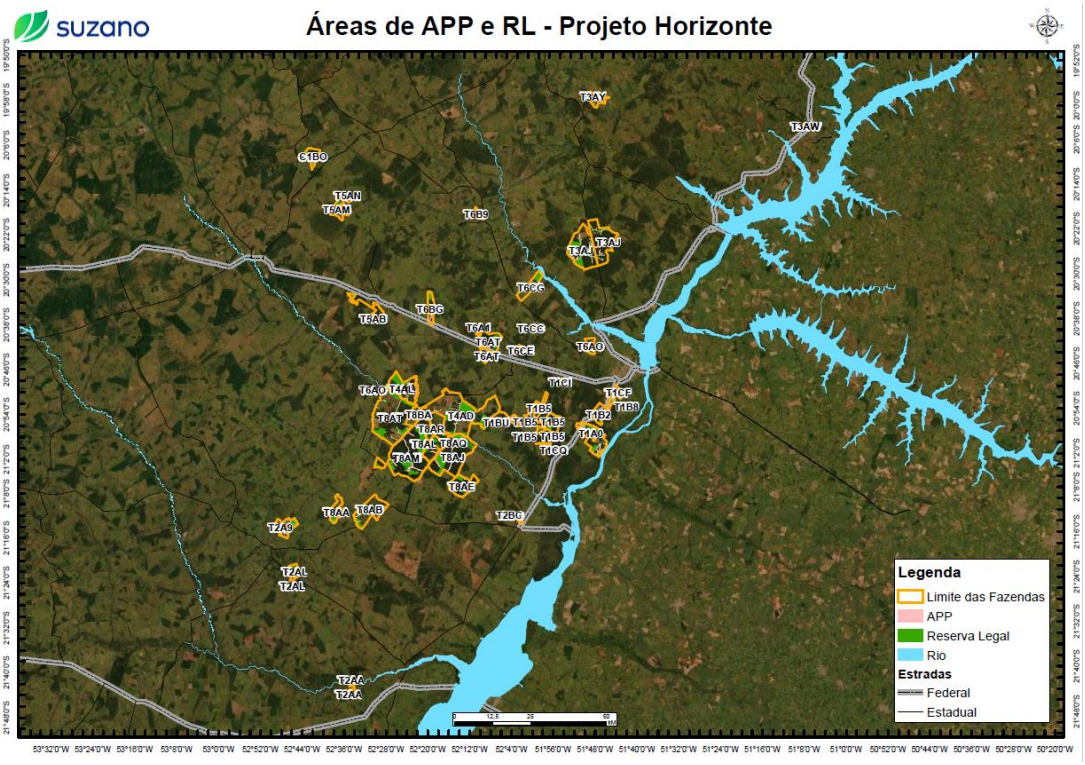

Figure 3 - Map with the location of water courses, permanent protection areas (APP) and legal reserves (RL) nearby or inside project areas.

1.4 Project Design

This project is a grouped project and a multiple project activity also. The first activity consists of the plantation of eucalyptus species for commercial purposes, which will be submitted to a 7year harvesting cycle for all the project longevity. The second activity is based on sandy areas recovery, using native species. Both project activities will be implemented on several areas, which compose a grouped project.

The first project activity consists of the commercial plantation of species from the *Eucalyptus spp gender*. So far, the farms that already started commercial planting implemented the E. *urophylla*, E.*grandis*, and a hybrid from the two species (E. *grandis x* E. *urophylla*).

The *E.urophylla* is an Indonesian species, mainly from the Timor and Flores islands. This species can adapt to a wide range of altitudes, from sea level to 3,000m altitude levels, and is known by its important characteristics, such as the tolerance to water stress, resistance to plagues and capacity of rooting.

On the other hand, the *E. grandis* originally from the Australian coastlands, from the New South Wales and Queensland states. This species has good properties for cellulose pulping and is known by its vigorous growth.

The hybrid of the two species is widely used by the forestry sector given its productive capacity and combination of important characteristics.

Brazil has the largest ex-situ collection of eucalyptus germplasm in the world. The species has enabled a significant increase in the quantitative and qualitative productivity of planted forests in its territory.[4] The prominence of the eucalyptus culture is related to the gains obtained by the advancement of genetic improvement and the improvement of forest management practices.[5]

It is important to stress that the project proponents only allow the plantation of Eucalyptus, and there is a list of permitted species under this gender that can be used in order to assure the intensity of wood production and carbon captured.

The second project activity consists of planting native species on sandy areas which represent a higher effort on recovery activities. The project proponent conduced an analysis on which species were usually observed on the project region, with the intention to plant the species already present at the region, considered the availability of the seedlings and phytophysiognomy at the project farm. From a list of 939 species mapped, the following list present the ones recognized as good species for restoration activities:

Astronium fraxinifolium Schott; Vitex polygama Cham.; Astronium graveolens Jacq.; Endlicheria paniculata (Spreng.) J.F.Macbr; Astronium urundeuva (M.Allemão) Engl.; Nectandra megapotamica (Spreng.) Mez; Lithraea molleoides (Vell.) Engl.; Ocotea velloziana

[4] PINTO JÚNIOR, J. E. P.; SANTOS, P. E. T.; AGUIAR, A. V.; KALIL-FILHO, A. A.; PIRES, I. E.; RESENDE, M. D. V.; SILVA, R. L.; RESENDE JÚNIOR., M. R. R. Genética florestal. Viçosa-MG: Arka, 2011. 318 p. Last access: 25 November 2021.

[5] CASTRO, C. A. O.; RESENDE, R. T.; BHERING, L. L.; CRUZ, C. D. Brief history of Eucalyptus breeding in Brazil under perspective of biometric advances. Ciência Rural, Santa Maria, v. 46, n. 9, p.1585-1593, 2016. Last access: 25 November 2021.

(Meisn.) Mez; Tapirira guianensis Aubl.; Byrsonima intermedia A.Juss.; Cordia sellowiana Cham.; Guazuma ulmifolia Lam.; Cordia trichotoma (Vell.) Arráb. ex Steud.; Luehea candicans Mart.; Trema micrantha (L.) Blume; Luehea divaricata Mart.; Caryocar brasiliense Cambess.; Luehea grandiflora Mart.; Terminalia argentea Mart. & Zucc.; Pseudobombax longiflorum (Mart.) A.Robyns; Terminalia glabrescens Mart.; Pseudobombax tomentosum (Mart.) A.Robyns; Erythroxylum campestre A.St.-Hil.; Cedrela fissilis Vell.; Erythroxylum deciduum A.St.-Hil.; Cedrela odorata L.

Croton urucurana Baill.; Guarea kunthiana A.Juss.; Mabea fistulifera Mart.; Guarea macrophylla subsp. tuberculata (Vell.) T.D.Penn.; Sapium glandulosum (L.) Morong; Maclura tinctoria (L.) D.Don ex Steud.; Anadenanthera colubrina var. cebil (Griseb.) Altschul; Eugenia florida DC.; Anadenanthera peregrina var. falcata (Benth.) Altschul; Eugenia pitanga (O.Berg) Nied; Bowdichia virgilioides Kunth; Myrcia bella Cambess.; Copaifera langsdorffii Desf.; Myrcia splendens (Sw.) DC.; Dipteryx alata Vogel; Psidium guineense Sw; Enterolobium contortisiliquum (Vell.) Morong; Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.; Enterolobium timbouva Mart.; Myrsine gardneriana A.DC.; Hymenaea courbaril L.; Myrsine guianensis (Aubl.) Kuntze; Hymenaea stigonocarpa Mart. ex Hayne; Myrsine umbellata Mart.; Inga laurina (Sw.) Willd.; Prunus myrtifolia (L.) Urb.; Inga vera Willd.; Alibertia edulis (Rich.) A.Rich.; Leptolobium dasycarpum Vogel; Rudgea viburnoides (Cham.) Benth.; Leptolobium elegans Vogel; Zanthoxylum rhoifolium Lam.; Machaerium aculeatum Raddi; Zanthoxylum riedelianum Engl.; Machaerium acutifolium Vogel; Casearia gossypiosperma Briq.; Machaerium hirtum (Vell.) Stellfeld; Casearia sylvestris Sw.; Machaerium opacum Vogel; Allophylus edulis (A.St.-Hil. et al.) Hieron. ex Niederl.; Machaerium stipitatum Vogel; Cupania vernalis Cambess.; Parapiptadenia rigida (Benth.) Brenan; Dilodendron bipinnatum Radlk.; Platypodium elegans Vogel; Matayba elaeagnoides Radlk.; Pterogyne nitens Tul.; Matayba guianensis Aubl.; Stryphnodendron adstringens (Mart.) Coville; Qualea grandiflora Mart.; Stryphnodendron rotundifolium Mart.; Qualea multiflora Mart.; Tachigali vulgaris L.G.Silva & H.C.Lima; Qualea parviflora Mart.; Aegiphila verticillata Vell.; Vochysia tucanorum Mart

In addition, 86 species were identified for planting clumps of grass, from which 18 were most frequently observed and are more likely to be found at the project region, listed below:

Axonopus pressus (Nees ex Steud.) Parodi; Gymnopogon foliosus (Willd.) Nees; Andropogon leucostachyus Kunth; Axonopus marginatus (Trin.) Chase; Axonopus siccus (Nees) Kuhlm.; Loudetia flammida (Trin.) C.E.Hubb.; Andropogon virgatus Desv.; Saccharum asperum (Nees) Steud.; Gymnopogon spicatus (Spreng.) Kuntze; Panicum sellowii Nees; Andropogon bicornis L.; Paspalum cordatum Hack.; Aristida riparia Trin.; Eriochrysis cayennensis

P.Beauv.; Aristida setifolia Kunth; Trachypogon spicatus (L.f.) Kuntze; Schizachyrium microstachyum (Desv. ex Ham.) Roseng., B.R.Arrill. & Izag.; Axonopus brasiliensis (Spreng.) Kuhlm

Initially, the project consists of a total area of 14,457 ha for the first project activity, and an area of 1,204 ha for the second project activity, distributed in 41 areas owned or leased by Suzano, located nearby Tres Lagoas, in the State of Mato Grosso do Sul.

The project is not a Multiple Activity project, it is a Grouped Project.

Eligibility Criteria

Provided this is a grouped project, new areas to be included at the project must follow a set of eligibility criteria.

For the First project activity, planting eucalyptus, the following set of eligibility criteria must be followed:

- New areas must be certified or seek certification under a recognized and high-level market sustainability program, for example the FSC;
- Plant only eucaplytus species from the positive list provided by Suzano;
- The pre-existing land use of the grouped project instance area must be degraded pasture.

For the Second project activity, native vegetation recovery, the following set of eligibility criteria must be followed:

- Plantation of native species most adequate for the area in question;
- The baseline for these areas must be degraded pasture or sandy areas.

The following set of criteria must be met by both project activities.

- Land owned or leased by Suzano;
- Located at the Cerrado biome, state of Mato Grosso do Sul, highlighted by the map under the green dot area:

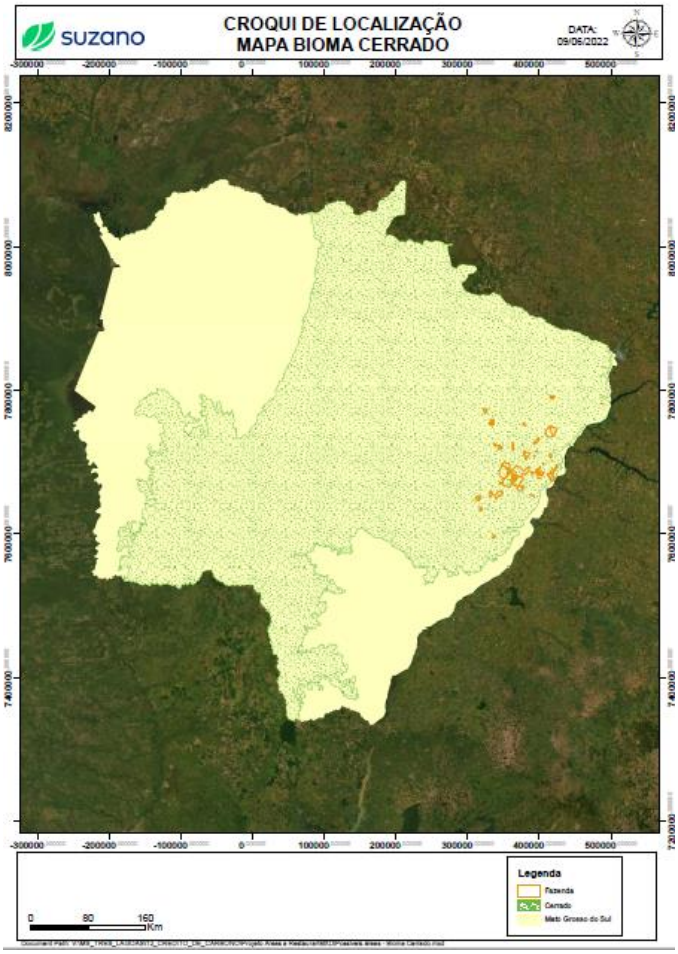

Figure 4 – New instances eligibility area

- New areas must meet the applicability conditions set out in the methodology and relevant tools applied to the project;
- New areas must prove some characteristics in common under the additionality assessment according to the rationale applied in the project description:
    - Present at least the baseline scenario for the project activity as an alternative land use scenario, in addition to the scenario of the project without generating credits;
    - Be additional under a new barrier analysis assessment;
    - Actively restore and maintain native vegetation at RL and APP areas, and financially support the implementation of social activities developed by the grouped project, in addition to the social programs usually conducted and those required for the operation of the industry being built nearby the project location.

- New areas must be subject to the same baseline scenario as the determined by the project description;

1.5 Project Proponent

Organization name	Suzano S.A.
Contact person	Julio Cesar Natalense
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Address	Brigadeiro Faria Lima Avenue, 1355. CEP 01452-919. São Paulo, SP. Brazil
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Organization name	WAYCARBON SOLUÇÕES AMBIENTAIS E PROJETOS DE CARBONO LTDA
Contact person	Felipe Bittencourt
Title	Chief Executive Officer
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Telephone	+55 31 3656-0501
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1.6 Other Entities Involved in the Project

This section will be completed for the VVB assessment and project registration

1.7 Ownership

The project activity will initially be conducted in 41 areas, owned or leased by Suzano S.A. and its controlled companies. Therefore, Suzano is the project owner and one of the project proponents. As part of the assessment procedure for selecting new properties, the property deeds for each property are assessed by Suzano to guarantee they comply with all legal

requirements, and documents are available in the project files. Each farm participating in the initial phase of this project is listed below, with the corresponding document ID of the CAR, in compliance with the Brazilian Forest Code.

Farms owned by Suzano and its controlled companies:

- Barra da Moeda Farm (T1A0)
    - CAR: Federal number - MS-5008305-B40F7267DD934A99A2A5D841B6880BA2; State number – CARMS0000997
- Estradão Farm (T1B5)
    - CAR: Federal Number - MS-5008305-5E41.5F8F.496C.47FF.A27B.ECF7.C938.B0FD; State Number – CARMS0005228
- Casa Branca Farm (T1B8)
    - CAR: Federal Number - MS-5008305-054A9EDCE6584635BC2E335E0349CFF3
- Laguna Farm (T1CF)
    - CAR: Federal Number - MS-5008305-E4F78FAA74FD4A799B3EE62817ACCAD5; State Number - CARMS0005372
- Matão Farm (T3AJ)
    - CAR: Federal Number - MS-5007802-0C32.34B1.E69E.4B8E.86B4.72AB.EB5F.0E28; State Number – CARMS0003351
- Boa Esperança III Farm (T3AW)
    - CAR: Federal number - MS-5001003-215FAEB145AB4F1B8243787C734F5DEE; State Number - CARMS0019096
- Rio Verde A Farm (T4AD)
    - CAR: Federal Number - MS-5008305-DFAB94F3C9AE4B0A9010063773B93FDD and MS-5008305-B5E802B307454AE787691AAAA983AB64
- São Marcos Farms (T4AL)
    - CAR: Federal Number - MS-5000203-B48AD61FA75740A493FBA61F1C4E0A61; State Number – CARMS0004921
- Ana Rosa Farm (T5AP)

  - CAR: Federal Number - MS-5008305-6CC6F6B1C84E4D028AB7FCAE62E9CBB4

- Curucaca Farm (T6AT)
  - CAR: Federal Number - MS-5008305-E66956CD581B4EE9837D91CDCC992B63
- Flor da Serra Farm (T6BG)
  - CAR: Federal Number - MS-5008305-E7F26E362F6E4D35A74768936C580EE8
- Guara-Suia Farm (T8AE)
  - CAR: Federal Number - MS-5002308-03F1AFAB77494446BCD975A5E9EFC591; State Number – CARMS0005378
- Brasileira Farm (T8AJ)
  - CAR: Federal Number - MS-5002308-46CD.CE67.96B8.4FC9.A167.68B2.FCE7.AADA
- Vale do Gerivá Farm (T8AL)
  - CAR: Federal Number - MS-5002308-9893E1F1BD4948A8A23B0EFC88252AEC; State Number – CARMS0005356
- Duas marias Farm (T8AM)
  - CAR: Federal number - MS-5002308-C14EFAF7F9B6475FAA1F563AB63886A1
- Bom Jesus Farm (T8AQ)
  - CAR: Federal Number - MS-5002308-C14EFAF7F9B6475FAA1F563AB63886A1; State Number – CARMS0004065
- Paraiso Farm (T8AR)
  - CAR: Federal Number - MS-5002308-6F4E670A57084C30947CE3E9C7736798; State Number – CARMS0004915
- Cristo Redentor Farm (T8AS)
  - CAR: Federal Number - MS-5002308-0830.4E20.1D26.4029.AB0F.AE23.B362.558D ; State Number – CARMS0004189
- Rio Verde B Farm (T8AT)
  - CAR: Federal number - MS-5002308-A942F42C7ADC49C4AC209E97ACF3D527

Farms Leased by Suzano and its controlled companies:

- Arete Farm (T1BU)
    - CAR: Federal Number - MS-5008305-B8581EE005604BD2B866EBC55F4F0E43; State Number - CARMS0018530
- Barra do Cervo Farm (T1CI)
    - CAR: Federal Number - MS-5008305-B056A4A34EE5411F986C63A2441E64B9; State Number - CARMS0003577
- São Miguel III Farm (T1CQ)
    - CAR: Federal Number - MS-5008305-C88E1C9E65064ECF9D61A15528E05941; State Number – CARMS069991
- Nossa Senhora de Fátima Farm (T1CU)
    - CAR: Federal Number - MS-5008305-131EF7528BBD4F5D91962315CEF6501B;
- Monte Alto Farm (T2A9)
    - CAR: Federal Number - MS-5007554-A07C926FCDD04239AF6F2A5A2FD0DB85; State Number - CARMS0002702
- Figueira Farm (T2AA)
    - CAR: Federal Number - MS-5001904-4E2C4BDF27A449489134D96F3D491F5F; State Number - CARMS0025322
- São João IV Farm (T2AL)
    - CAR: Federal Number - MS-5007554-5BC570C54AF744A5BC0BECFB3C23259F; State Number - CARMS0049391
- Jandaia Farm (T2BC)
    - CAR: Federal Number - MS-5002308-C4BE286F0EAC4389AA782652CDE7DAA4; MS-5002308-A5DFA15ED2724A9DA442A6FC23BFB206;
- Joamar Farm (T3AY)
    - CAR: Federal Number - MS-5007802-545102DDB28143A78F0EFB472CD65728; State Number - CARMS0052313
- Ariranha Farm (T5AB)
    - CAR: Federal Number - MS-5000203-713C2F6CECF04CE7AD23D9E26CC0BCCC; State Number - CARMS0011519

- Santa Inês Gleba C Farm (T5AM)
    - CAR: Federal Number - MS-5008305-2AC8A845D07C485A895DED97015BB166; State Number - CARMS0004270
- Santa Inês Farm (T5AN)
    - CAR: Federal Number - MS-5008305-D8B6A68827354D5F9121E56E72891F02; MS-5008305-DA850A57C552442FB29CB93EAE805881; MS-5008305-DE43F0A33855454BAA3195CF61621983; MS-5008305-DA850A57C552442FB29CB93EAE805881; MS-5008305-181C47D1F83E43AC85FB367F1C1C5874; State Number - CARMS0025875
- Triangulo do Vale Farm (T6A1)
    - CAR: Federal Number - MS-5008305-716127DCCABC4015955177B0C7A8F244; State Number - CARMS0024593
- São Lucas Farm (T6AO)
    - CAR: Federal Number - MS-5002308-510877EE7FCA46DEAA9CC0480728B9E2; MS-5008305-4A6BB673956346849ACC2EEDAF33E472; State Number - CARMS0023478
- Matinha do Brioso Farm (T6B8)
    - CAR: Federal Number - MS-5008305-AFA694C0230D4819BB5A8ED29A72BB17; State Number - CARMS0039384
- Pontal do Brioso Farm (T6B9)
    - CAR: Federal Number - MS-5008305-92615D425AFF43DDA2DCC13079D341BD; State Number - CARMS0039385
- Vista Alegre III Farm (T6CC)
    - CAR: Federal Number - MS-5008305-11E9EC4D1A9F45F4BF74B9B158EDA1E8; State Number - CARMS0018162
- Santa Terezinha II Farm (T6CE)
    - CAR: Federal Number - MS-5008305-B635889599E64EEFABFCCEFD4B32CD68; State Number - CARMS0003365
- Sucuriu Farm (T6CG)
    - CAR: Federal Number - MS-5008305-7D9BABB52E4445DAAE34FE728663A01C;
- Santo Antonio IV Farm (T8AA)

  - CAR: Federal Number - MS-5007554-E47C48B6E0CB4FB6A67ADF757983BF9E; State Number - CARMS0003352

- Vista Alegre II Farm (T8AB)
  - CAR: Federal Number - MS-5002308-E7A5A93F803A4A74BB277919417B72D4;
- São José Farm (T8BA)
  - CAR: Federal Number - MS-5002308-07967A7EABA4418E900CB2F1AFC2608D;

1.8 Project Start Date

According to the VCS Standard Version 4.2 section 3.7, the project start date for AFOLU projects is the date on which activities, that lead to the generation of GHG emission reductions or removals, are implemented. Therefore, the project start date is defined as 02 November 2017, the date when activities for preparing land for seedling were implemented at the first PUS, at Santa Inês (T5AM) and Monte Alto (T2A9) Farms, according to internal documentation.

1.9 Project Crediting Period

The Project Crediting Period will be 30 years, renewable.

The first crediting period will be from 02 November 2017 to 01 November 2047, both days included.

1.10 Project Scale and Estimated GHG Emission Reductions or Removals

Considered the first project activity is an ARR project with cutting cycles of 7 years, there is a limit that must be observed which defines the quantity of estimated ERs that can be converted to actual VCUS, The Long-term average GHG benefit. Project proponents will consider the long-term average GHG benefit, as required by VCS Standard. Project LTA will be estimated by the following equation:

$$LA = \frac{\sum_{t=0}^{n} PE_t - BE_t}{n}$$

Where:

LA = The Long-Term Average GHG benefit

PE_t = The total to-date GHG emission reductions and removals generated in the project scenario (tCO2e). Project scenario emissions reduction and removals shall also consider project emissions of CO2, N2O, CH4 and leakage.

BE_t = The total to-date GHG emissions reductions and removals projected for the baseline scenario (tCO2e)

T = year

N = total number of years in the established time period.

Below is a preliminary estimate. The complete calculations, including for the portion of the project that includes restoration of native species, will be provided in the validation and verification reports.

Year	Estimated GHG emission reductions or removals (tCO_2e)
2018	193,916.74
2019	558,674.96
2020	1,196,465.59
2021	1,822,492.64
2022	2,497,322.21
2023	3,151,162.25
2024	3,777,337.14
2025	3,224,083.74
2026	2,785,414.74
2027	1,717,042.42
2028	2,321,261.58
2029	2,540,488.11
2030	3,151,162.25
2031	3,777,337.14
2032	3,224,083.74

2033	2,785,414.74
2034	1,717,042.42
2035	2,321,261.58
2036	2,540,488.11
2037	3,151,162.25
2038	3,777,337.14
2039	3,224,083.74
2040	2,785,414.74
2041	1,717,042.42
2042	2,321,261.58
2043	2,540,488.11
2044	3,151,162.25
2045	3,777,337.14
2046	3,224,083.74
2047	2,785,414.74
Total number of crediting years	30
Average annual ERs	86,396.93

1.11 Description of the Project Activity

The ARR Horizonte Carbon Project first activity aims to recover and guarantee the reforestation of degraded areas through the plantation of Eucalyptus. The second project activity will also implement the plantation of native vegetation on sandy areas located outside APPs and RL areas.

Moreover, native vegetation will be recovered through the assisted regeneration of native species on degraded APP and RL areas and protect native vegetation in the project area from unplanned deforestation, besides the social projects to be implemented, although these activities do not count for carbon reductions and removals.

Through the natural process of photosynthesis, trees absorb carbon from the atmosphere and store it in their biomass, a phenomenon also known as carbon sequestration. In this process, the trees absorb the molecules of CO_2 and water which, in the presence of light, results in the production of glucose ($C_6H_{12}O_6$) and water, releasing oxygen (O_2) to the atmosphere. The glucose goes through several chemical reactions during the metabolic process, resulting in the production of biomass. Approximately 47% of a tree's biomass is carbon[6].

Forests have an important role in preserving characteristics of a certain region. They improve the microclimate of the regions, making local temperatures milder, reducing erosion, maintaining biodiversity, protecting water resources, and finally reducing other negative impacts that climate change could cause. Also, planted forests increases the availability of wood and fiber supply for industrial consumption, reducing the pressure on native forests.

As pointed out in section 1.3, the project is not located within a jurisdiction covered by a jurisdictional REDD+ program.

Process of implementation and management of the Eucalyptus plantation areas – First project activity

The forest implementation process is composed of a set of silvicultural activities, precisely designed to obtain a safe environment and technical conditions for the development of a planted forest. The project activity's procedures follow a specific protocol, whose ID is PO.12.02.001, developed by Suzano. It is important to highlight that implementation funds were hired to assist the project proponent in planting activities, which must follow the requirements set by the project proponent.

The procedure starts with the silviculture team, where supervisors and technicians receive the micro-planning map of the area, with information about the location, conditions and the activities to be performed.

During the execution of the silvicultural implantation activities, the teams must follow the micro planning information, which defines the execution area for planting Eucalyptus and delimits the areas that will be conserved and remain in permanent preservation.

The forest implantation process is developed in sequential steps, as follows

[6] SOARES, C. P. B.; PAULA NETO, F.; SOUZA, A.L. Dendrometria e inventário florestal. 2ed. Viçosa, MG: Editora UFV, 2011. 272p. Last access: 25 November 2021.

1. Cleaning of the area: The activity is implemented in a way that may facilitate the execution of subsequent silvicultural activities. The process is implemented in the project area as informed to the environmental agency. Eventually, chemical cleaning can be applied, depending on the characteristics of the area. The recommended dosage is defined by experts and varies according to the degree of infestation of invasive species.

   It is important to highlight that the project area's location has a high number of occurrence of weeds, which compete with the trees for water, light and nutrients, and is also vulnerable to plagues that can damage the leaves and lead to the death of great extensions of adult forests. Under this context, weeds and pests control is essential for the maintenance of the planted trees. However, the edaphoclimatic context also promotes a higher and quicker degradation of defensives when compared to temperate climate regions.

   In order to mitigate and address all environmental risks that may occur, the project activities follows all the Brazilian laws regarding the application of such products, applying only registered products allowed by the agriculture, environmental and sanitary authorities; meets all the procedures and criteria listed by the chemical policies from the applied certifications (FSC and CERFLOR); has specific internal procedures to the appliance of such products, seeking safety; supports research institutes and companies that develop more sustainable products from the environmental perspective; apply such defensives only with a previous basement on monitored data, where it is evaluated the environmental impact; the chemical defensives are applied only as a last resource; drones and other equipment for spraying products are only used at the project areas, and mainly for the application of fertilizers and biological products. Fungicides are rarely applied.

2. Ant control: This activity can occur throughout the entire cycle of the eucalyptus crop, including the cleaning step. It begins with the systematical granulated bait or micro bait holders. Whenever active scouts are found, they must be fought in a localized manner. Interventions shall be made until the pest is under control or until it does not pose a risk to the establishment of the eucalyptus crop. Depending on the climatic conditions (humidity), powdered product and/or thermal spraying may also be used under the circumstances, conditions and procedures aforementioned.

3. Soil preparation: this activity precedes planting, and its purpose is to make sure that the soil is in perfect conditions for seedling development and maintenance of forest productivity. The execution of this step must be based on the concepts of minimum

cultivation, using the fewer operations as possible (restricted to the rows or the planting holes), to assure a balance between quality of soil preparation and maintenance of forest residues on the soil. The activity is carried out by agricultural tractors using subsoilers, which have a precision system that controls the execution of the step, following the recommendations and specifications outlined in the micro planning.

It is important to highlight that Suzano thrives to implement best practices available at the market, in line with FSC and other quality standards. The subsoiling procedure is the only step that can cause disturbance to the soil, where a stem is used. The soil preparation is based on the principle for minimum cultivation, where soil disturbance is as minimal as possible, maintaining all plant residues as coverage.

In addition, Suzano has specific additional procedures to soil preparation in line with the biome of the region, where stumps can be cut and kept at the project site instead of being removed. Moreover, the process is monitored and controlled, included the depth of subsoiling activities and spacing between planting lines.

4. Fertilization: Set of activities that supply the micro and macro nutrients needed by the plant, enabling the ideal conditions for its development according to the technical recommendation specified in the forestry micro planning. Fertilization can be performed manually or with help of machines (through land or air). In the manual activity, a manual device for dosing the fertilizer is used, whereas in the mechanized activity, a device can be coupled to the subsoiler during soil preparation, or a drone can be used.

5. Planting: The seedlings destined for planting can be treated with termite prevention, according to specific technical recommendations for the implantation area. The seedling is then placed in the soil previously prepared, up to a specific height where it can stand still at a right an angle to the ground. The soil surrounding the seedling is then pressed, to assure its fixation. In some cases, gel can be used during the planting process, where it is added in the soil surrounding the seedling, making it unnecessary to press the soil as previously described.

   For this step, the ideal climate and soil conditions must be evaluated to define which procedure must be followed: manual, semi-mechanized or mechanized planting, ensuring optimum seedling development in the field.

Figure 5 – Planted and Irrigated seedling

6. Irrigation: the purpose of this step is to ensure soil moisture and provide the ideal conditions for the plant's development in cases where the soil presents water deficit. The evaluation of the lack of soil moisture is done visually by the silvicultural team and by the assessment of meteorological data, such as precipitation, relative humidity and temperature. The wilting aspect of the seedling is also taken into consideration. Irrigation can be performed through watertight valves in a mechanized system, or manually using costals to transport the necessary amount of water to be applied per pit. To improve the effectiveness of irrigation, gel can be used at the planting activity with a dose between 1.5 to 2.0 g/seedling of absorbent polymers (gel) and irrigation. An evaluation must be made within 2 to 5 days after the first irrigation to assess the adaptation of the seedlings and to define if another irrigation is necessary. In case irrigation is necessary, the company fulfills all legal requirements before starting the operation.

All operational processes involved in the plantation procedure are submitted to auditing.

Forest maintenance and management process

It is up to the Planning team to annually prepare the schedule of plantation units (PUs) to be monitored, proceed with the installation of plots and data collection, ensure data consistency and prepare the preliminary report of the monitoring results. This information will be used to make decisions regarding management recommendations/changes to the PUs.

The activities for forest maintenance are listed below:

1. Ant control: previously described under item 2;

2. Weeding: consists in the removal of all the invasive vegetation from the area surrounding the trees, with appropriate tools.

Figure 6 – Manual weeding

Depending on the local characteristics and technical recommendations, the weeding can also be treated with the use of herbicides, avoiding them to grow with pre-emergent, or eradicating it once it has germinated with conventional/ pressurized or semi-mechanized knapsack sprayers. Mechanized chemical weeding can also be used, which is performed with spraying equipment coupled to tractors.

The method to be applied must be defined according to the location of the area and its topography, vegetation and climate conditions.

3. Complementary Fertilization: Fertilization can be performed manually or with help of machines (through land or air). In the manual process the fertilizer is applied close to the seedling using a hose connected to the sprayer or metering cup. In mechanized fertilization, the activity must be performed with a fertilizer spreader coupled to the tractor (figure 5). The tractor is equipped with precision management equipment and should be calibrated twice a day following the dosage recommended by experts. In mechanized fertilization it is not allowed to use wet or stoned fertilizer because it may compromise the quality of fertilization. In areal application, the aircrafts have integrated GPS that dimension application by strip, making it possible to apply fertilizer in the whole PU. Soil correction (lime, gypsum, lime mud or inorganic compost) is done by tamping machines as per Figure 7.

Figure 7 – Mechanical Fertilization

Figure 8 – Application of soil correction

4. Brush clearing: this activity targets controlling weeds that are in competition with the eucalyptus in the planting line through appropriate tools such as hoes and scythes. In the pre-cutting phase, the activity is carried out before harvesting begins.

Figure 9 – Mechanical pre-cut trimming

Process of implementation and management of the Native plantation areas – Second project activity

1. Control of erosive process and rehabilitation of degraded areas: application of tools and engineering techniques to reestablish the physical conditions of the environment, with special attention to degraded areas due to erosion and silting process.

2. Conduction and natural regeneration: this step is divided into 3 activities, listed below.

    a. Control of invasive exotic grasses: The exotic species is usually brachiaria, which impedes the natural regeneration of native species, especially herbs and undershrub. Therefore, it is indicated to implement weeding control procedures or the application of herbicides. Nevertheless, it is important to control the soil coverage permanently, considered the removal of weeds may lead to soil exposure, and could result in an erosion process, a serious environmental problem at the project region.

    b. Eradication of exotic tree species: even though exotic species can be planted by the project, considered the intention of restoring natural ecosystems, the removal of eventual sparse exotic trees may be done by the project proponent.

    c. Plantation of native species: This activity should take place in cases where degradation surpasses the limit under which natural regeneration of native vegetation could occur spontaneously or would take too long to occur. It

consists of planting seedlings under a specific project for each area. No planting activity is recommended unless monitoring data shows low resilience. In cases of exposed and eroded soil, the use of native grasses is recommended.

1.12 Project Location

The ARR Horizonte Carbon Project is situated in Três Lagoas (10,217 km²), Brasilândia (5,807 km²), Santa Rita do Pardo (6,142 km²), Selviria (3,259 km²), Bataguassu (2,418 Km²), Água Clara (7,809 km²) and Aparecida do Taboado (2,750 km²), cities of Mato Grosso do Sul state. Together, these cities representing 10.75% of the State area.

The designated areas and land occupation at the farms where the projects will be implemented are detailed below.

- Project area: 15,661.65 ha

Degraded pasture areas, designated to the current Project activity, where ARR activities will be accounted under the emission removals calculations. Emission removals can be monitored and accounted for this area in specific because the project proponents have set clear limits on where the project activity will take place. The first project activity area is highlighted in yellow on the maps below. The second project activity area is highlighted in light pink.

- Permanent Preservation Areas and legal Reserves (APP and RL): 34,964 ha

As defined per law n. 12,651/2012, the Permanent Preservation area can be covered or not by native vegetation, and has the purpose to preserve hydrological resources, landscape, geological stability and biodiversity, protecting the soil and assuring the wellbeing of communities. Project proponents will help recovering the area, although this will not be considered under the emission reductions calculations.

The same regulation outlines that every rural property must maintain an area with vegetation coverage, as a legal reservation. It is an area located inside the rural property or possessed by the same owner, with the purpose to grant the sustainable and economical use of natural resources, helping on conservation, ecological process rehabilitation, as well as promoting the biodiversity's conservation, wildlife protection and native flora.

These areas can be identified in green and pink on the maps below.

- Planted areas: 98,577.2 ha

Areas that were Eucalyptus plantation before the beginning of the Project. These areas are not being considered under this Project.

These areas can be identified in slashed pink, red and light grey on the maps below.

- Infrastructure: 4,542.4 ha

Farm areas occupied with infrastructure, such as roads and hearquarters.

A KML file is attached separately to better indicate the coordinates of the project, and images of each area can be seen below. In the following areas, the first activity of the project will be implemented, which is the planting of eucalyptus.

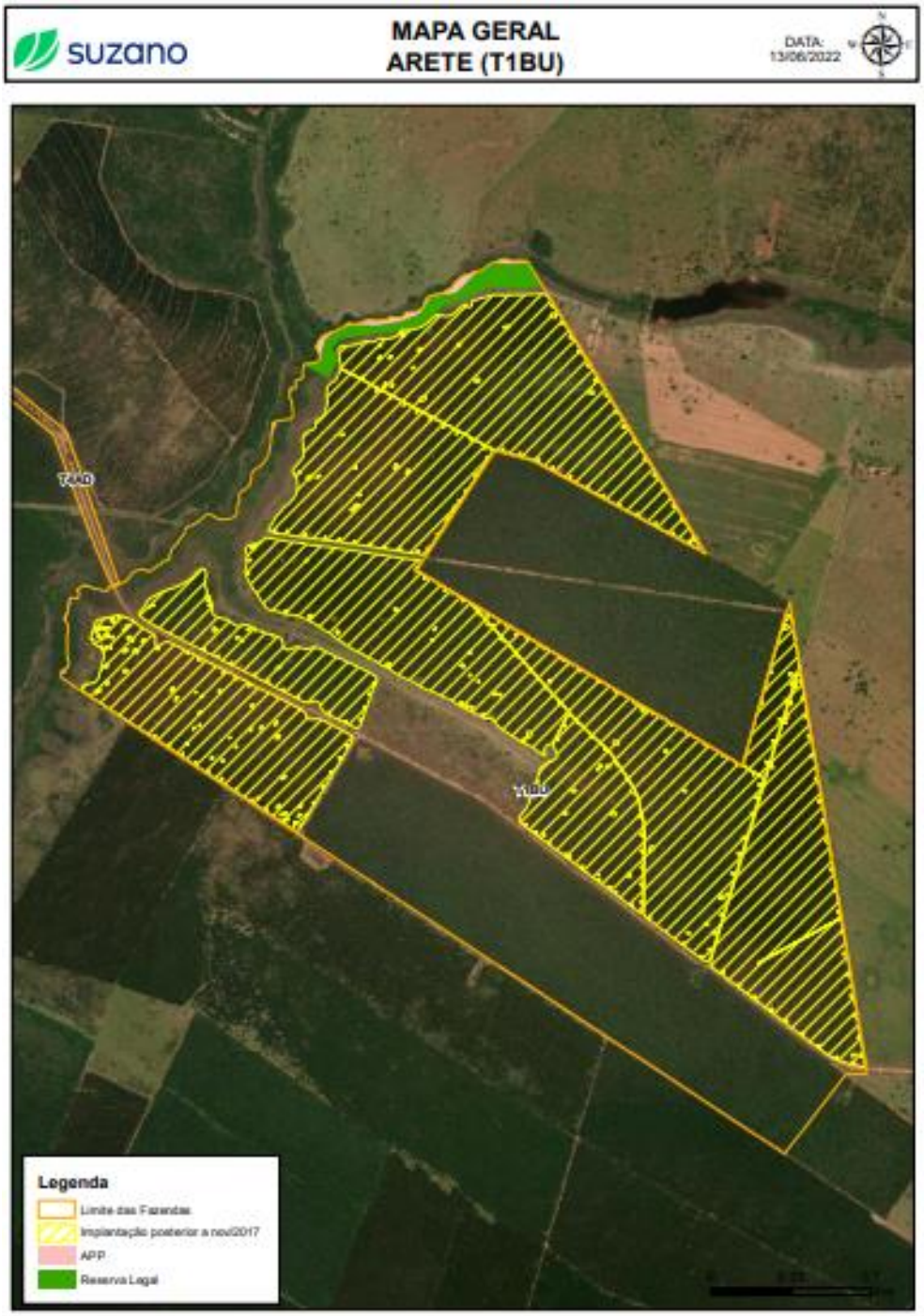

Figure 10 – Location and stratification of Arete. First activity project area highlighted in yellow.

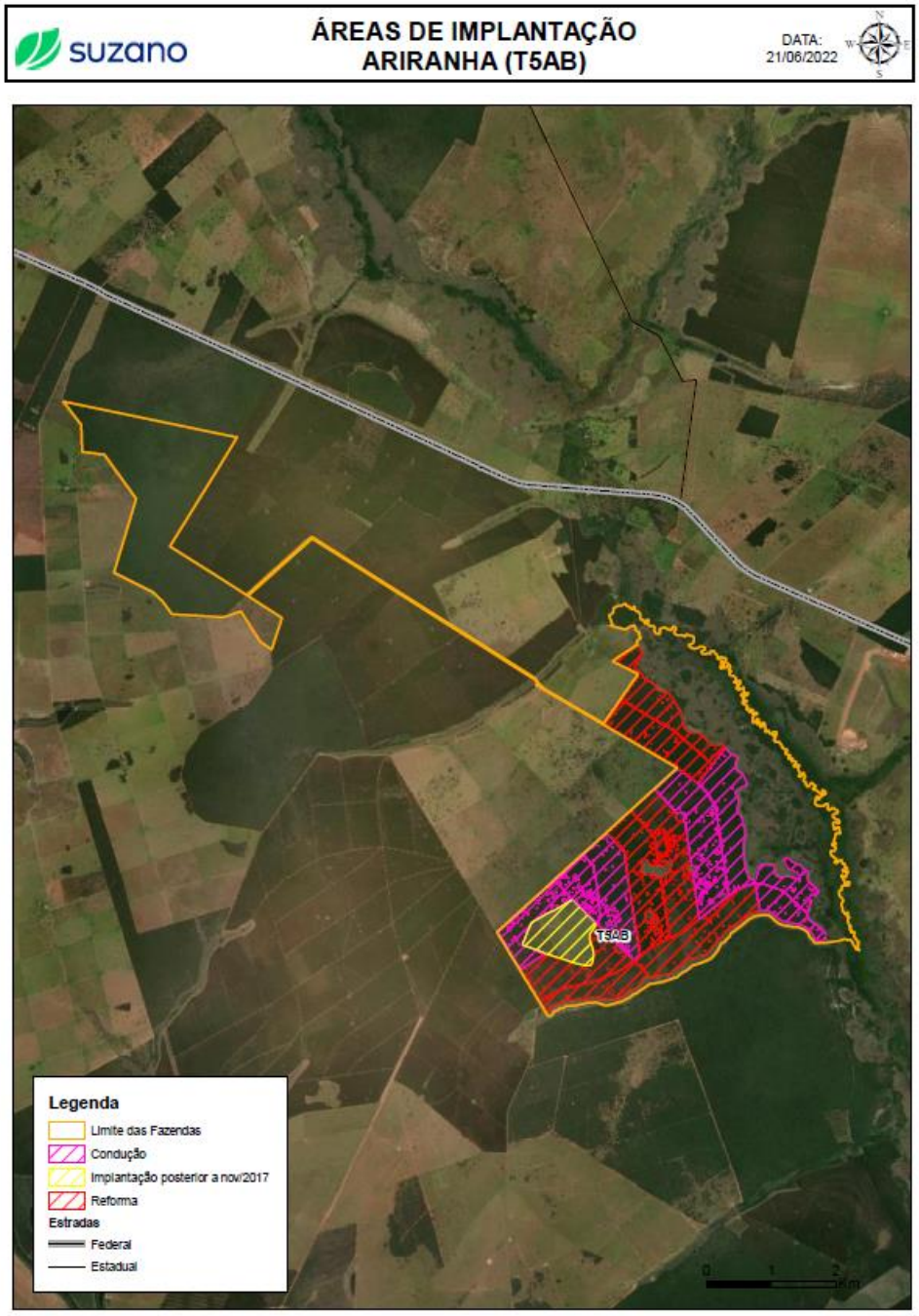

Figure 11 – Location and stratification of Ariranha. First activity project area highlighted in yellow.

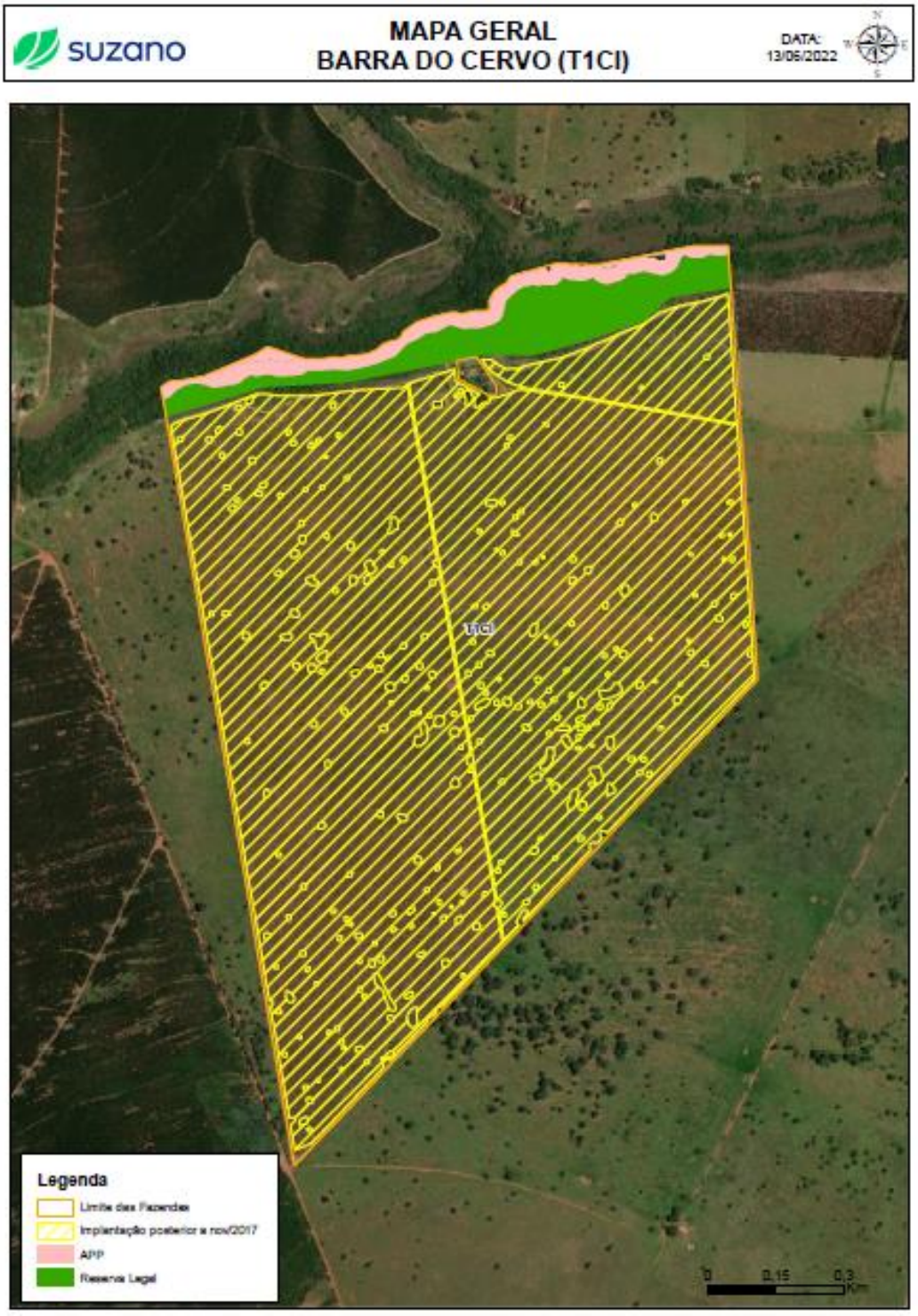

Figure 12 - – Location and stratification of Barra do Cervo. First activity project area highlighted in yellow.

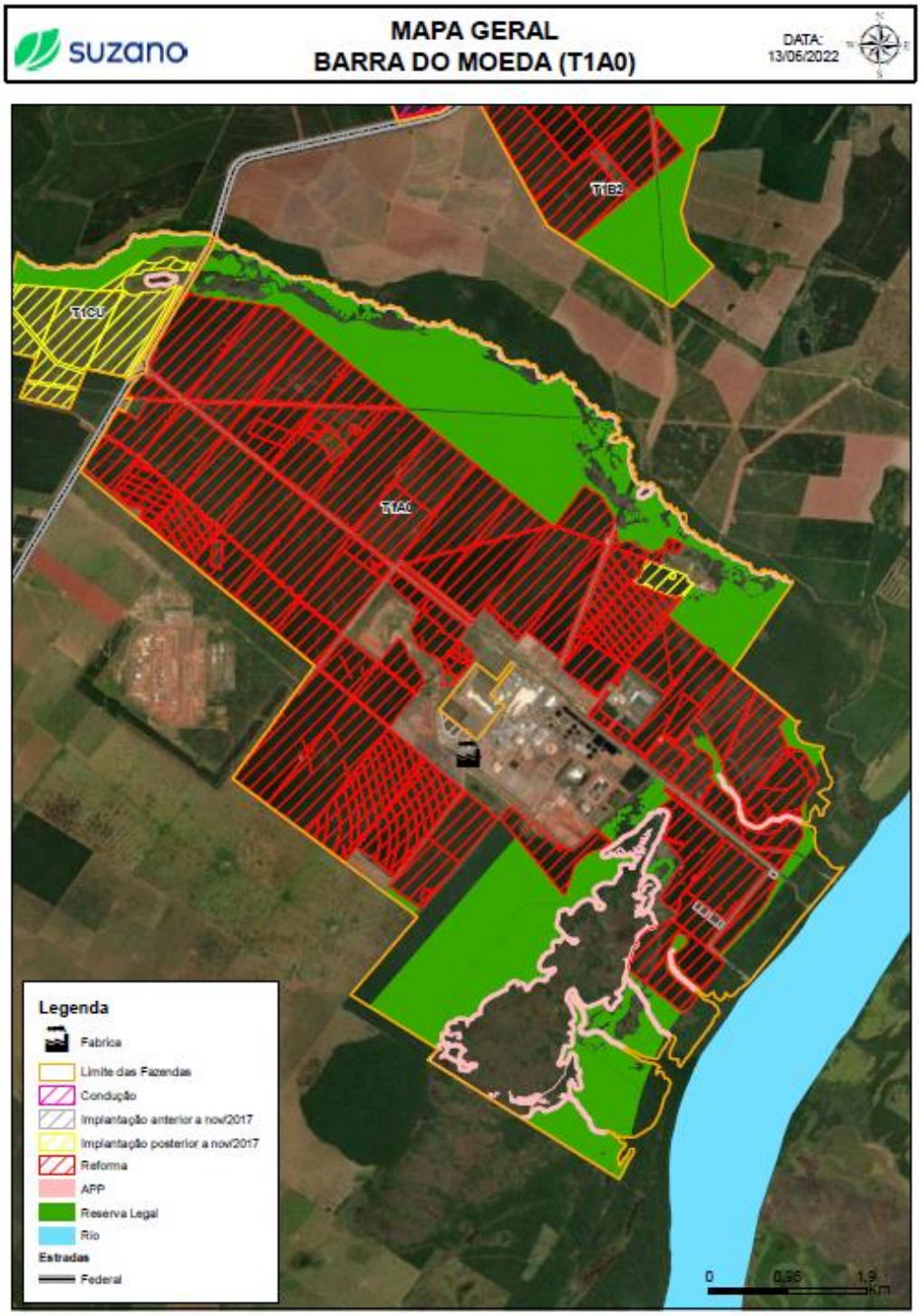

Figure 13 - – Location and stratification of Barra do Moeda. First activity project area highlighted in yellow.

Figure 14 - – Location and stratification of Boa Esperança III. First activity project area highlighted in yellow.

Figure 15 - Location and stratification of Figueira. First activity project area highlighted in yellow.

Figure 16 - Location and stratification of Jandaia. First activity project area highlighted in yellow

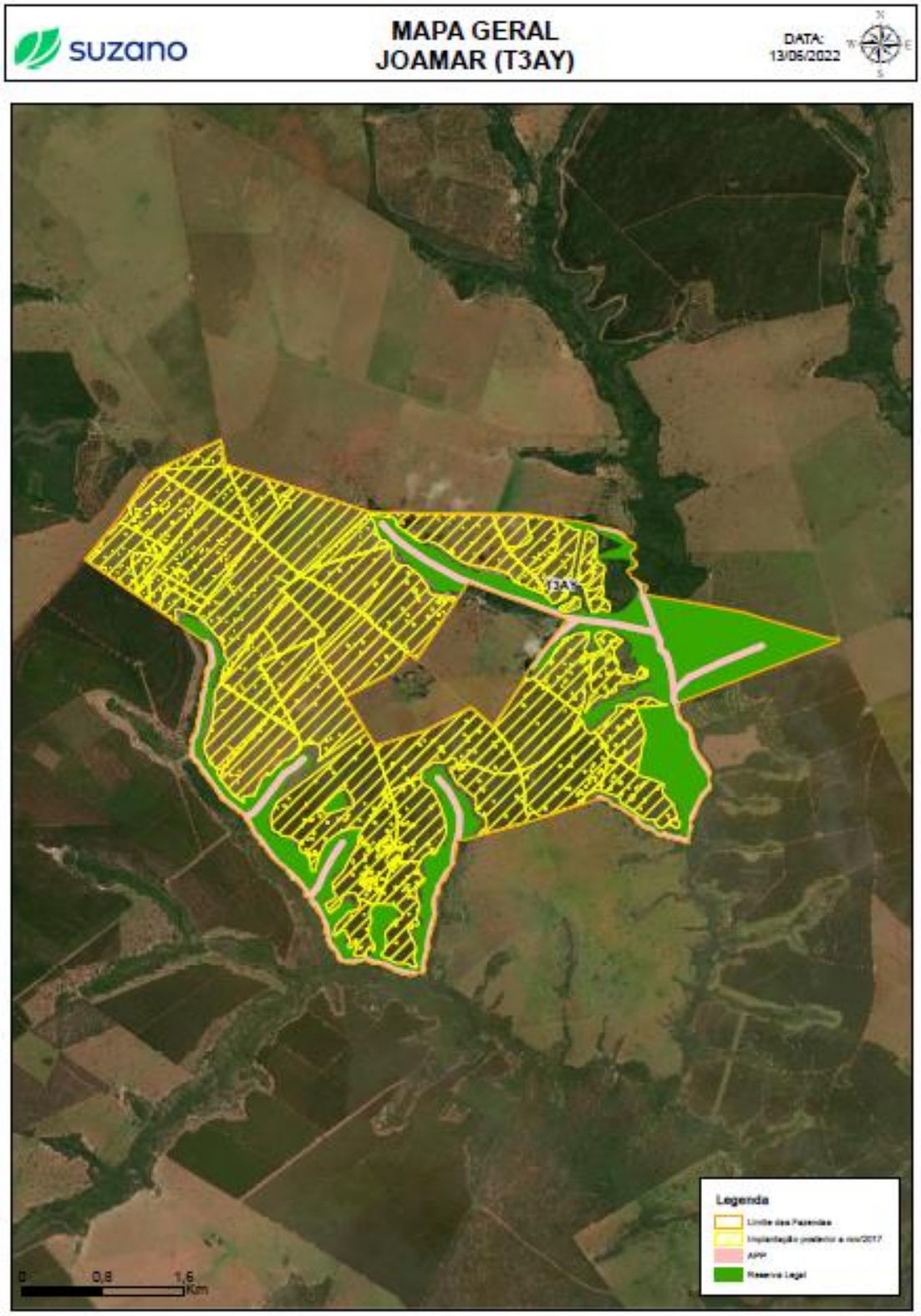

Figure 17 - Location and stratification of Joamar. First activity project area highlighted in yellow.

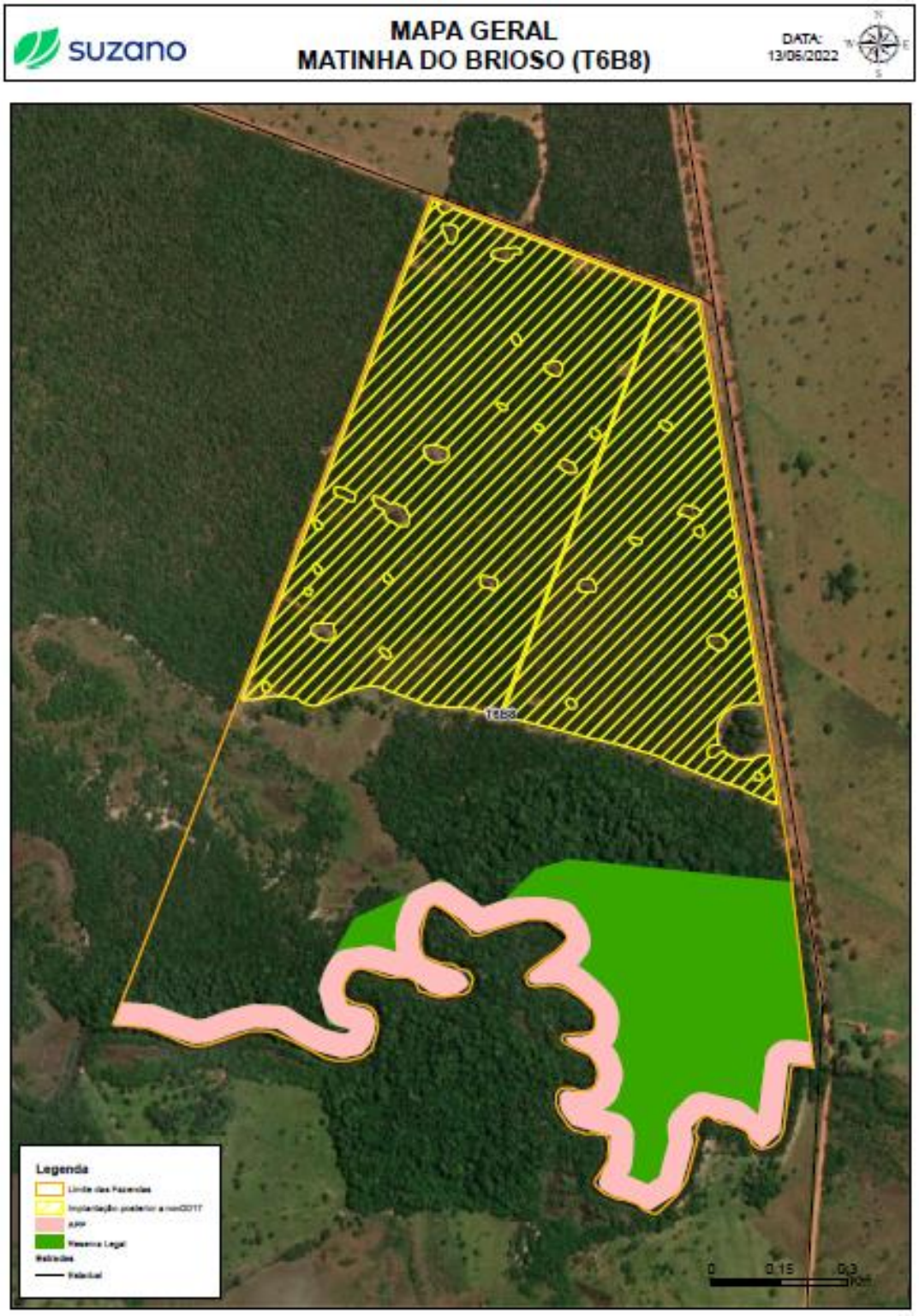

Figure 18 - Location and stratification of Matinha do Briosio. First activity project area highlighted in yellow.

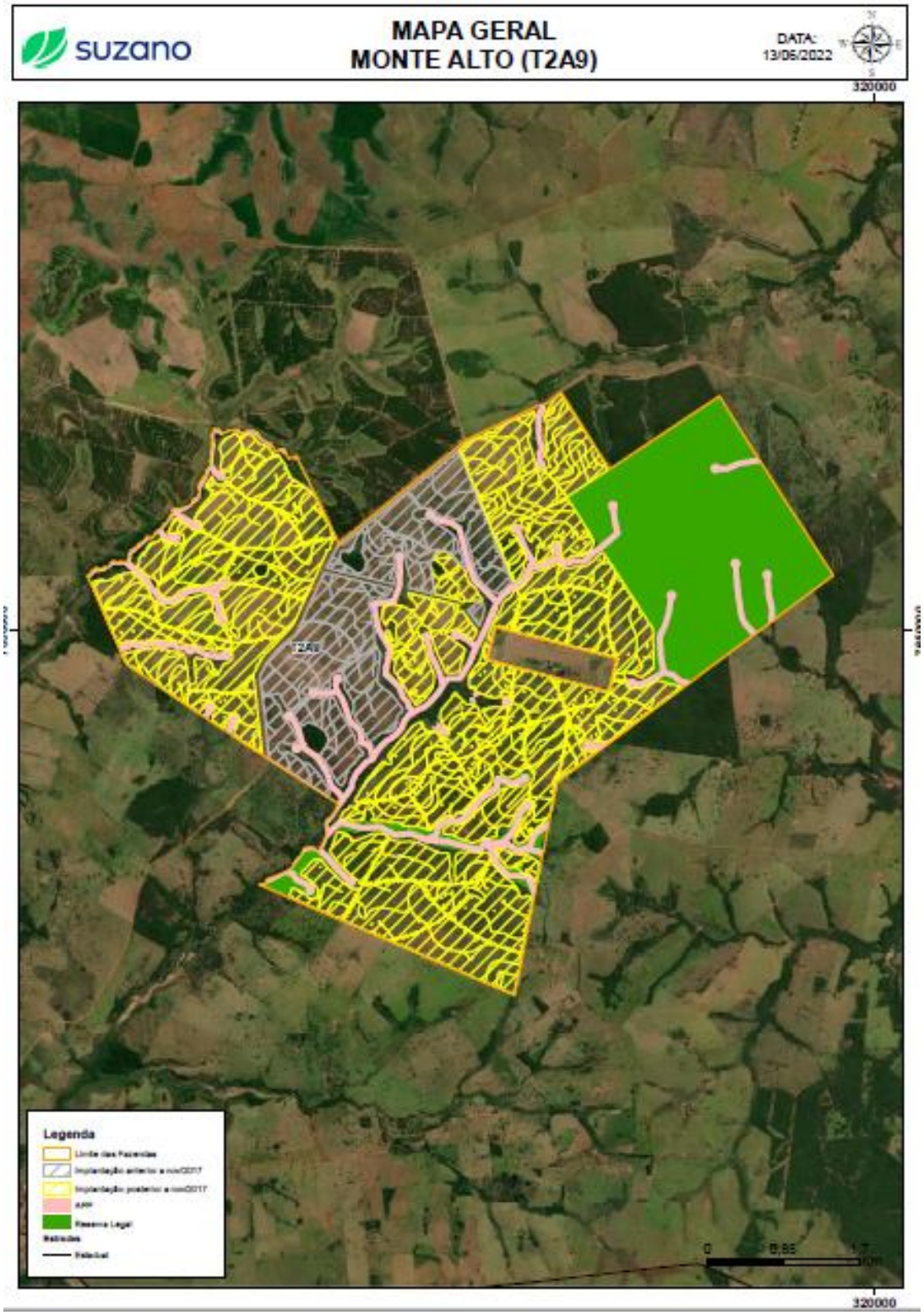

Figure 19 - Location and stratification of Monte Alto. First activity project area highlighted in yellow.

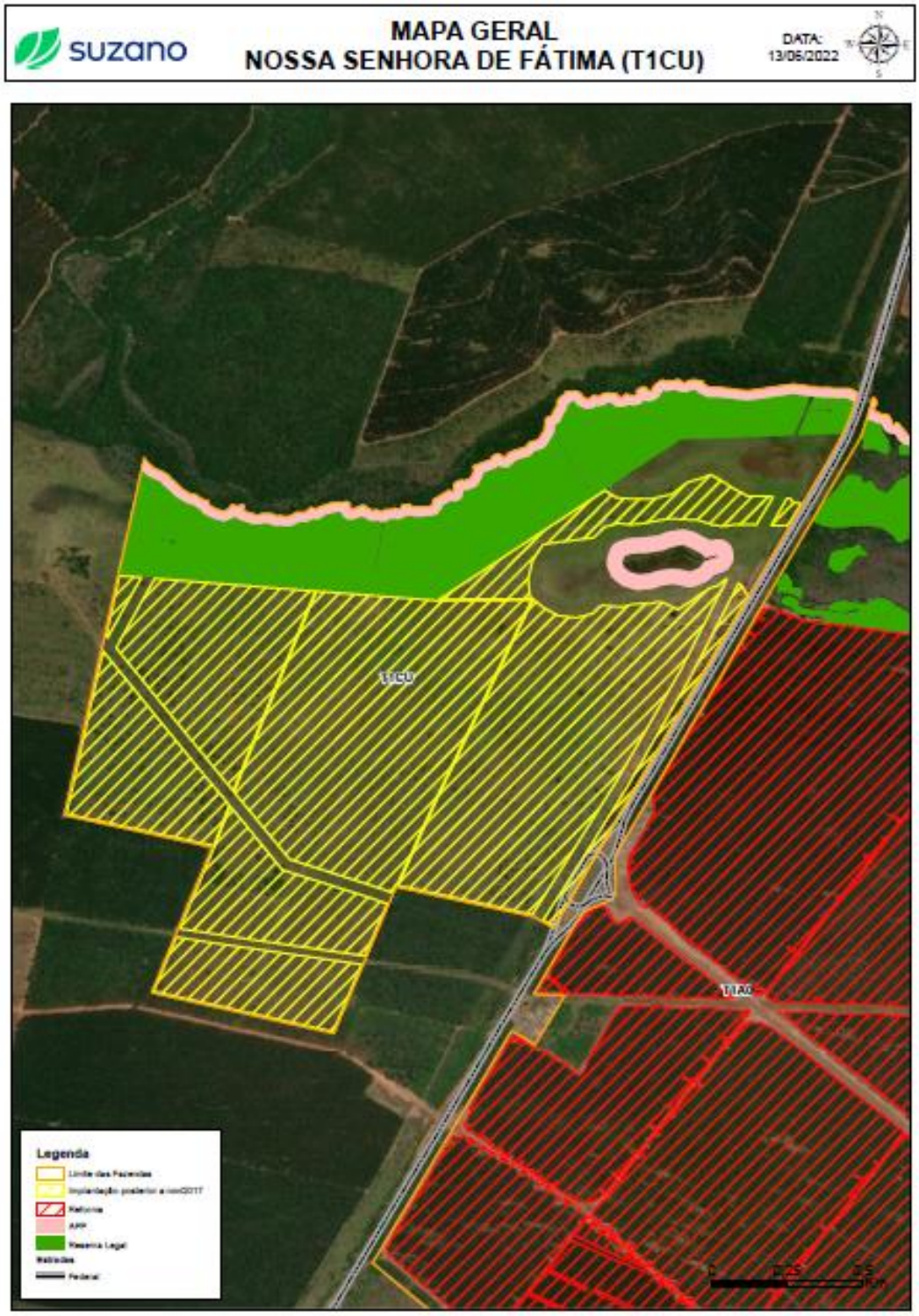

Figure 20 - Location and stratification of Nossa Senhora de Fátima. First activity project area highlighted in yellow.

Figure 21 - Location and stratification of Pontal do Briosio. First activity project area highlighted in yellow.

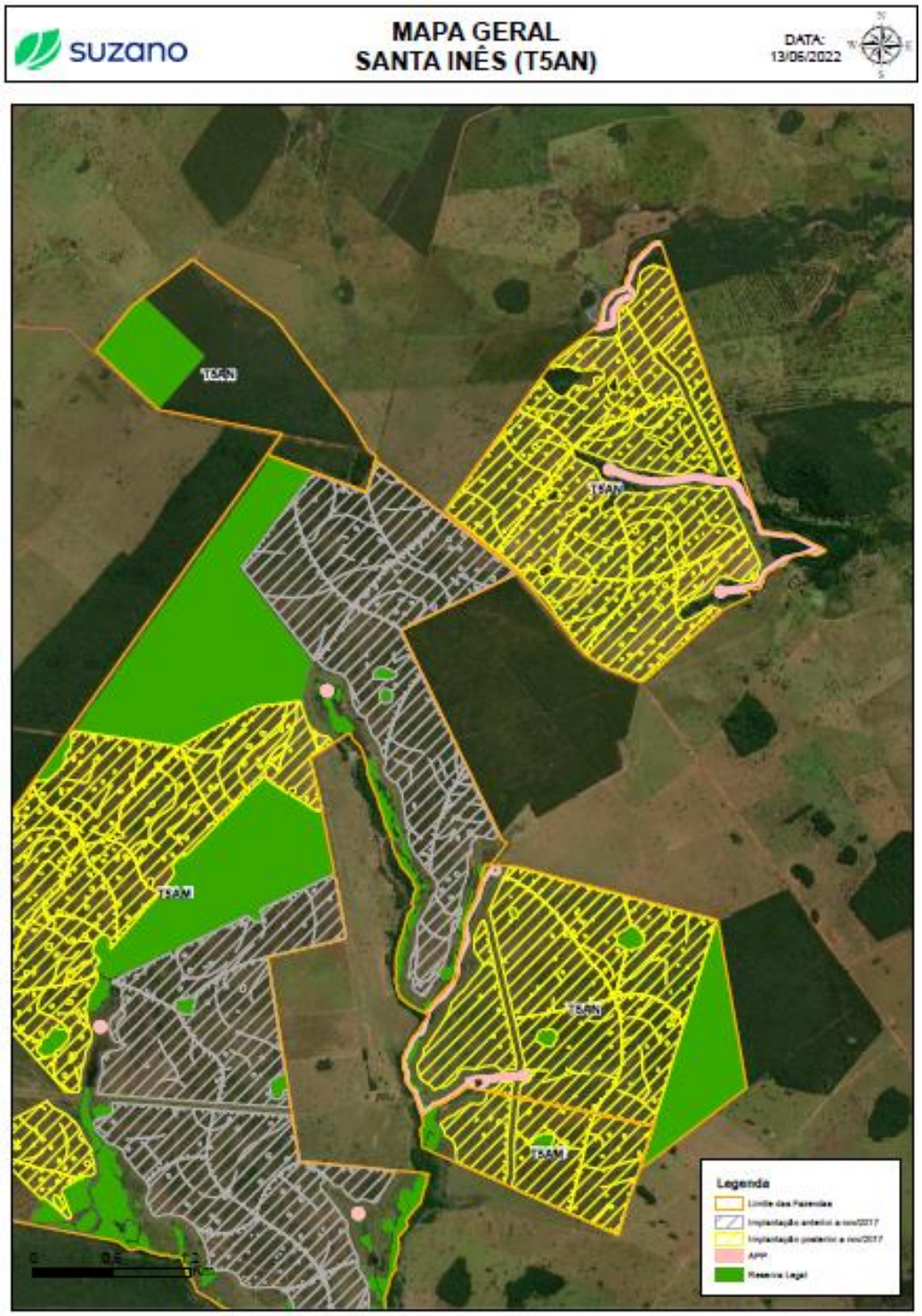

Figure 22 - Location and stratification of Santa Inês. First activity project area highlighted in yellow.

Figure 23 - Location and stratification of Santa Inês Gleba C. First activity project area highlighted in yellow.

Figure 24 - Location and stratification of Santa Terezinha II. First activity project area highlighted in yellow.

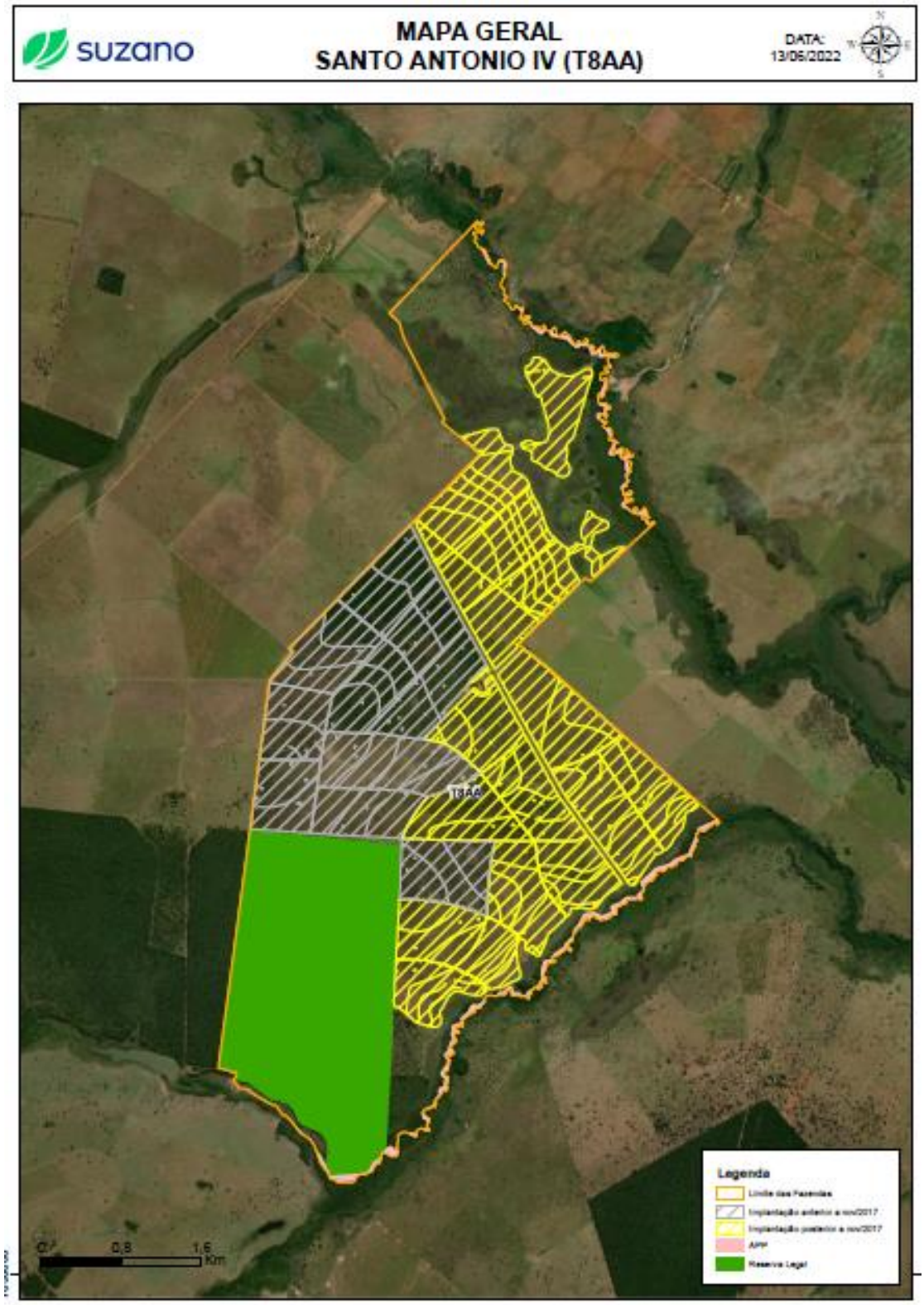

Figure 25 - Location and stratification of Santo Antônio IV. First activity project area highlighted in yellow.

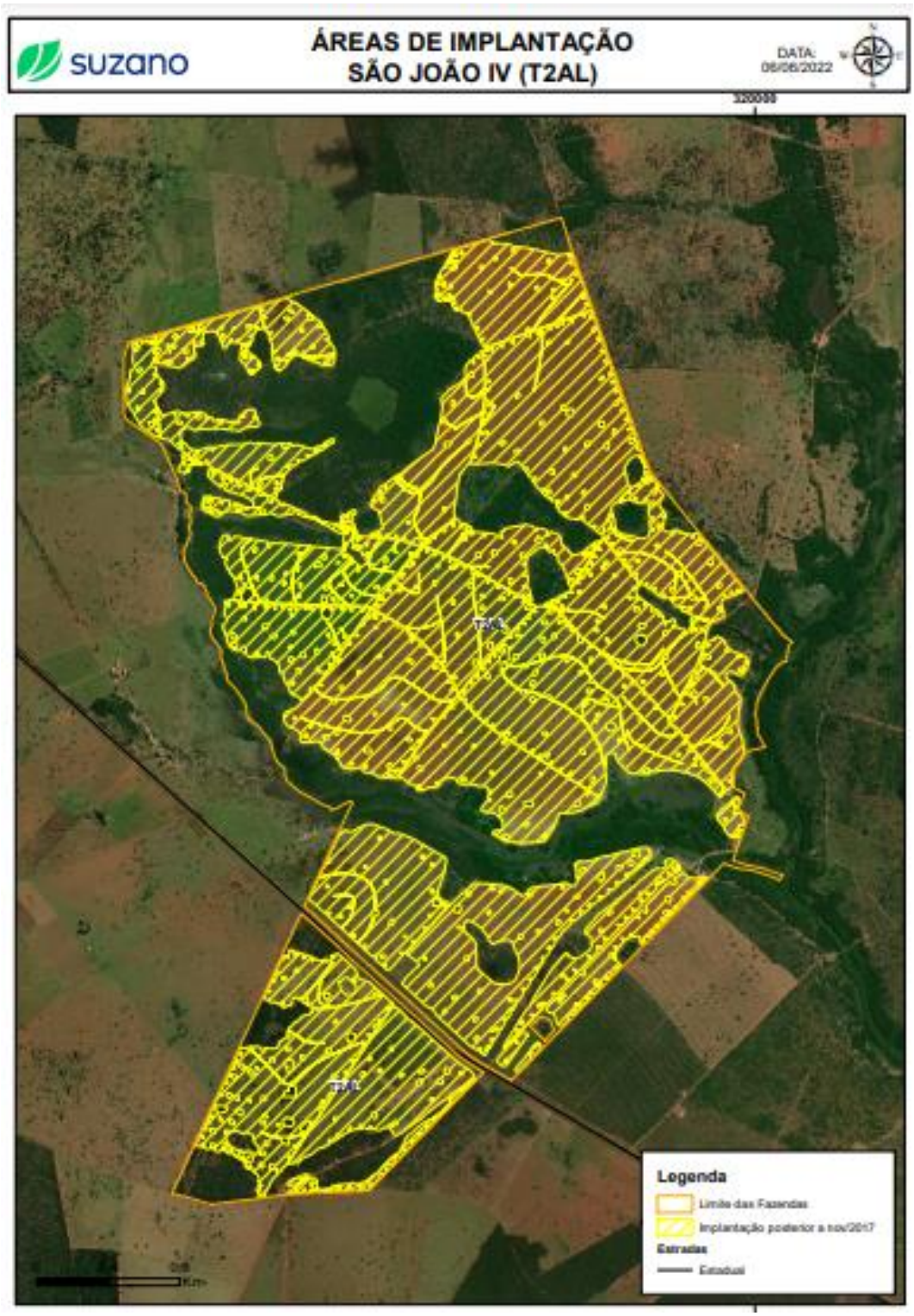

Figure 26 - Location and stratification of São João IV. First activity project area highlighted in yellow.

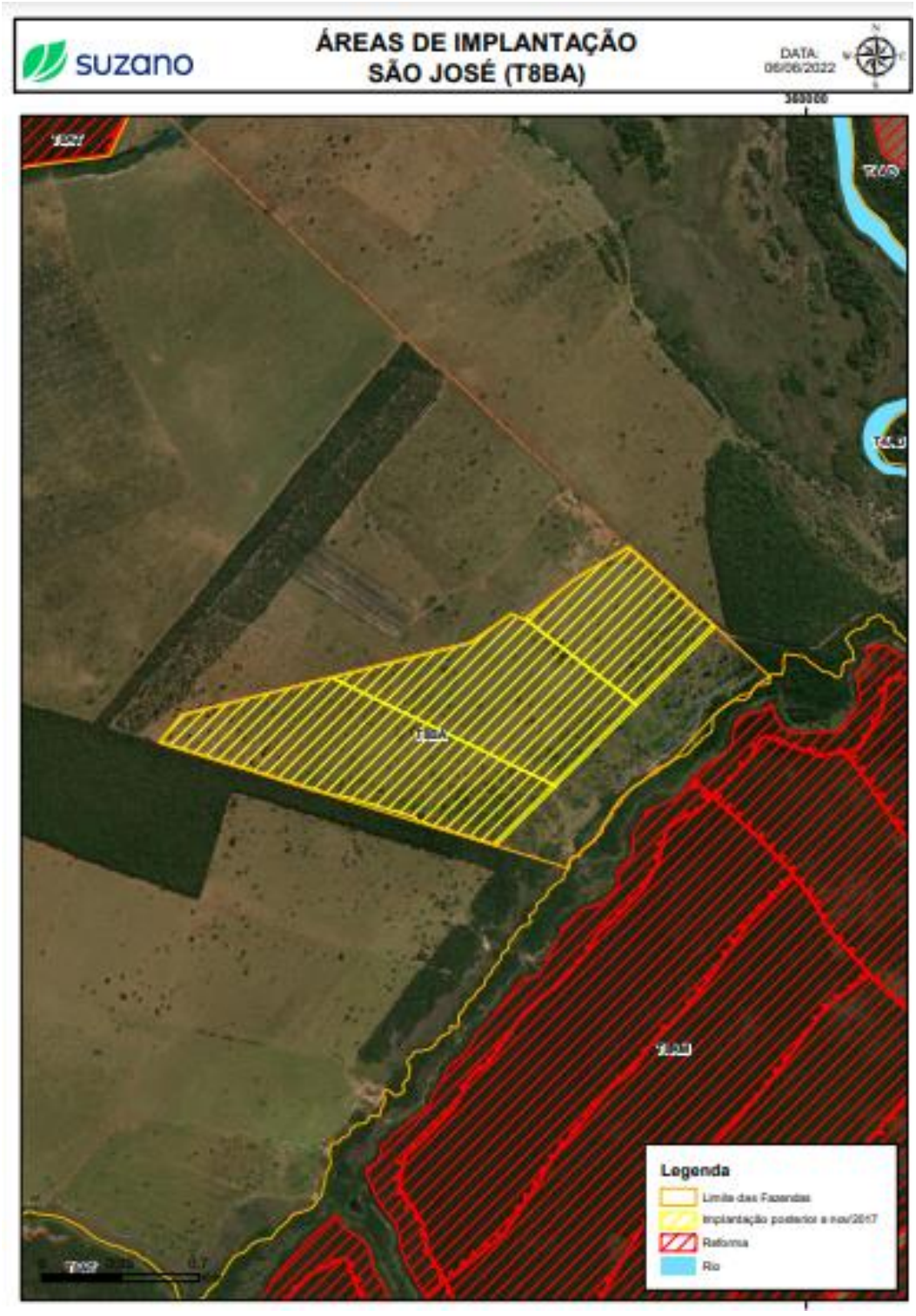

Figure 27 - Location and stratification of São José. First activity project area highlighted in yellow.

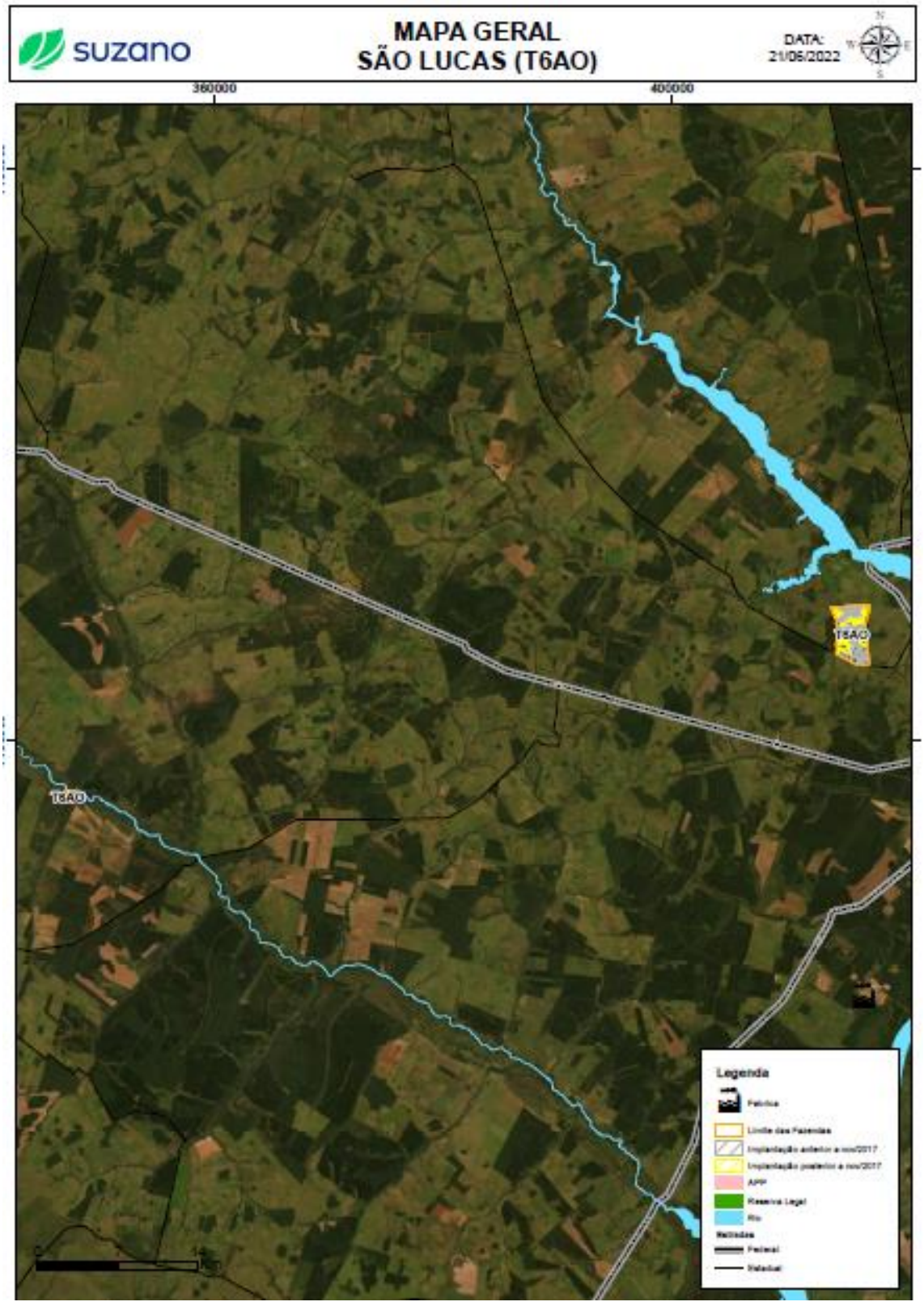

Figure 28 - Location and stratification of São Lucas. First activity project area highlighted in yellow.

Figure 29 - Location and stratification of São Miguel III. First activity project area highlighted in yellow

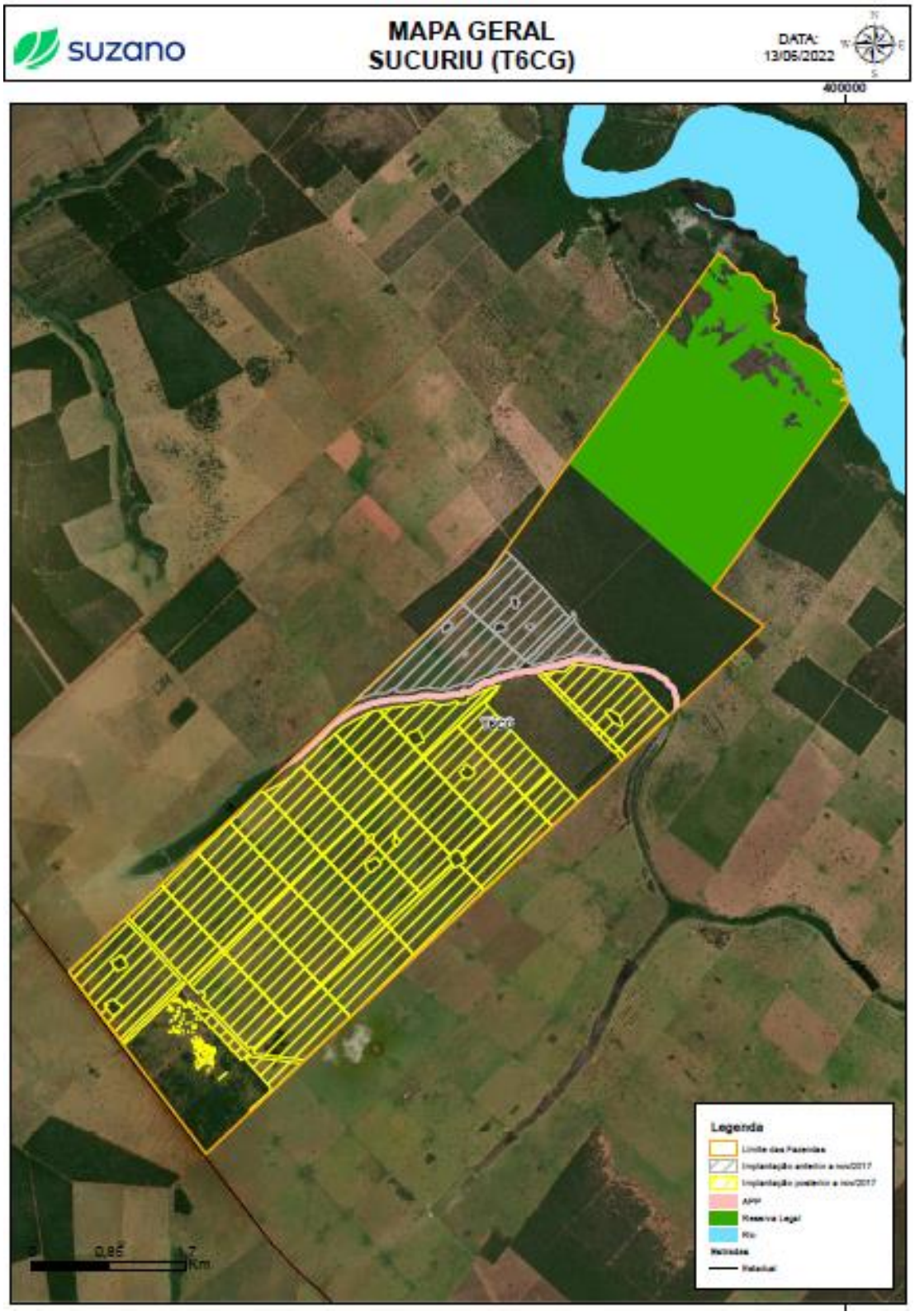

Figure 30 - Location and stratification of Sucuriu. First activity project area highlighted in yellow.

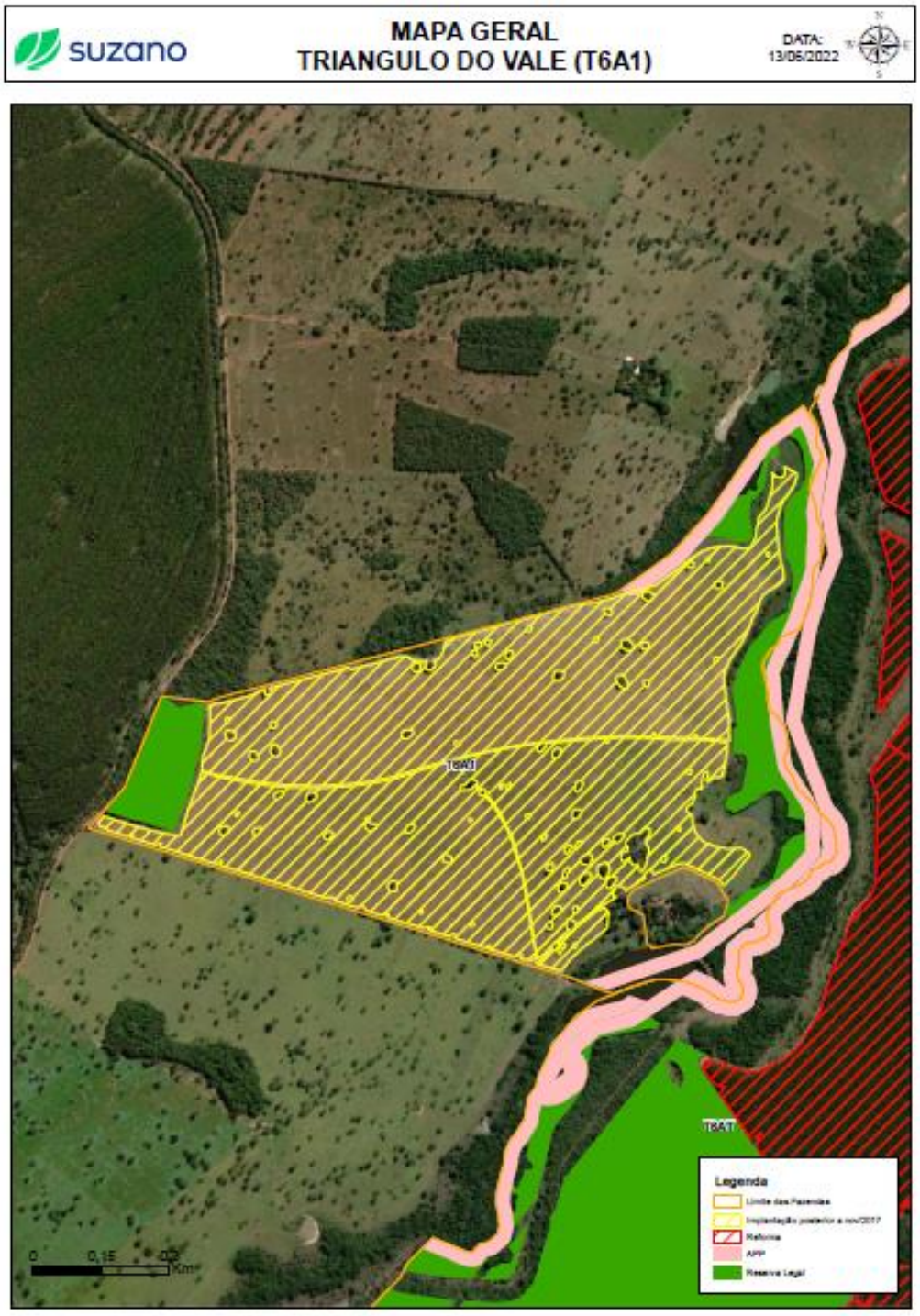

Figure 31 - Location and stratification of Triangulo do Vale. First activity project area highlighted in yellow.

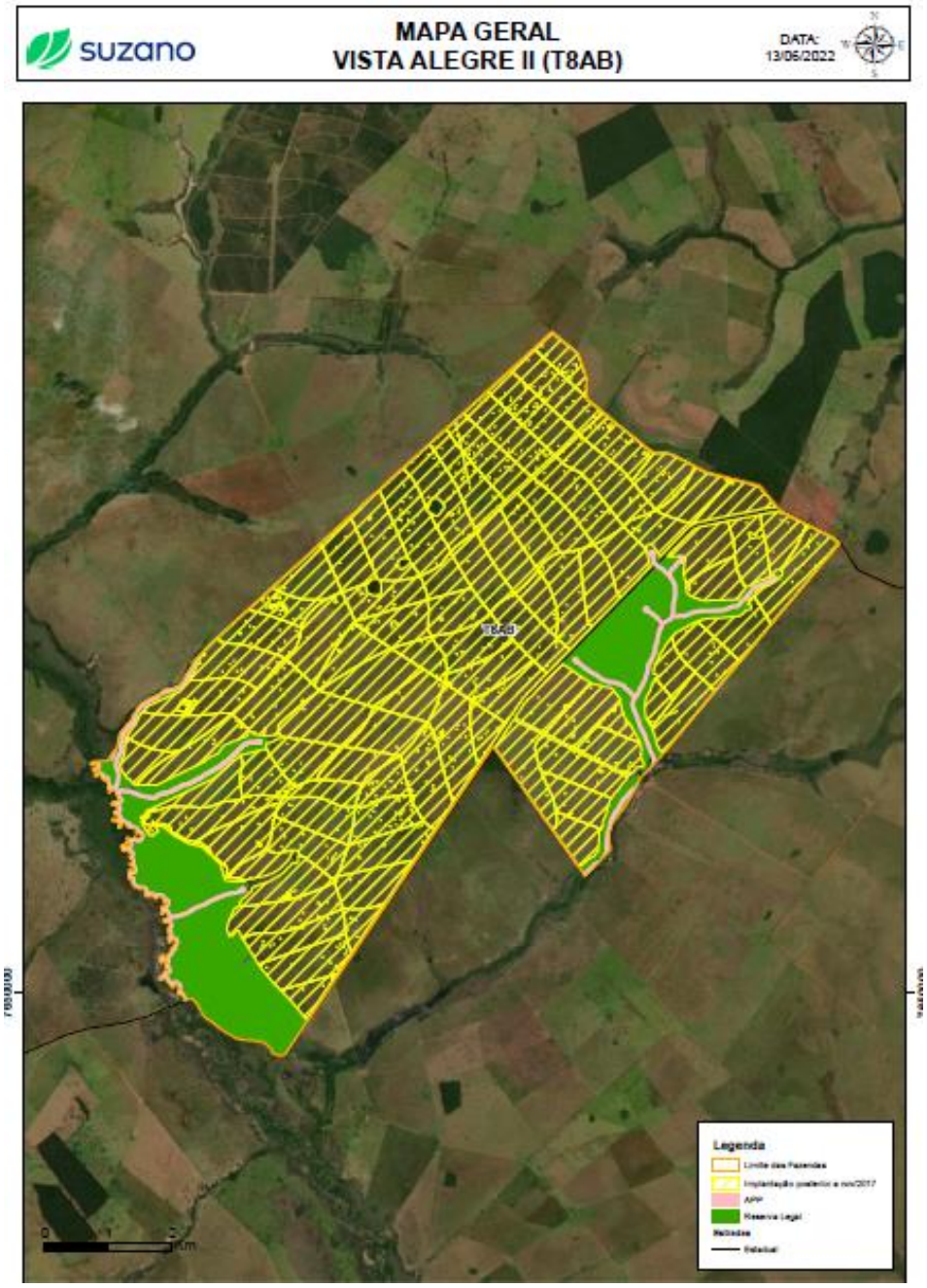

Figure 32 - Location and stratification of Vista Alegre II. First activity project area highlighted in yellow.

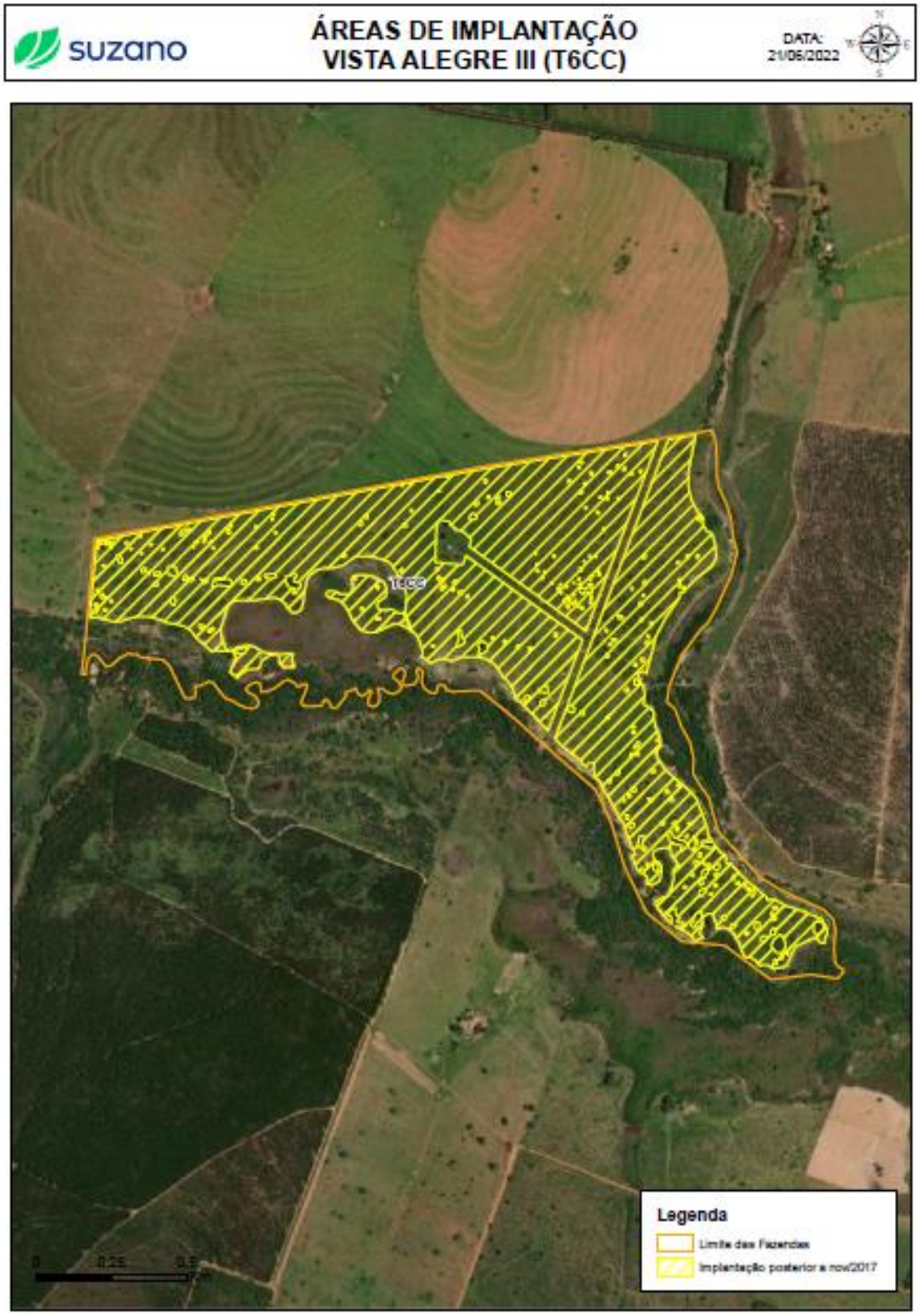

Figure 33 - Location and stratification of Vista Alegre III. First activity project area highlighted in yellow.

In the following areas, the second activity of the project will be implemented, which is the planting of native species.

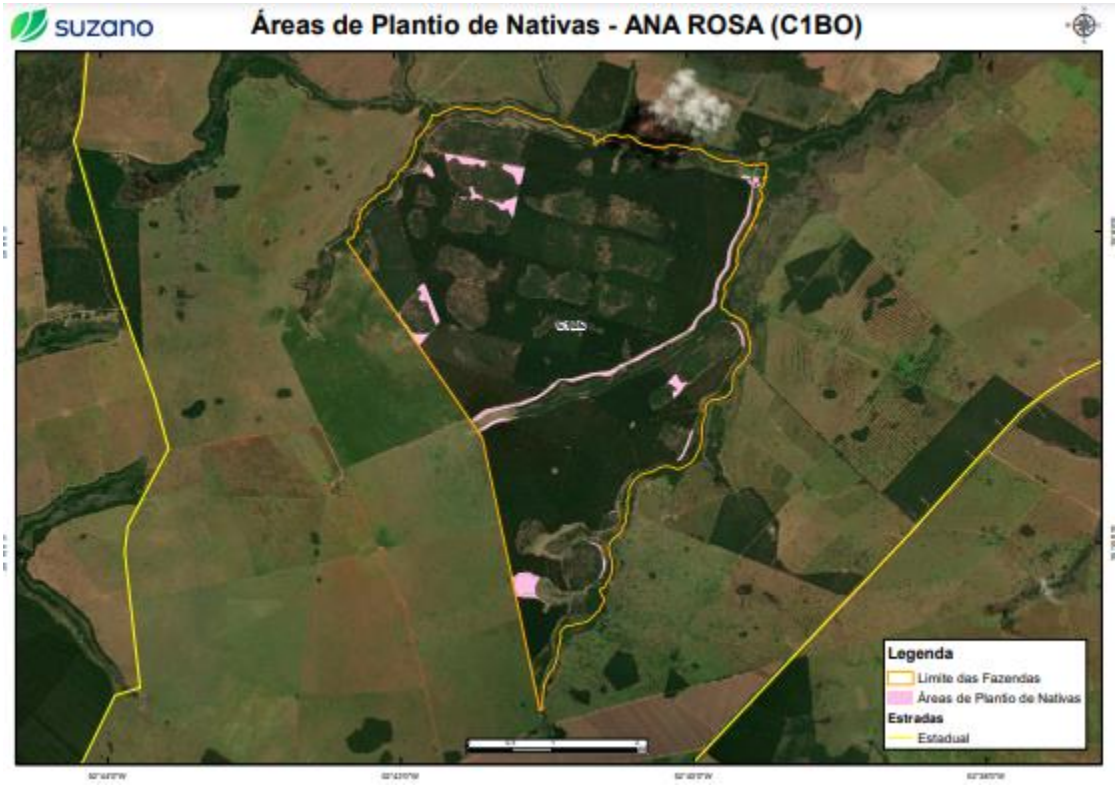

Figure 34 - Location and stratification of Ana Rosa. Second project activity area highlighted in light pink.

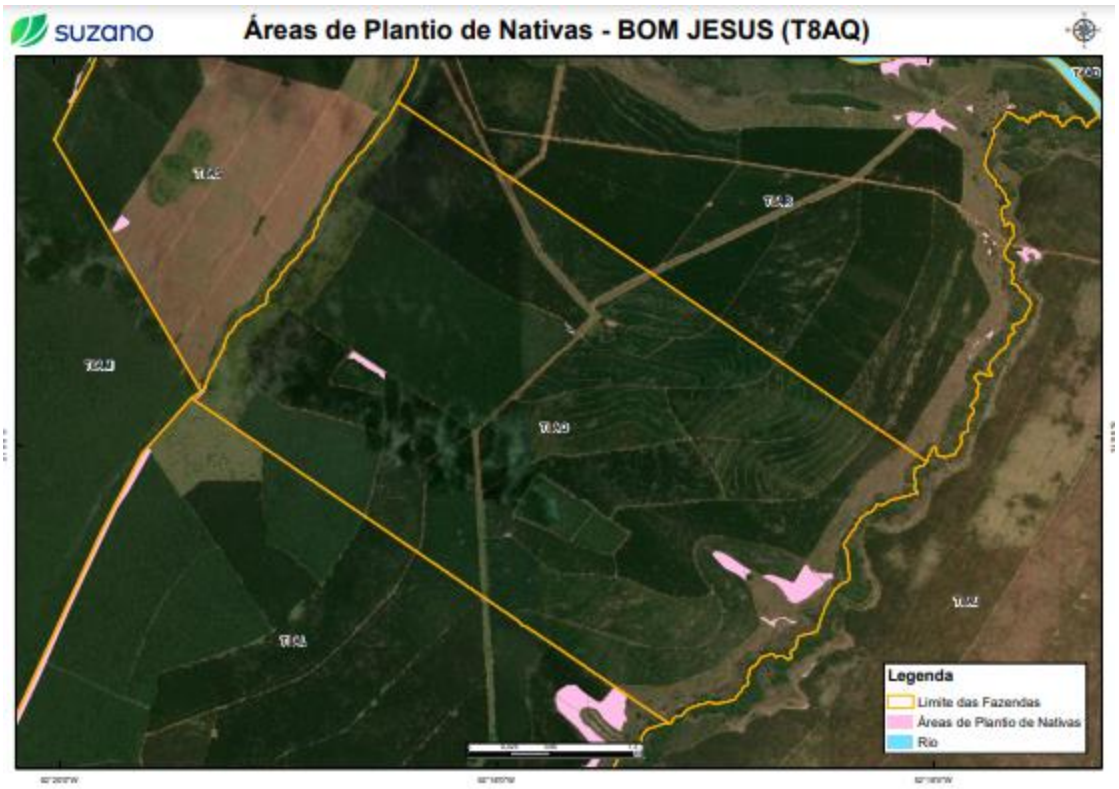

Figure 35 - Location and stratification of Bom Jesus. Second project activity area highlighted in light pink.

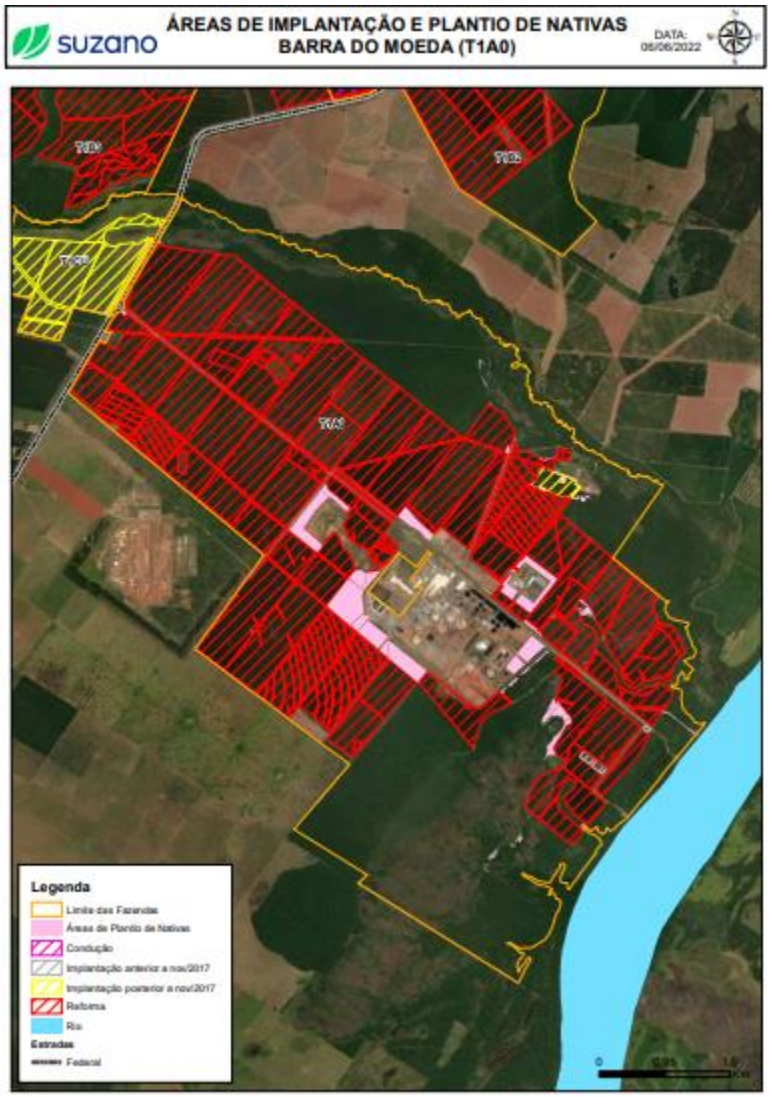

Figure 36 - Location and stratification of Barra da Moeda. Second project activity area highlighted in light pink.

Figure 37 - Location and stratification of Brasileira. Second project activity area highlighted in light pink.

Figure 38 - Location and stratification of Boa Esperança III. Second project activity area highlighted in light pink.

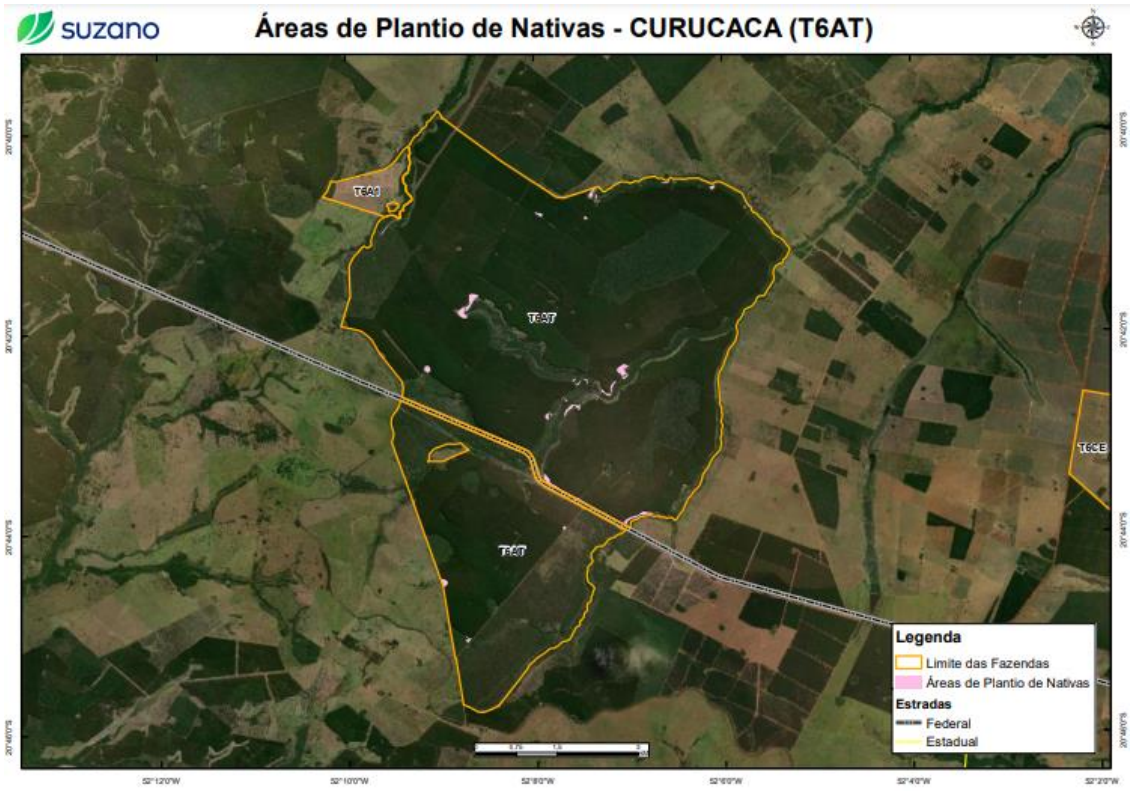

Figure 39 - Location and stratification of Curucaca. Second project activity area highlighted in light pink.

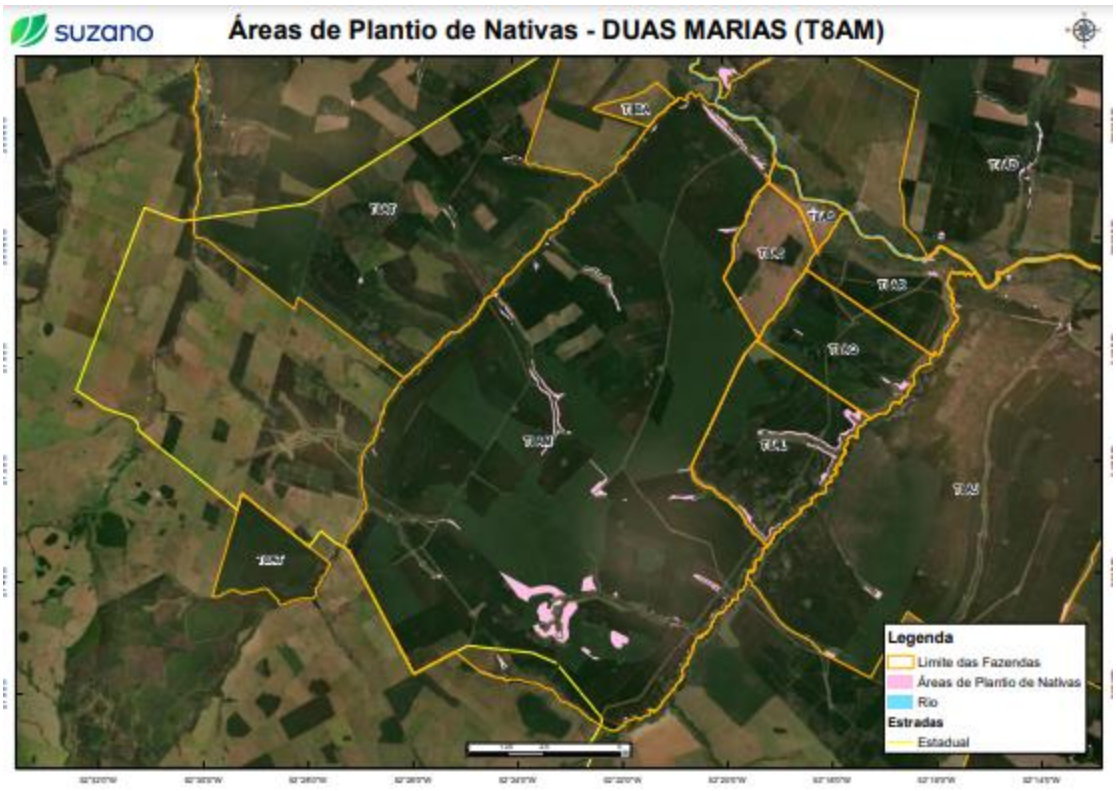

Figure 40 - Location and stratification of Duas Marias. Second project activity area highlighted in light pink.

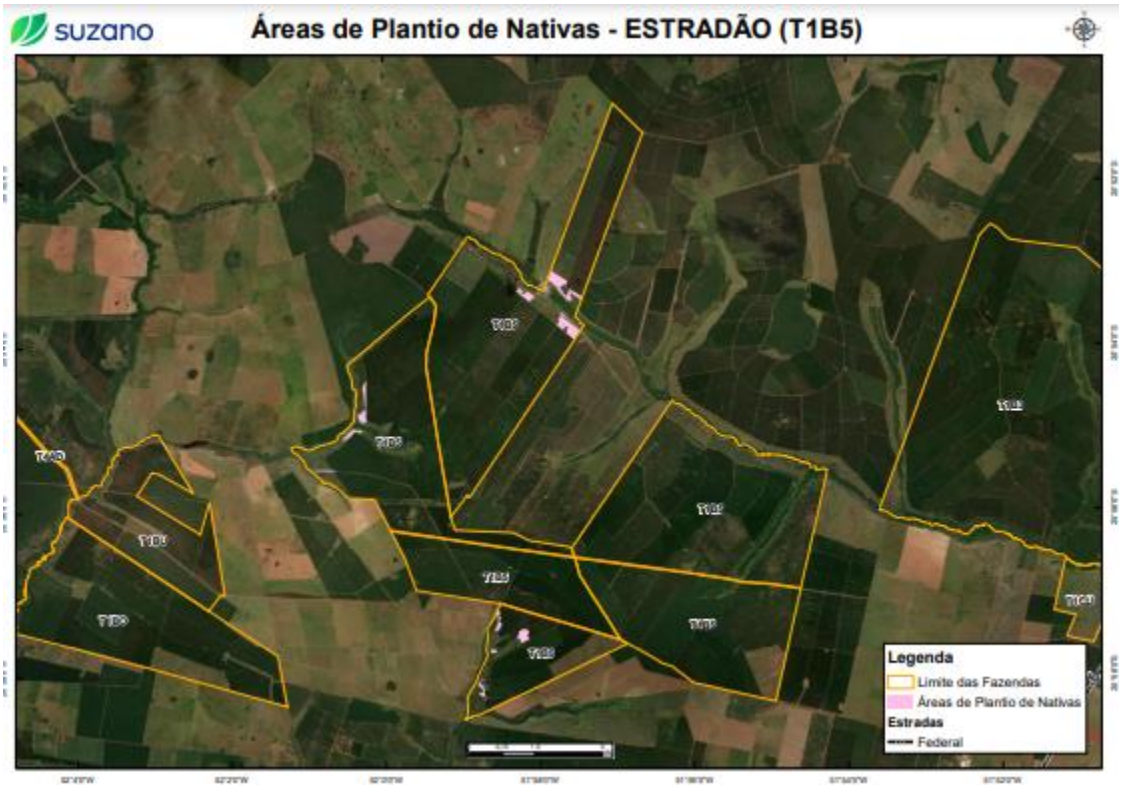

Figure 41 - Location and stratification of Estradão. Second project activity area highlighted in light pink.

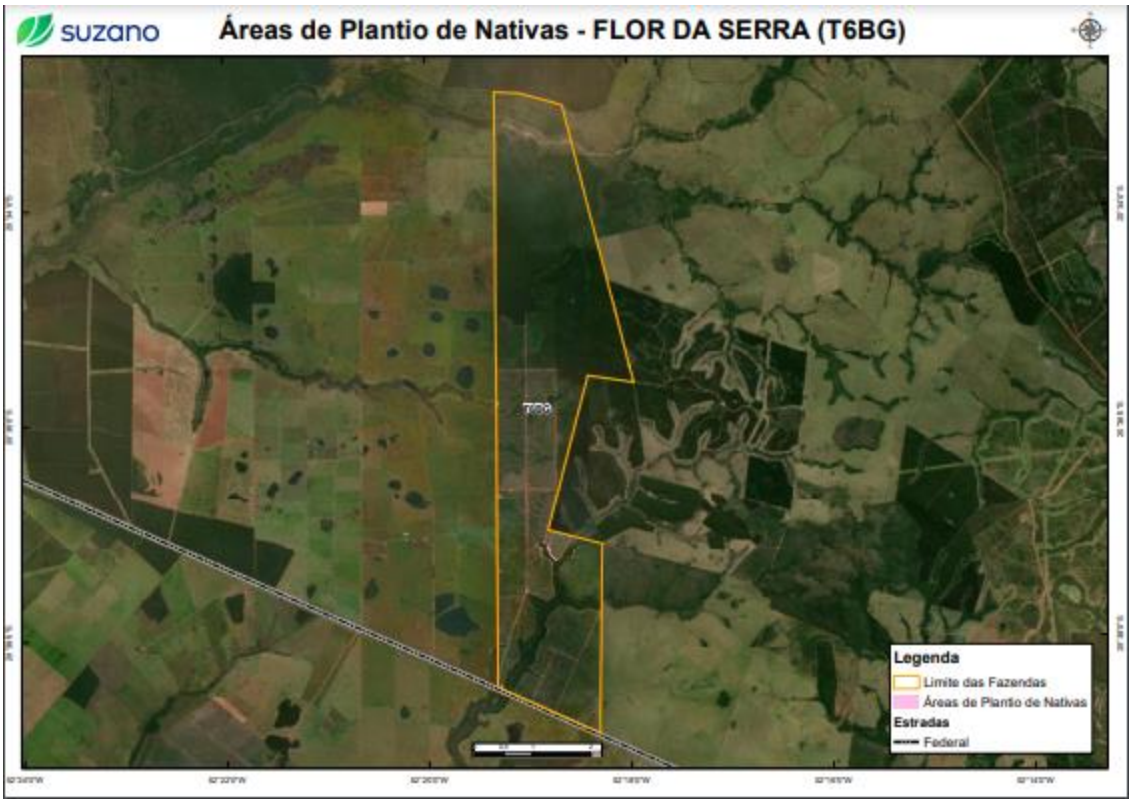

Figure 42 - Location and stratification of Flor da Serra. Second project activity area highlighted in light pink.

Figure 43 - Location and stratification of Guara-Suia. Second project activity area highlighted in light pink.

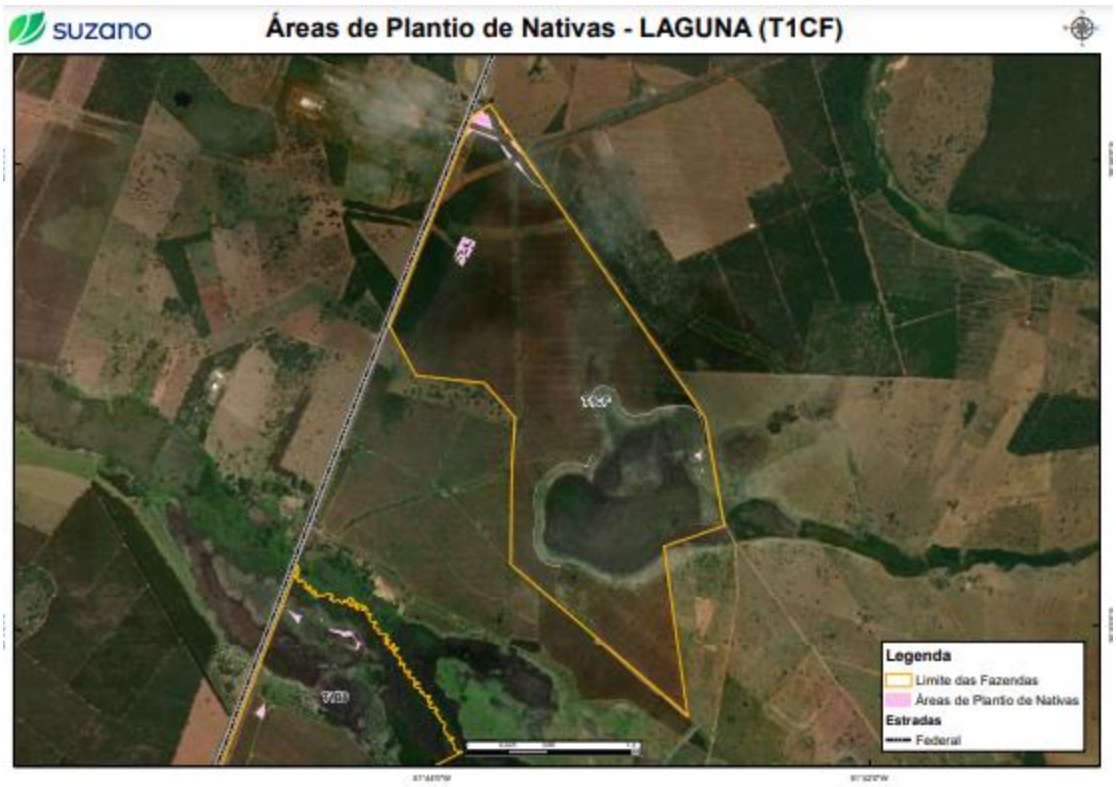

Figure 44 – Location and stratification of Laguna. Second project activity area highlighted in light pink.

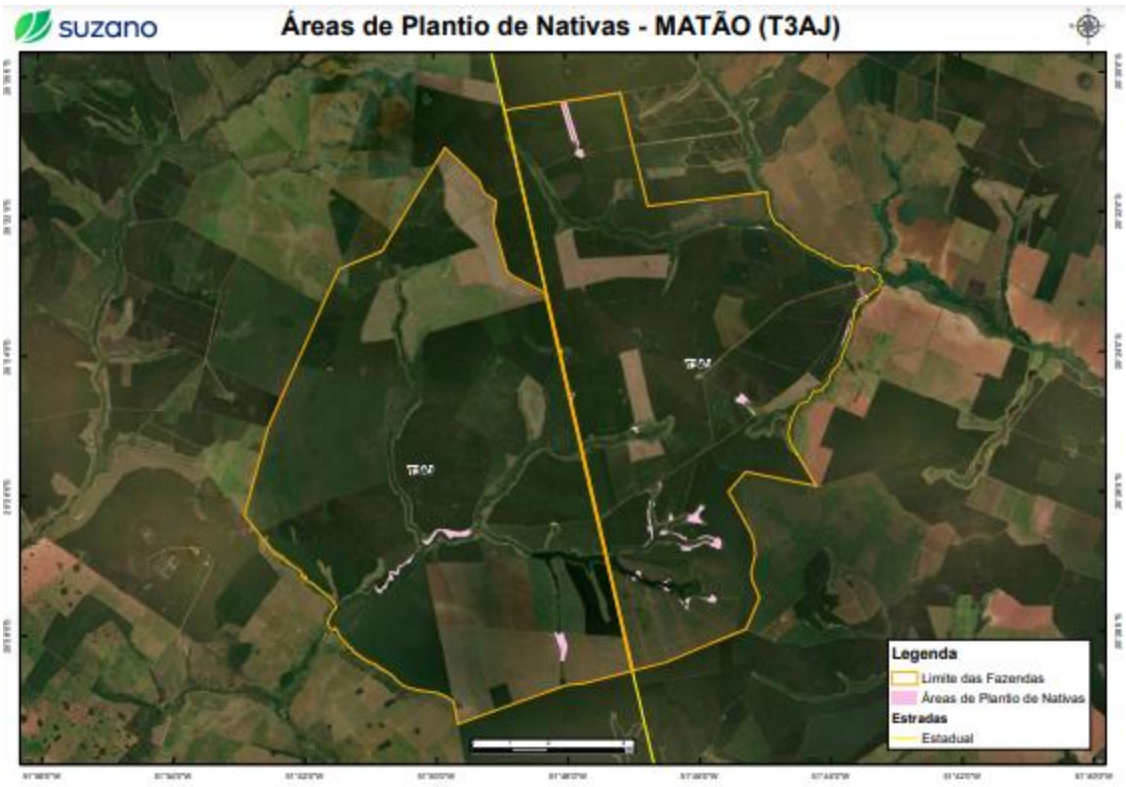

Figure 45 – Location and stratification of Matão. Second project activity area highlighted in light pink.

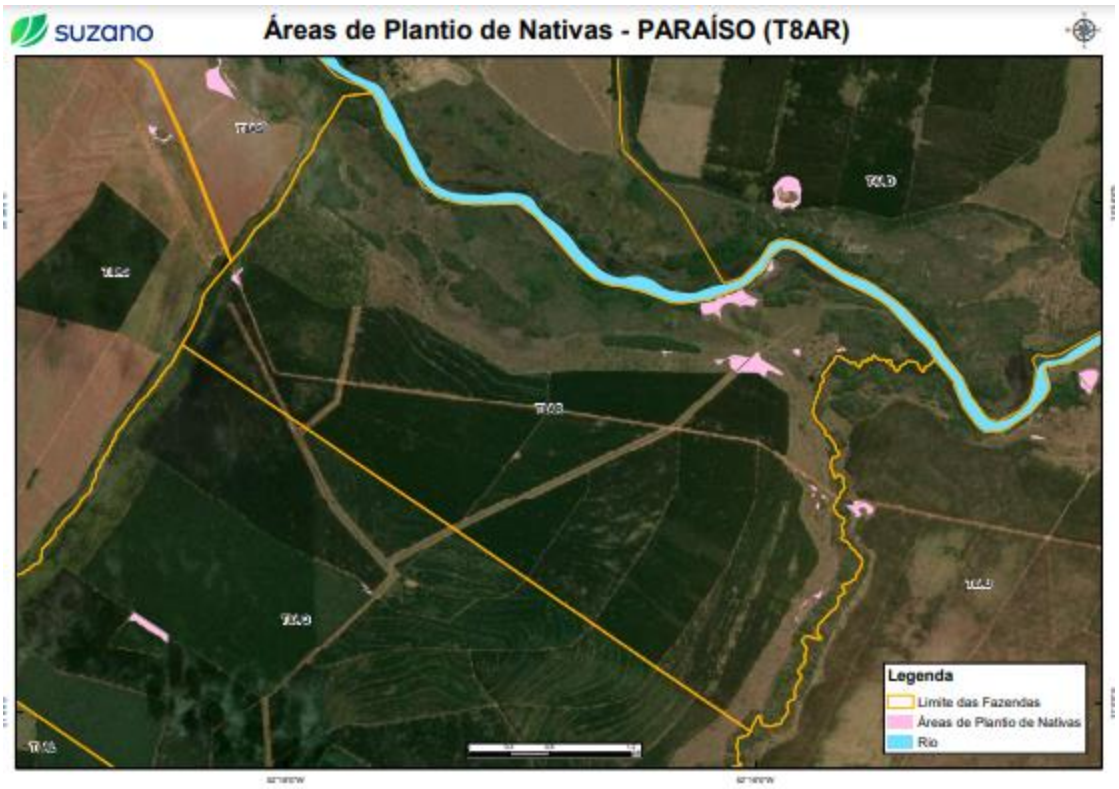

Figure 46 – Location and stratification of Paraíso. Second project activity area highlighted in light pink.

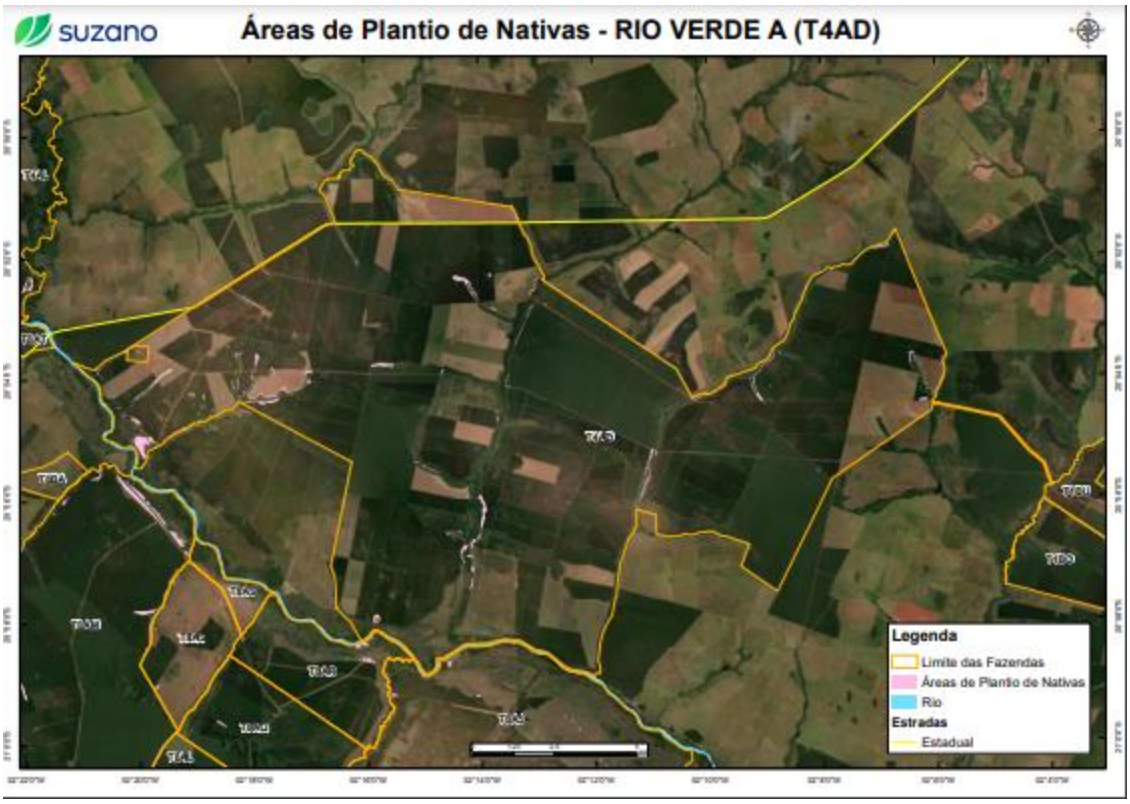

Figure 47 - Location and stratification of Rio Verde A. Second project activity area highlighted in light pink.

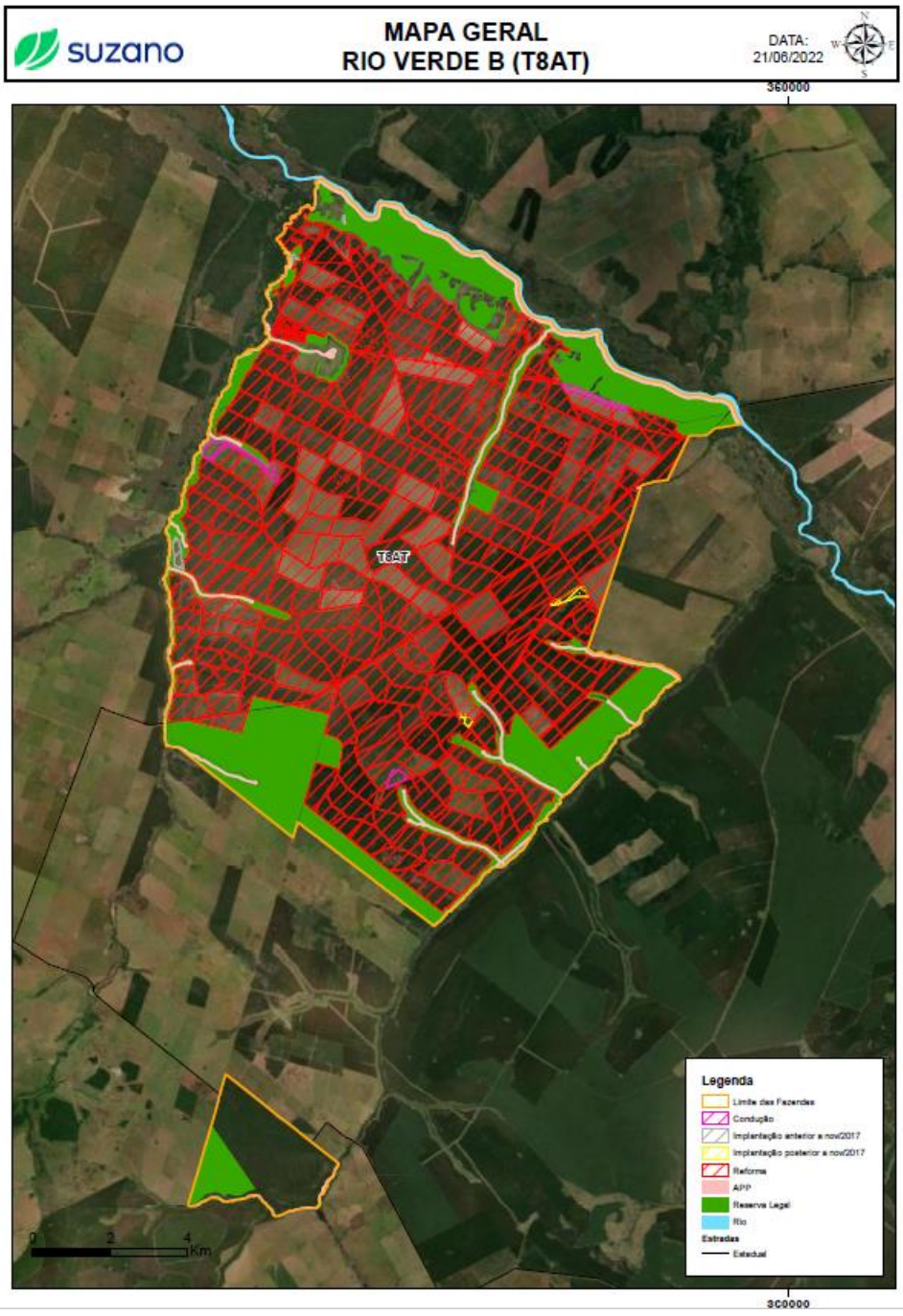

Figure 48 - Location and stratification of Rio Verde B. Second project activity area highlighted in light pink.

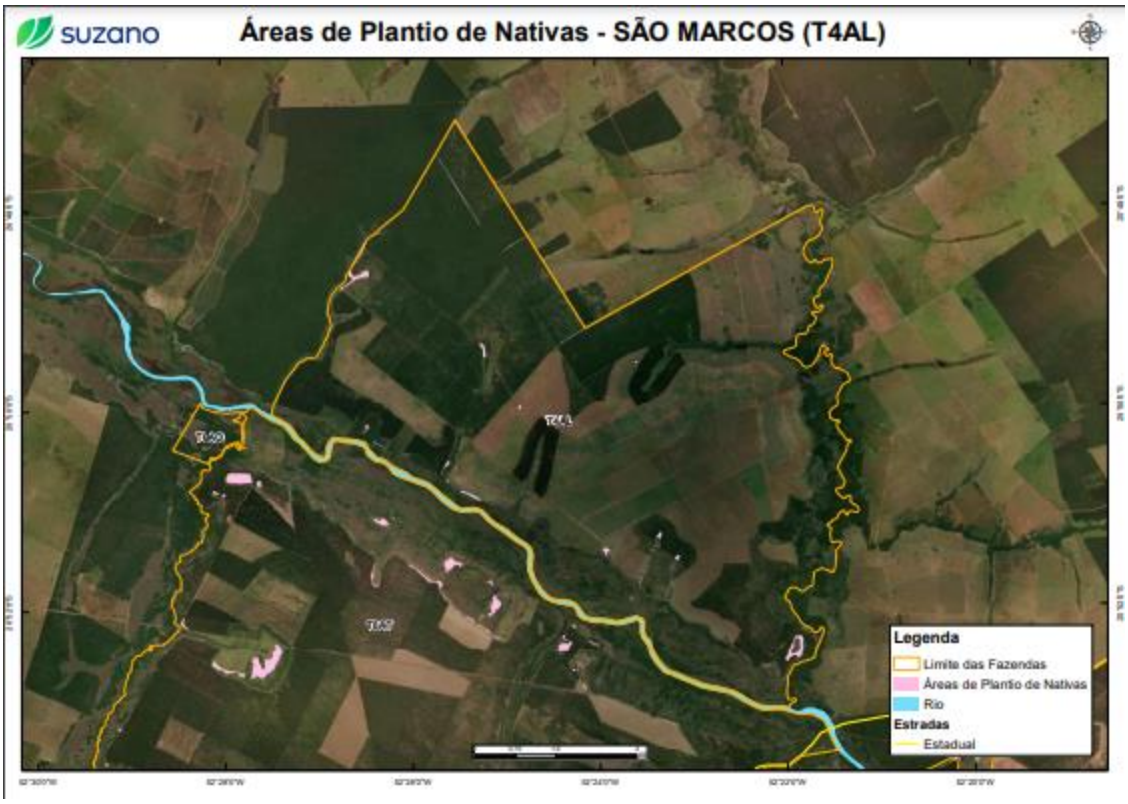

Figure 49 - Location and stratification of São Marcos. Second project activity area highlighted in light pink.

Figure 50 - Location and stratification of Vale do Gerivá. Second project activity area highlighted in light pink.

1.13 Conditions Prior to Project Initiation

- **Ecosystem type:** The Project Area is in the Phyto ecological region of arboreal savannah with gallery forest, inside the Cerrado Biome, where pasture and commercial deforestation took place regularly. For the Cerrado biome, the classification of the vegetation in the field is supported by Ribeiro and Walter (2008) who define forests as environments with a predominance of tree species and continuous or discontinuous canopy formation, while savanna formations are characterized by the coexistence of arboreal, shrub and herbaceous layers. The grassland formations are characterized by the prevalence of herbaceous and shrub species, with fewer trees and a lack of canopy formation. Figure 30 provides a pictorial representation of 12 vegetation Phyto physiognomies typical of the Cerrado, including: Riparian Forest (Mata Ciliar), Gallery Forest, Dry Forest, Tall Woodland (Cerradão), Dense Cerrado, Typical Cerrado, Sparse Cerrado, Park Savanna, Palmland, Vereda, Rupestrian Cerrado, Rupestrian Grassland, Shrub Grassland and Open Grassland (low-grass savanna).

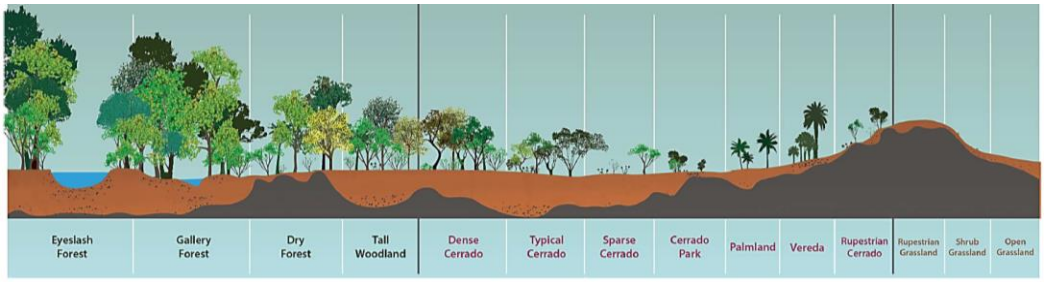

Figure 51 - Pictorial representation of the main vegetation Phyto physiognomies in the Cerrado biome, in a biomass gradient (from the largest forest formations, on the left, to the smallest ones - savannas and grasslands, on the right). Source: Adapted from Ribeiro and Walter, 2008

The main soils present at the project area are the Dark Red Latosoil and Purple Latosoil. Because they are deep and porous or very porous, they present adequate conditions for good root development in depth. These soils are considered suitable for forestry and perennial plantations if well managed from an agronomic point of view. Besides these aspects, under natural conditions, Dark Red Latsoil present low Carbon ("C") contents in the soil, due to the intense process of weathering, the highest content for organic matter on these soils was 4.5% [7]. On the other hand, Purple Latosoils show even lower rates of organic matter on its composition, of 3.5% on the highest assessment[8]. Therefore, the soils that occur within the project boundary are not inserted in the category of organic soils[9], being eligible for project activity in accordance with the applied methodologies in this PD. Moreover, a few farms under the project had their soil sampled and tested. All results indicated the areas have a composition of more than 80% of sand in their soil, being classified as loamy sand soils (USDA). Nevertheless, organic matter results indicated an average value of 1.1 dag/dm³

- **Current and historical land-use:** According to MapBiomas[10], currently the city of Três Lagoas has only 17,78% of its area occupied by native formations. 79.8% of its area occupied by cattle ranching, agriculture, and forestry. The predominance of land use for the city has been the same since 1985, date from which data is available at the website, being the most relevant activity the cattle ranching, even though native

[7] CARNEIRO, Silvia Pereira. Qualidade de um Latossolo Vermelho sob diferentes tipos de uso e manejos em área do cerrado. Available at: <https://repositorio.ufmg.br/bitstream/1843/MPBB-8FXLGP/1/mestrado_silvia.pdf>. Last access: 25th November 2021

[8] CENTURION, J.F; Et. al.. Characteristics of dusky latosols developed from alkaline and basic rocks in Jaboticabal, SP. Sci. agric. (Piracicaba, Braz.) 52 (2). Ago 1995. Available at: <https://www.scielo.br/j/sa/a/BZBzr3LV9CRWZf69Sy4ZggJ/?lang=pt#>. Last access: 19th May 2021.

[9] PENMAN et al. "Good practice guidance for land use, land-use change and forestry." (2003).

[10] MAPBIOMAS, Coleção 6 (1985-2020). Available at: <https://mapbiomas.org/>. Last access: 27th May 2022.

vegetation has been a target of deforestation activities. Since 1987, over 173k ha have been deforested. Before the implementation of the project, the areas were in fallow, and before that, they were occupied by cattle ranching.

1.14 Compliance with Laws, Statutes and Other Regulatory Frameworks

The project activities are compliant to all mandatory Laws, Statues and Other Regulatory Frameworks. The most relevant regulations to which the project is subjected to are:

- Resolution CERH MS nº 25, from 3 March 2015, states the criteria for grants and rights about the use of water resources.

The grants and rights to use for the project activity will be made available at each monitoring report for each new area included.

- Resolution SEMADE nº 9, from 13 May 2015, states the standards and procedures for environmental licensing among other guidelines. According to this resolution, the plantation and conduction of native or exotic forestall species aiming for extraction or production of forestry products in lands with alternative soil use, such as agriculture and livestock, or in areas underexplored or degraded, do not need to fulfill the environmental licensing process, given the activities will not be implemented in Pantanal areas, Permanent Preservation areas, or Legal Reservation areas. The only requirement is that the responsible for the activity must submit a communication to the IMASUL (Instituto de Meio Ambiente de Mato Grosso do Sul in Portuguese) before starting the activities.

Suzano will submit the communication letter to the IMASUL before starting the project activities. All letters shall be made available for the VVB assessment at the first monitoring event after the inclusion of new areas.

- Law nº 12.727, from 17 October 2012, defines general requirements about the vegetation protection, Permanent Preservation areas and Legal Reservation areas, the forestry exploitation, the supply of forestry raw material, control of the forestry products origin, and prevention and control of forestry fires.

The commercial plantation will neither be implemented in a Permanent Preservation area, nor in Legal Reservation areas. Moreover, the project activity seeks to preserve and restore such areas.

It is important to highlight that the project proponents are aware about the possibility of progress on the regulations during the project crediting period and are committed to follow

all current and future demands and requirements, and to the sustainable management principles.

- Law n. 8.171/1991: National regulation for agriculture and instruments for agriculture, livestock, aquiculture and forestry; in Regulating Standard N. 31: provides for the use, storage, transport, and disposal of pesticides and other agricultural inputs.

All the chemical products used in the forest plantations are authorized for eucalyptus cultivation and have MSDS available in the area. Their handling is done according to its instructions and can be applied only after Preliminary Risk Analysis and with the proper Individual Protection Equipment.

No one is allowed to enter or remain at site during the spraying, only the applicator, who must wear appropriate clothing for the procedure, which is dully sanitized, maintained and preserved before each application. No mechanized equipment is used for application

The products are kept in their original packaging, and in accordance with Suzano's regulatory norms and procedures, which are not reused: they must be correctly destined for the reception point.

- SDA Ordinance No. 91, of November 30, 1992: Establishes norms for the importation, use, and commercialization of dodecachlor-based formicide baits.

Currently Suzano S.A. has opted to abstain from using dodecachlor-based formicide baits on the Company's premises.

- Law no. 10,711, of August 5, 2003: Provides on the National Seed and Seedling System and makes other provisions.

The production of seedlings by Suzano is compliant with the National Registration of Seeds and Seedlings - Renasem as a seedling producer (art. 8). The cultivars are registered in the RNC. IPB2: 15534; AEC0144: 21874; FJ460: 36383. The seedlings transported are tagged with invoices, which contain appropriate information.

- Law No. 12651 of May 25, 2012 - Brazilian Forest Code: Determines the maintenance of preserved or restoring native vegetation in areas around springs or perennial water sources, whatever their topographical situation, with a minimum radius of fifty meters (permanent preservation area - APP). The intervention or suppression of native vegetation in APPs can only be carried out with specific authorization from the competent environmental agency, and in the cases of public

utility, social interest or low environmental impact provided for in this law. This law allows the continuity of "agrosilvopastoral", ecotourism, and rural tourism activities in Permanent Preservation Areas in rural areas consolidated until July 22, 2008. In this case, the reforestation rules established in articles 61-A to 65 must be observed. The reforestation of Permanent Preservation Areas, in the scope of the Environmental Regularization Programs - PRA, must be done according to the criteria of article 19 of Decree No. 7.830, of October 17, 2012

The project proponent maintains the 50 meters required by law, as outlined under section 1.3. Rural Environmental Registration (CAR) was conducted for Suzano's properties and can currently be verified in the Sicar[11] database, where all national CAR registrations can be accessed.

The legal reserve and permanent preservation areas are defined and identified during the micro-planning stage of each property. The project is based on environmental zoning, environmental legislation, and the principles of forest certification. The inscription or update of the CAR will be made after the micro-planning of the area is carried out. At this step, it is identified any RL and APP deficits by satellite images, with the support of GIS tools, images obtained by UAVs (Unmanned Aerial Vehicle) and field visits.

The next step is to define the medium and long-term actions, in order to make the necessary adjustments to the Permanent Preservation Areas - APP and Legal Reserve – RL, in compliance with the Brazilian Forestry Code. Suzano also has an Environmental Restoration Program, recognized as one of the largest biodiversity conservation and environmental restoration strategies in the country. This program prioritizes the areas declared as Permanent Preservation Areas and Legal Reserves on its properties in all the Brazilian biomes.

- INMETRO Ordinance No. 547, October 25, 2012: Outlines the requirements for obtaining and maintaining the Sustainable Forest Management Unit certificate.

Suzano S.A. declares its commitment to conduct its forest stewardship system following the Principles and Criteria of FSC and NBR 14.789 CERFLOR Forest Stewardship Certifications, with the objective of providing long-term sustainability for its business, continuous improvement of its activities and performance, as well as the adoption of environmentally correct and socially responsible practices.

[11] Serviço Florestal Brasileiro. Consultar demonstrativo do CAR. Available at: <https://www.car.gov.br/#/consultar>. Last Access: 25th November 2021.

- State Law no. 90, of June 2nd, 1980, provides on atmospheric emissions - fixed sources. Refrain from releasing any substance into the air or polluting the environment without the proper authorization from the environmental agency (art. 3).

Any release of substances will only be carried out upon authorization from the environmental agency. The company does not perform open air burning in urban or densely populated areas.

- State Law no. 214, of March 25, 1981: Prohibits cutting trees from species in extinction and makes other provisions to avoid cutting the following endangered plant species: Prunus avium (angelim or cherry tree); Tabebuia spp (ipê); Caesalpinia ferrea (ironwood); Cedrela fissilis (cedar); Paratecoma peroba (peroba); Platypodium elegans (faveiro); Phillanthus nobilis (castle); Piptadenia spp (angico); Astronium urundeuva (aroeira). Note: The extraction of the species can only be done by means of a Cutting License provided by the competent environmental agency, under the terms of Decree No. 1,017, dated May 19, 1981.

The project activities will not cut the species cited in the norm. If necessary, due to force majeure, it will only be done with the express authorization of the licensing environmental agency and documentation will be dully shared with the VVB.

- Law 2.406, of January 29, 2002: establishes the State Policy for Water Resources, creates the State System for the Management of Water Resources, and makes other provisions.

The project proponent's water resources capture activities are considered exempt from licensing. Anyhow, the activities are registered, the information is evaluated and approved by IMASUL, and the declaration of user of water resources (DURH) is issued.

- Decree No. 13,977, of June 5, 2014: Provides for the Rural Environmental Registry of Mato Grosso do Sul, the MS More Sustainable Program, and other provisions.

Suzano has a policy of not suppressing native vegetation, both inside and outside Permanent Preservation Areas. In case the company should undertake any intervention, it will occur upon express authorization from the environmental agency. The Rural Environmental Registry (CAR) was conducted for the project properties, as mentioned above.

- CBMMS Technical Standard n. 45, of 2021: provides for forest fire prevention and combat measures.

Suzano has a modern fire monitoring system, controlled by the Forestry Security area. This system counts with different tools, such as forest monitoring towers that collect data for fire risk monitoring. The field teams work in full synergy with the system operators allowing for an almost immediate intervention in fire occurrences[12].

The Company has trained firefighters, a fleet equipped with firefighting kits, as well as water trucks and a CAF truck (compressed air foam). Suzano also works with the engagement of the neighboring communities through the Floresta Viva Program, which establishes communication channels so that anyone can indicate where there are fire spots on their plantations.

- IMASUL Ordinance n. 912, of June 02, 2021: Implements the Electronic Environmental Licensing system in the scope of the Environmental Institute of Mato Grosso do Sul.

Obligations verified and fulfilled. All processes susceptible to protocol via e-licensing are requested digitally and will be made available for the VVB assessment

1.15 Participation under Other GHG Programs

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

The project has not been registered, nor is it seeking registration under any other GHG program.

1.15.2 Projects Rejected by Other GHG Programs

The project has not been rejected by any other GHG program.

1.16 Other Forms of Credit

1.16.1 Emissions Trading Programs and Other Binding Limits

The activities that result on the GHG removal of the project are not included in any other emission trading programs or mechanisms that includes GHG allowance trading.

[12] SUZANO. Relatório 2020. Available at: <https://r2020.suzano.com.br/wp-content/uploads/2021/05/RelatorioSuzano2020.pdf>. Last access on 12th May 2022.
SUZANO. Central de Indicadores – Informações consolidadas base 2020. Page 252. Available at: <https://centraldeindicadores.suzano.com.br/wp-content/uploads/2021/05/Central-de-Indicadores-Suzano-2020_port.pdf>. Last access on 12th May 2022

1.16.2 Other Forms of Environmental Credit

The activities that result on the GHG removal of the project has not sought for, nor is it interested in any other forms of environmental credit.

1.17 Sustainable Development Contributions

1.17.1 Sustainable Development Contributions Activity Description

The Project is responsible for more than just carbon fixation through reforestation. It is in line with the Brazilian NDC, which has a specific topic for the forestry and land use change sectors[13]. The project is aligned to the following points:

- Enforcement of the forestry code: The project considers efforts on conservation and restoration of RLs and APPs.
- Afforestation and reforestation of 12 million Ha of forest until 2030: This project consists of ARR activities implementation.
- Enlarge the sustainable management with native vegetation system scale: The project encompasses native vegetation restoration.

The project is also in line with the SDGs[14]. A percentage of the profits will be directed to the development of social activities:

- No Poverty (1): The Inclusive Recycling project, to be implemented, targets people in social vulnerability conditions and under the poverty line to generate more income and strengthen the recycling cooperative structure. The Nursery Seedlings project, Rural and Territorial Development Program and Hives Program also contributes to this SDG.
- Zero Hunger (2): The Rural and Territorial Development Program and Food and Income project promotes agroecological production, broadening the products range, improving food quality and the associations revenue. The program also aids Milk producers, helping to develop the milk and meat quality, and to distribute it. It also built a facility for processing the milk and helps delivering milk and yogurt on supermarkets and local schools.
- Quality Education (4): The Educational Program is dedicated to reducing scholar inequalities, ensuring students regular presence, broadening the content learned at school and engaging with parents. The Artful Women project targets local women in vulnerability areas, to increase their income and help them to enter the market with craft and sewing activities. The Hands-On project focus on the same public, providing training on bakery skills.

[13] MMA. **REDD+ e a NDC do Brasil, 2019**. Available at: < http://redd.mma.gov.br/pt/redd-e-a-indc-brasileira>. Last Access: 20th October. 2021.

[14] IPEA. **ODS – Metas Nacionais dos Objetivos de Desenvolvimento Sustentável.** 2018. Available at: < https://www.ipea.gov.br/portal/images/stories/PDFs/livros/livros/180801_ods_metas_nac_dos_obj_de_desenv_susten_propos_de_adequa.pdf>. Last access: 20th October 2021.

- Gender Equality (5): The Good Agent project provides training to prevent sexual violence against minors and elimination of violence against women.
- Decent Work and Economic Growth (8): The Capacitation on the gastronomic sector project targets local community to provide training in cook related opportunities. The Inclusive Recycling, the Rural and Territorial Development Program and the Nursery Seedlings projects also contributes for this SDG.
- Sustainable Cities and Communities (11): The Circular Economy project creates a new source of revenue for local families, where the residues are transformed into fertilizers.
- Responsible Consumption and Production (12): The Inclusive Recycling project and Circular Economy project also contributes for this goal.
- Climate Action (13): The project activity contributes for this goal, because of the emission removals promoted by the project.
- Life on Land (15): The project activity contributes for this goal, because of native restoration activity. In addition, the Nursery Seedling project will supply native species for the regeneration activities. The local fauna and flora are also frequently.

1.17.2 Sustainable Development Contributions Activity Monitoring

Section to be completed on the following monitoring report, after 2023.

Table 1: Sustainable Development Contributions

Row number	SDG Target	SDG Indicator	Net Impact on SDG Indicator	Current Project Contributions	Contributions Over Project Lifetime
15)	13.0	Tonnes of greenhouse gas emissions avoided or removed	Implemented activities to increase	To be completed for the validation of this report	To be completed for the validation of this report

1.18 Additional Information Relevant to the Project

Leakage Management

The leakage assessment for this grouped project is determined as per AR-TOOL15, an A/R Methodological tool for the "Estimation of the increase in GHG emissions attributable to displacement of pre-project agricultural activities in A/R CDM project activity", which sets out a procedure for assessing and estimating the increase in GHG emissions resulting from displacement of pre-project agricultural activities from the project boundary.

As previously outlined, the project area from both project activities are characterized as degraded pasture or sandy areas, hence, no crop cultivation activities would be displaced by the first group of instances. Grazing activities are also unlikely to be displaced by the project. The Phyto physiognomy of the area indicates that these areas had not been managed for a few years, given the state of the grassland seen at the areas. This is likely considered since Suzano bought the areas, no grazing activities were conducted at the project site.

The displacement of cattle activity is also unlikely. As will be discussed under the additionality analysis, cattle ranching is significantly more attractive financially than any forestry activity and face no barrier for its implementation. A recent study by IHS Markit shows that leasing areas for Forestry usage was on average 27% more expensive than for cattle ranching nationally, for the year of 2020[15]. This corroborates the real scenario where it's highly unlikely that a forestry activity could displace cattle ranching.

Furthermore, the land typically becomes available to the market when the family that owns the property is no longer interested in the cattle ranching business, usually when younger members are seeking better opportunities at bigger cities.[16] More recently, with the expansion of Commodity production areas, there has been a considerable increase in pastureland prices in the region which has provided additional financial incentives to sell the properties.[17]

[15] IHS Markit, 2020. **Arrendamento de terras.** Semestral Report - 25th edition. Available at: <https://fnpstore.commercesuite.com.br/arrendamento-ct-34-349650.htm>. Last access: 20th October 2022.

[16] Maria Telma de Aquino Rodrigues, Araújo, C. de A., Deneson Oliveira Lima, & Conceição Maria Dias de Lima. (2020). Êxodo Rural: perspectivas dos jovens sobre a vivencia em meio rural. *Diversitas Journal*, *5*(2), 729–738. Available at: <https://doi.org/10.17648/diversitas-journal-v5i2-777>. Last access: 12th May 2022

[17] Sauer, Sérgio e Leite, Sergio Pereira. Expansão agrícola, preços e apropriação de terra por estrangeiros no Brasil. Revista de Economia e Sociologia Rural [online]. 2012, v. 50, n. 3 [Acessado 22 Outubro 2021] , pp. 503-524. Available at: <https://doi.org/10.1590/S0103-20032012000300007>. Epub 02 Out 2012. ISSN 1806-9479. Last access: 12th May 2022.

In addition, Suzano will develop a series of activities with local community and stakeholders which will assure best job opportunities, health, and educational conditions, and inform the population on how to develop more sustainable activities, including cattle ranching.

Commercially Sensitive Information

There is no commercially sensitive information omitted from the public Project Description by the project proponents.

Further Information

There is no further relevant information to be included about the project.

2 SAFEGUARDS

2.1 No Net Harm

Section to be completed for the validation and verification analysis

2.2 Local Stakeholder Consultation

Section to be completed for the validation and verification analysis

2.3 Environmental Impact

Section to be completed for the validation and verification analysis

2.4 Public Comments

Section to be completed for the validation and verification analysis

2.5 AFOLU-Specific Safeguards

Section to be completed for the validation and verification analysis

3 APPLICATION OF METHODOLOGY

3.1 Title and Reference of Methodology

The project activity will apply the AR-ACM0003 – Afforestation and Reforestation of Lands Except Wetlands, version 2 – A/R Large-scale Consolidated Methodology. The tools and modules to be applied are:

- VCS AFOLU Non-Permanence Risk Toll (T-BAR) – version 4.0
- AR-TOOL02: "Combined tool to identify the baseline scenario and demonstrate additionality in A/R CDM project activities" – version 1;
- AR-TOOL14: "Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities" – Version 04.2;
- AR-TOOL12: "Estimation of carbon stocks and change in carbon stocks in dead wood and litter in A/R CDM project activities" – Version 03.1;
- AR-TOOL08: "Estimation of non-CO2 greenhouse gas (GHG) emissions resulting from burning of biomass attributable to an A/R CDM project activity" – version 04.0.0;
- AR-TOOL15: "Estimation of the increase in GHG emissions attributable to displacement of pre-project agricultural activities in A/R CDM project activity" – version 02.0.
- AR-TOOL16: "Tool for estimation of change in soil organic carbon stocks due to the implementation of A/R CDM project activities" – version 01.1.0

3.2 Applicability of Methodology

The AR-ACM0003 methodology is applicable under the following conditions:

Condition	Project adherence
The land subject to the project activity does not fall in wetland category	Although the state of Mato Grosso do Sul has a biome categorized as wetland, the Pantanal, the project is located in the Cerrado biome, which has a vegetation similar to a savannah and has no flooded area or characteristics that could be categorize as wetland. Therefore, the project does not fall into the wetland category and the methodology is applicable.
Soil disturbance attributable to the project activity does not cover more than 10 per	As indicated under the section 1.13, the project is not located at lands containing

cent of area in each of the following types of land, when these lands are included within the project boundary: (i) Land containing organic soils; (ii) Land which, in the baseline, is subjected to land-use and management practices and receives inputs listed in appendices 1 and 2 to this methodology.	organic soils. In fact, results show that the soil composition at the project area contains more than 80% of sand, which means it is a sandy soil. In addition, more than half of the cultivated pasture area in the Cerrado biome is degraded or in the process of degradation[18]. The emission of CO2 in degraded pasture is one of the great bottlenecks of Brazilian cattle breeding. Degraded pastures have shown a reduction in carbon content in the soil[19] and consequently this reduction leads to the emission of CO2 into the atmosphere, because it loses significant amounts of organic matter[20]. It is estimated that 60% to 90% of the carbon content of the soil is released into the atmosphere in degraded pastures, compared to a rate of 12 to 25% in a common scenario[20]. The baseline of the project is defined as extensive cattle ranching. Nevertheless, it is important to highlight that Suzano thrives to implement best practices available at the market, in line with FSC and other quality standards. Only the subsoiling procedure can cause disturbance to the soil, where a stem is

[18] VOLPE, E.; MARCHETTI, M. E.; MACEDO, M. C. M.; ROSA Jr., E. J. Renovação de pastagem degradada com calagem, adubação e leguminosa consorciada em Neossolo Quartzarênico. Acta Scientiarum Agronomy, Maringá, v. 30, n. 1, p. 131-138, 2008. Last access: 25th November 2022

[19] FIGUEIREDO, E. B.; PANOSSO, A. R.; BORDONAL, R. O.; TEIXEIRA, D. D. B.; BERCHIELLI, T. T.; LA SCALA, N. Soil CO_2–C emissions and correlations with soil properties in degraded and managed pastures in southern Brazil. Land Degradation & Developrent, v.28, p. 1163-1492, 2016. Last access: 25th November 2022

[20] EMBRAPA - Desafios e perspectivas na recuperação de pastagens degradadas na Amazônia, Belém, 2015. Last access: 25th November 2022

	used. Furthermore, it is based on the principle for minimum cultivation, where soil disturbance is as minimal as possible, maintaining all plant residues as coverage. Subsoiling activities are also monitored and controlled.

Applicability conditions of T-BAR – "AFOLU non-permanence risk-tool"

Condition	Project adherence
There are no internal applicability conditions	As outlined under section 3.2 of the VCS Standard v4.2, all AFOLU projects must apply the non-permanence risk tool. This project applies the tool, as required by the standard.

Applicability conditions of AR-TOOL02 – "Combined tool to identify the baseline scenario and demonstrate additionality in A/R CDM project activities"

Condition	Project adherence
Forestation of the land within the proposed project boundary performed with or without being registered as the A/R CDM project activity shall not lead to violation of any applicable law even if the law is not enforced.	The project does not lead to violation of any applicable law, as identified in section 1.14.
This tool is not applicable to small - scale afforestation and reforestation project activities.	This is not a small-scale A/R project as per the definitions of the CDM: "SSC A/R CDM project activity: An afforestation or reforestation measure, operation or action: (a) Where the average projected net anthropogenic GHG removals by sinks for each verification period do not exceed eight

	kilotonnes of carbon dioxide equivalent per year; and (b) Which is developed or implemented by low-income communities and individuals as determined by the host Party." The projected net anthropogenic GHG removals exceed 8.000 tCO2e/year, and is not developed by a low-income community and individuals.

Applicability conditions of TOOL14 – "Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities"

Condition	Project adherence
This tool has no internal applicability conditions	-

Applicability conditions of TOOL12 – "Estimation of carbon stocks and change in carbon stocks in dead wood and litter in A/R CDM project activities"

Condition	Project adherence
This tool has no internal applicability conditions	-

Applicability conditions of TOOL16 – "Tool for estimation of change in soil organic carbon stocks due to the implementation of A/R CDM project activities"

Condition	Project adherence
The areas of land to which this tool is applied: (i) Do not fall into wetland category; or	The tool will not be applied for the first project activity, only for the plantation of native vegetation. Nevertheless, as mentioned previously under the AR-ACM0003 applicability

(ii) Do not contain organic soils as defined in "Annex A: glossary" of the IPCC GPG LULUCF 2003; (iii) Are not subject to any of the land management practices and application of inputs as listed in the Tables 1 and 2;	conditions, this project does not fall into wetland category, nor does it contain organic soil or is subject to the land management practices mentioned in the tables 1 and 2.
The A/R CDM project activity meets the following conditions: (i) Litter remains on site and is not removed in the A/R CDM project activity; and (ii) Soil disturbance attributable to the A/R CDM project activity, if any, is: • In accordance with appropriate soil conservation practices, e.g. follows the land contours; • Limited to soil disturbance for site preparation before planting and such disturbance is not repeated in less than twenty years.	The tool will not be applied for the first project activity, as the harvest cycles are due to occur each seven years. It will only be applied for the second project activity, of native revegetation, were no disturbances to the soil will take place after planting the species. As per the project management practices, the litter is not removed from the site, and the soil disturbance is limited, given the project implements the best practices available at the market for soil preparation, plantation and harvest.

Applicability conditions of TOOL08 – "Estimation of non-CO2 GHG emissions resulting from burning of biomass attributable to an A/R CDM project activity"

Condition	Project adherence
The tool is applicable to all occurrence of fire within the project boundary.	This project activity does not include burning biomass. In addition, all due fire prevention measures are provided by Suzano. In case of a loss event caused by fire, a loss event report will be dully submitted to Verra as per the VCS Standard.

	In this case, this tool will be applied.
Non-CO2 GHG emissions resulting from any occurrence of fire within the project boundary shall be accounted for each incidence of fire which affects an area greater than the minimum threshold area reported by the host Party for the purpose of defining forest, provided that the accumulated area affected by such fires in a given year is ≥5% of the project area.	This project activity does not include burning biomass. In addition, all due fire prevention measures are provided by Suzano. In case of a loss event caused by fire, a loss event report will be dully submitted to Verra as per the VCS Standard. In this case, given the threshold of fire occurrence in ≥5% of the area is met, this tool will be applied.

Applicability conditions of TOOL15 – "Estimation of the increase in GHG emissions attributable to displacement of pre-project agricultural activities in A/R CDM project activity"

Condition	Project adherence
This tool is not applicable if the displacement of agricultural activities is expected to cause, directly or indirectly, any drainage of wetlands or peat lands.	This project activity does not cause the displacement of agricultural activities. As previously mentioned, the activity implemented before the project was extensive cattle ranching. The project also does not cause directly or indirectly the drainage of wetlands or peat lands. Although the state of Mato Grosso do Sul has a biome categorized as wetland, the Pantanal, the project is located in the Cerrado biome, which has a vegetation similar to a savannah and has no flooded area or characteristics that could be categorize as wetland.

3.3 Project Boundary

Table 2 - Sources of GHG emissions included in or excluded from the first project activity boundary (eucalyptus plantation)

Source		Gas	Included?	Justification/Explanation
Baseline	Above and below ground biomass	CO_2	Yes	This is the major carbon pool subject to project activity as per the ACM0003 definitions. This pool is represented by isolated trees and grassland, which will be harvested for implementing this project. For each area where suppression of sparse trees mayl be necessary, the suppression license will be provided for VVB assessment, and such carbon stock will be dully accounted by the project.
		CH_4	No	This is not a requirement of the methodology
		N_2O	No	This is not a requirement of the methodology
	Dead wood and litter	CO_2	Yes	Carbon stock in this pool is expected to increase due to implementation of the project activity. The tools for accounting such pools have no internal applicability conditions.
		CH_4	No	This is not a requirement of the methodology
		N_2O	No	This is not a requirement of the methodology
	Soil Organic Carbon	CO_2	No	This carbon stock is optional as per the ACM0003. Thus, it is not applicable for this project activity as per the TOOL16 which defines the condition of “Limited to soil disturbance for site preparation before planting and such disturbance is not repeated in less than twenty years”.
		CH_4	No	This is not a requirement of the methodology
		N_2O	No	This is not a requirement of the methodology
	Burning of woody biomass	CO_2	No	CO2 emissions due to burning of biomass are accounted as change in carbon stock
		CH_4	No	Burning of woody biomass for the purpose of site preparation, or as part of forest management, is allowed under this methodology. The project proponents will not burn biomass for site preparation or forest management.
		N_2O	No	Burning of woody biomass for the purpose of site preparation, or as part of forest management, is allowed under this methodology. The project proponents will not burn biomass for site preparation or forest management.

Source		Gas	Included?	Justification/Explanation
Project	Above and below ground biomass	CO_2	Yes	This is the major carbon pool subject to project activity as per the ACM0003 definitions. This pool is expected to increase with the implementation of the project activity.
		CH_4	No	This is not a requirement of the methodology
		N_2O	No	This is not a requirement of the methodology
	Dead wood and litter	CO_2	Yes	Carbon stock in this pool is expected to increase due to implementation of the project activity. The tools for accounting such pools have no internal applicability conditions.
		CH_4	No	This is not a requirement of the methodology
		N_2O	No	This is not a requirement of the methodology
	Soil Organic Carbon	CO_2	No	This carbon stock is optional as per the ACM0003. Thus, it is not applicable for this project activity as per the TOOL16 which defines the condition of "Limited to soil disturbance for site preparation before planting and such disturbance is not repeated in less than twenty years".
		CH_4	No	This is not a requirement of the methodology
		N_2O	No	This is not a requirement of the methodology
	Burning of woody biomass	CO_2	No	CO2 emissions due to burning of biomass are accounted as change in carbon stock
		CH_4	No	Burning of woody biomass for the purpose of site preparation, or as part of forest management, is allowed under this methodology. The project proponents will not burn biomass for site preparation or forest management.
		N_2O	No	Burning of woody biomass for the purpose of site preparation, or as part of forest management, is allowed under this methodology. The project proponents will not burn biomass for site preparation or forest management.

Table 3 - Sources of GHG emissions included in or excluded from the second project activity boundary (native vegetation plantation)

Source		Gas	Included?	Justification/Explanation
Baseline	Above and	CO_2	Yes	This is the major carbon pool subject to project activity as per the ACM0003 definitions. This pool is represented by

Source		Gas	Included?	Justification/Explanation
	below ground biomass			isolated trees and grassland, which will be harvested for implementing this project. For each area where suppression of sparse trees mayl be necessary, the suppression license will be provided for VVB assessment, and such carbon stock will be dully accounted by the project.
		CH_4	No	This is not a requirement of the methodology
		N_2O	No	This is not a requirement of the methodology
	Dead wood and litter	CO_2	Yes	Carbon stock in this pool is expected to increase due to implementation of the project activity. The tools for accounting such pools have no internal applicability conditions.
		CH_4	No	This is not a requirement of the methodology
		N_2O	No	This is not a requirement of the methodology
	Soil Organic Carbon	CO_2	Yes	Carbon stock in this pool is expected to increase due to implementation of the project activity. The tool for accounting this pool have internal applicability conditions that are met for this second project activity in specific, and will only be accounted for under areas where native vegetation is being implemented.
		CH_4	No	This is not a requirement of the methodology
		N_2O	No	This is not a requirement of the methodology
	Burning of woody biomass	CO_2	No	CO2 emissions due to burning of biomass are accounted as change in carbon stock
		CH_4	No	Burning of woody biomass for the purpose of site preparation, or as part of forest management, is allowed under this methodology. The project proponents will not burn biomass for site preparation or forest management.
		N_2O	No	Burning of woody biomass for the purpose of site preparation, or as part of forest management, is allowed under this methodology. The project proponents will not burn biomass for site preparation or forest management.
Project	Above and below	CO_2	Yes	This is the major carbon pool subject to project activity as per the ACM0003 definitions. This pool is expected to increase with the implementation of the project activity.
		CH_4	No	This is not a requirement of the methodology

Source		Gas	Included?	Justification/Explanation
	ground biomass	N_2O	No	This is not a requirement of the methodology
	Dead wood and litter	CO_2	Yes	Carbon stock in this pool is expected to increase due to implementation of the project activity. The tools for accounting such pools have no internal applicability conditions.
		CH_4	No	This is not a requirement of the methodology
		N_2O	No	This is not a requirement of the methodology
	Soil Organic Carbon	CO_2	Yes	Carbon stock in this pool is expected to increase due to implementation of the project activity. The tool for accounting this pool have internal applicability conditions that are met for this second project activity in specific, and will only be accounted for under areas where native vegetation is being implemented.
		CH_4	No	This is not a requirement of the methodology
		N_2O	No	This is not a requirement of the methodology
	Burning of woody biomass	CO_2	No	CO2 emissions due to burning of biomass are accounted as change in carbon stock
		CH_4	No	Burning of woody biomass for the purpose of site preparation, or as part of forest management, is allowed under this methodology. The project proponents will not burn biomass for site preparation or forest management.
		N_2O	No	Burning of woody biomass for the purpose of site preparation, or as part of forest management, is allowed under this methodology. The project proponents will not burn biomass for site preparation or forest management.

The project does not account for sources of GHG emissions, given no burning of biomass will occur during the project activity.

Furthermore, as per AR-ACM0003, GHG emissions resulting from removal of herbaceous vegetation, combustion of fossil fuel, fertilizer application, use of wood, decomposition of litter and fine roots of N-fixing trees, construction of access roads within the project boundary, and transportation attributable to the project activity shall be considered insignificant and therefore accounted as zero.

The map below illustrates the initial areas considered for the project implementation.

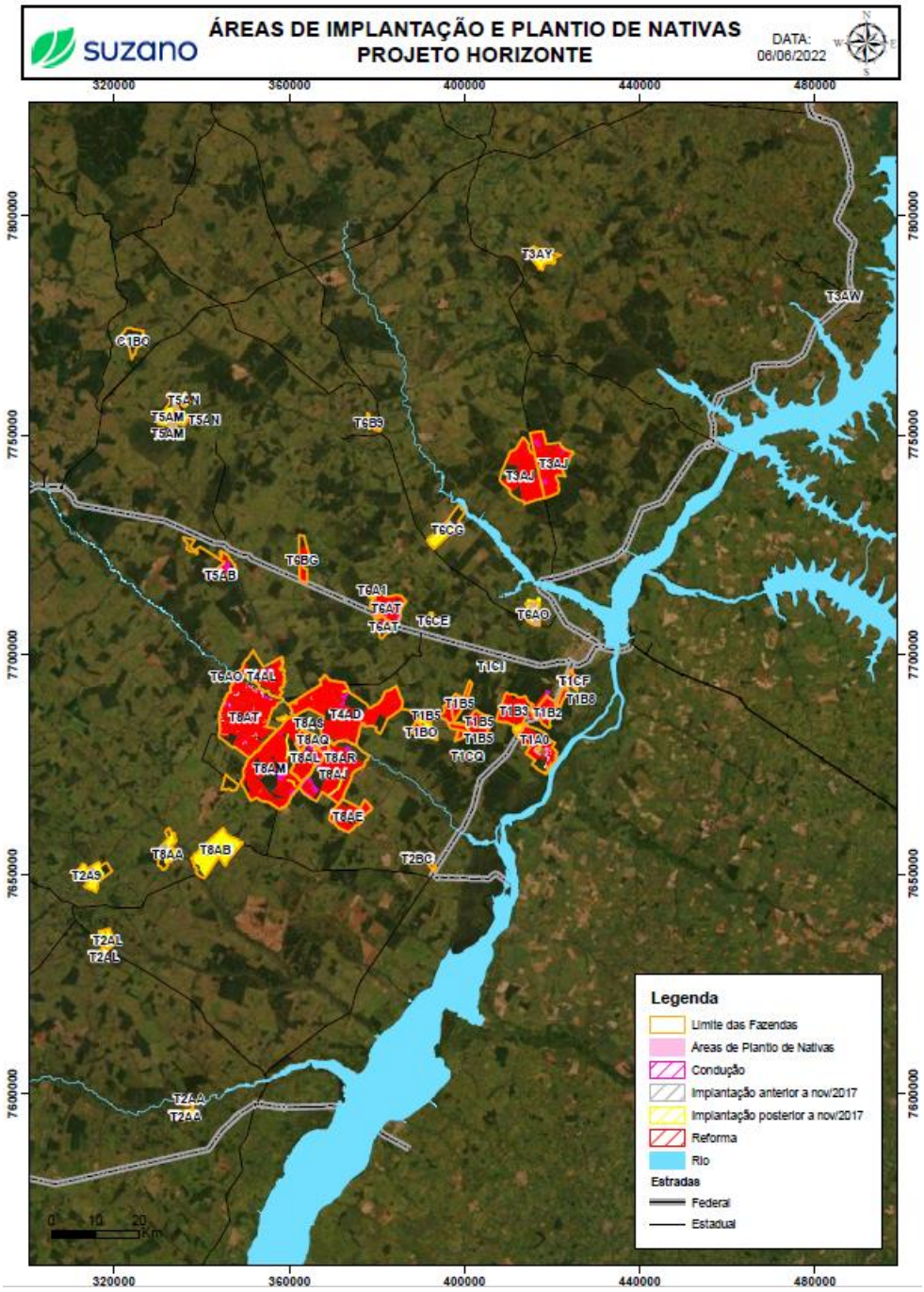

Figure 52 – Project activity map, where the project area is highlighted in yellow and light pink.

3.4 Baseline Scenario

For the project activity to be implemented, the baseline scenario is identified on section 3.5, following the steps outlined at the AR-TOOL02, "Combined tool to identify the baseline scenario and demonstrate additionality in A/R CDM project activities".

The base scenario is constituted by large areas of grassland with sparse trees in landscape. The pasture areas, mostly occupied by extensive cattle raising, consist of raising cattle on pasture. This is generally done without major investments and with the occupation of large areas, considered ideal for the so-called beef cattle.[21]

The main incentives of extensive cattle raising are the low investment needs, although there are still expenses with mineral replacement and supplementation, depending on the type of animal being raised. The disadvantages are the need to occupy large areas, which can generate environmental problems because of the availability of pasture and the lack of cattle feed in this type of breeding system. Historically, cattle ranchers in the region use the practice of burning the vegetation to clean the soil, either to prepare for planting or to form pasture.[22]

The use of fire to "prepare" the soil causes negative environmental impacts, since it eliminates fundamental nutrients for any vegetative crop, such as potassium and phosphorus, kills microorganisms that help the development of plants, reduces the humidity of the soil and facilitates the process of soil degradation. Also worth mentioning are the problems of air pollution and even the pollution of springs, groundwater, and rivers by the ashes.[22]

Over the years, abusive extensive cattle raising has caused a serious process of pasture degradation characterized by: deterioration of the pasture; small patches of land erosion; and reduced soil fertility (decrease in macro and micro trace elements and organic matter). Pasture degradation originates from factors such as: cattle feeding pressure (during grazing, cattle ingest large amounts of green fodder, which contains nutrients derived from the soil); lack of rational soil fertility management, which is a necessary practice to replenish the

[21] LANGE, Anderson; DANTAS, Jeferson; FREDDI, Onã S.; et. al. Degradação do solo e pecuária extensiva no norte de Mato Grosso. Available at: <https://periodicoscientificos.ufmt.br/ojs/index.php/nativa/article/view/6838>. Last Access on 26 Nov. 2021.

[22] ARAUJO, Fernando M.; SILVA; Janete R.; COSTA, João V.S.. As queimadas e sua relação com o desmatamento no bioma cerrado. Available at: <https://www.researchgate.net/profile/Janete_Rego/publication/333450782_AS_QUEIMADAS_E_A_SUA_RELACAO_COM_O_DESMATAMENTO_NO_BIOMA_CERRADO/links/5cee8befa6fdcc791692bcdb/AS-QUEIMADAS-E-A-SUA-RELACAO-COM-O-DESMATAMENTO-NO-BIOMA-CERRADO.pdf>. Last access: 26th Nov. 2021.

nutrients extracted from the soil by grazing; cattle trampling, affecting areas where pasture rotation is not practiced, which leads to reduced vegetation cover, exposing the soil to rainfall and subsequent erosion and exhaustion of the superficial fertile layer; the shrinking of the original tree cover as the tree plants present in the pastures are seen as competitors for light, nutrients, and forage water. For this reason, there is a tendency to eliminate the tree component from the landscape, reducing soil resistance to erosion and causing increased evaporation of water present in the soil.[23]

This is the configuration of the landscape prior to the start of project activities.

3.5 Additionality

The AR-TOOL02, "Combined tool to identify the baseline scenario and demonstrate additionality in A/R CDM project activities", version 01 is used for the assessment of the additionality and identification of the baseline. Considered that the second project activity would not take place without the first project activity, and that they are conducted in neighbor farms, or even in the same farm, only one additionality assessment will be developed for both project activities. Considered the project activities apply the same methodology and compose different instances, this approach is in line with the VCS Standard v 4. paragraph 3.5.5.

The applicability conditions for the tool are detailed under section 3.2 and dully met.

The additionality and baseline identification must follow the steps:

STEP 0. Preliminary screening based on the starting date of the A/R project activity

STEP 1. Identification of alternative scenarios

STEP 2. Barrier analysis

STEP 3. Investment analysis (if needed)

STEP 4. Common practice analysis

STEP 0. Preliminary screening based on the starting date of the A/R project activity

[23] NOGUEIRA, Deise C. S.; TAVANTI, Renan F. R.; MONTANARI, Rafael; et. Al. Variabilidade espacial da emissão de CO2 em sistema silvipastoril e pastagem degradada na região do Cerrado. Available at: <http://cadernos.aba-agroecologia.org.br/index.php/cadernos/article/view/6278/2380>. Last access: 26th Nov. 2021.

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

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

Outcome:

Although the start date (in 2017) is before the project registration date, the project proponents have been considering credits revenue for its commercial plantation activities since 2017, when a prior consideration letter was submitted to the CDM board[24], proving its intention in registering a project and consideration of the credit's revenue. It is important to highlight that the entity name registered accounts for Fibria Celulose S/A, which was initially in charge of developing the project and was incorporated by Suzano in 2018 having the operation at the project area and city where the project is located continue under similar circumstances.

In addition, the start date of the project activity is of 02 November 2017, after 31 December 1999, as required by the AR-TOOL02. Detailed information about the acquisition of each specific area was provided to the VVB for a better assessment and detailed at section 1.7.

STEP 1. Identification of alternative scenarios to the proposed A/R project activity

This step serves to identify alternative land use scenarios to the proposed CDM project activity that could be the baseline scenario, through the following sub-steps:

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

Identify realistic and credible land-use scenarios that would have occurred on the land within the proposed project boundary in the absence of the afforestation or reforestation

[24] CDM Prior Consideration Registry. Available at: <https://cdm.unfccc.int/Projects/PriorCDM/notifications/index_html>. Last access: 26th November 2021

project activity under the Verified Carbon Standard (VCS). The scenarios should be feasible for the project participants or similar project developers taking into account relevant national and/or sectoral policies and circumstances, such as historical land uses, practices and economic trends.

Outcome:

SCENARIO 01: Continuation of extensive cattle farming

The first alternative land use scenario is the permanence of extensive cattle ranching in degraded grasslands, in continuation of the pre-project land use. The agricultural establishments in the state of Mato Grosso do Sul total an area of 30.5 million hectares, where 60.4% are occupied by natural and planted pastures, used mainly for cattle production. The state accumulates 19.5 million heads of cattle, representing 11.3% of the national cattle herd (172.7 million heads of cattle)[25].

The grasslands used for cattle raising were originally occupied by the Cerrado, which, after the process of deforestation or suppression of vegetation, were converted to pasture. This deforestation process is still in force in Brazil. In 2019, an estimated 1.29 million ha were deforested, of which 33.5% occurred in the Cerrado biome[1]. The indiscriminate advance of the agricultural frontier for production, especially soybeans and cattle raising, is currently the main threat to Brazilian Cerrado.

Therefore, it can be concluded that livestock farming is characteristic for Mato Grosso do Sul and for the whole country. It is clearly established in the regional economy. Nevertheless, according to MapBiomas[1], the total area destined for cattle ranching at the city where the project is located was over 2,187,900 ha in 2017, and is credible to assume that the project area could be destined for such activity, considered this is the previous land use. Based in a recent study by Ferreira, the proportional estimated costs for this activity would be of R$ 1,369.57 per ha, composed by R$ 558.87 of variable costs, and R$ 810.70 of fixed costs[26].

Hence, the alternative Scenario 01 is deemed as a plausible alternative land use scenario to the project activity.

[25] IBGE. Resultados definitivos Mato Grosso do Sul. Available at: <https://censos.ibge.gov.br/agro/2017/templates/censo_agro/resultadosagro/pdf/ms.pdf>. Last Access: 26th November 2021.

[26] FERREIRA, Robson Leandro. Avaliação Economico-Financeira de um sistema de gado de corte em região leiteira de Minas Gerais. UFRRJ: 2019. Available at: <https://tede.ufrrj.br/jspui/bitstream/jspui/5125/2/2019%20-%20Robson%20Leandro%20Ferreira.pdf>. Last access: 14th July 2022.

SCENARIO 02: Afforestation of the land within the limits of the Project carried out without registration as an AFOLU VCS project activity

Scenario 02 represents the afforestation of the land within the limits of the Project carried out without being registered as an AFOLU VCS project activity, considering not only the eucalyptus and native vegetation planting activities, but with the implementation of the social activities that are additional to what Suzano is used to do.

In Brazil, the planted tree sector has been an important indicator of the economic, social and environmental development, since it promotes local economic change, offers new job opportunities and generates income for the population. Additionally, it contributes to climate change adaptation, mitigation and the provision of ecosystem services.

Usually, the wood produced by commercial plantations is consumed by the industrial sector of pulp and paper, as a source to renewable energy production through biomass, to produce charcoal, to produce furniture and to be used as an input to the construction sector.

In 2019, the total area of planted trees totaled 9.0 million hectares in Brazil, which is an increase of 2.4% compared to 2018 (8.79 million hectares, considering the adjustment according to the new methodology)[27].

Nevertheless, revegetation of degraded also occur at the project country, even if not in such a high frequency. To promote this activity, several guides for restoring native vegetation were published, considering the Biome particularities. [28,29]

The costs for implementing such activities are estimated as R$ 10,998.31/ha per cutting cycle, according to the Agrianual, published in 2020[30].

[27] *IBÁ – Indústria Brasileira de Árvores; Relatório 2020, ano base: 2019. Brasília – DF; 2020, 66p. Last Access: 26th November 2021.*

[28] KUHLMANN, Marcelo; RIBEIRO, José Felipe. Recomposição da Vegetação Nativa no Bioma Cerrado. EMBRAPA, 2011. Available at: < https://www.infoteca.cnptia.embrapa.br/infoteca/bitstream/doc/1135031/1/Recomposicao-da-vegetacao-nativa-do-bioma-cerrado-Felipe.pdf>. Last Access: 08th of July, 2022.

[29] DURIGAN, Giselda; et. al. Manual para Recuperação da Vegetação de Cerrado. São Paulo: SMA, 2011. Available at: < https://www.icmbio.gov.br/educacaoambiental/images/stories/biblioteca/permacultura/Manual_recuperacao_cerrado.pdf>. Last access: 08th of July, 2022.

[30] Agrianual. Anuário da Agricultura Brasileira, 2020. Available at: < http://www.agrianual.com.br/>. Last access 14th July 2022.

Therefore, Scenario 02 is deemed as a plausible alternative land use scenario to the project activity.

SCENARIO 03: Land use within the project boundary for soy farming

Scenario 03 refers to the destination of the areas within the project boundary to soy production. The expansion of soybean cultivation in Brazil, particularly in the Cerrado, happened because of a series of technical and political factors. These range from biotechnological innovations, such as the production of cultivars that are adapted to the edaphoclimatic conditions of this biome and its variations, to the inevitable participation of the State as a promoter and articulator of private agents, all due to the external demand for commodities[31].

In the period between January and November 2020, soybean exports in the state of Mato Grosso do Sul reached an export value of (US$ FOB) 1.62 billion, an increase of 42.4% compared to 2019[32]. To demonstrate the evolution of soybean crop expansion in the state, **Erro! Fonte de referência não encontrada.** represents the spatialization of data that conclusively attest to the expansion of the planted area in the last decades in the state. This predatory form of expansion is consistent with the dynamics of modern production; there is still the advance of crops over portions of native vegetation, as well as a more technological management of crops, increasing their average yield per hectare through the massive use of fertilizers and pesticides[33].

[31] *FACCIN, A. C. T. M. Complexo soja no Mato Grosso do Sul: competitividade regional e vulnerabilidade territorial. Tese (Doutorado em Geografia). Faculdade de Ciências Humanas, Universidade Federal da Grande Dourados. Dourados, 2017. Available at: <https://repositorio.ufgd.edu.br/jspui/handle/prefix/390>. Last Access: 26th November 2021.*

[32] *Governo Federal – Ministério da Indústria, Comércio Exterior e Serviços. ComexVis Available at: <http://comexstat.mdic.gov.br/pt/comex-vis>. Last Access: 26th November 2021.*

[33] CAMPOS, Margarida C.. Modernização da Agricultura, Expansão da soja no Brasil e as transformações socioespaciais no Paraná. Geografar Magazine, Curitiba, v. 6. N. 1. P. 161-191. June/2011. Available at: <https://revistas.ufpr.br/geografar/article/download/21808/14203>. Last Access: 26th November 2021.

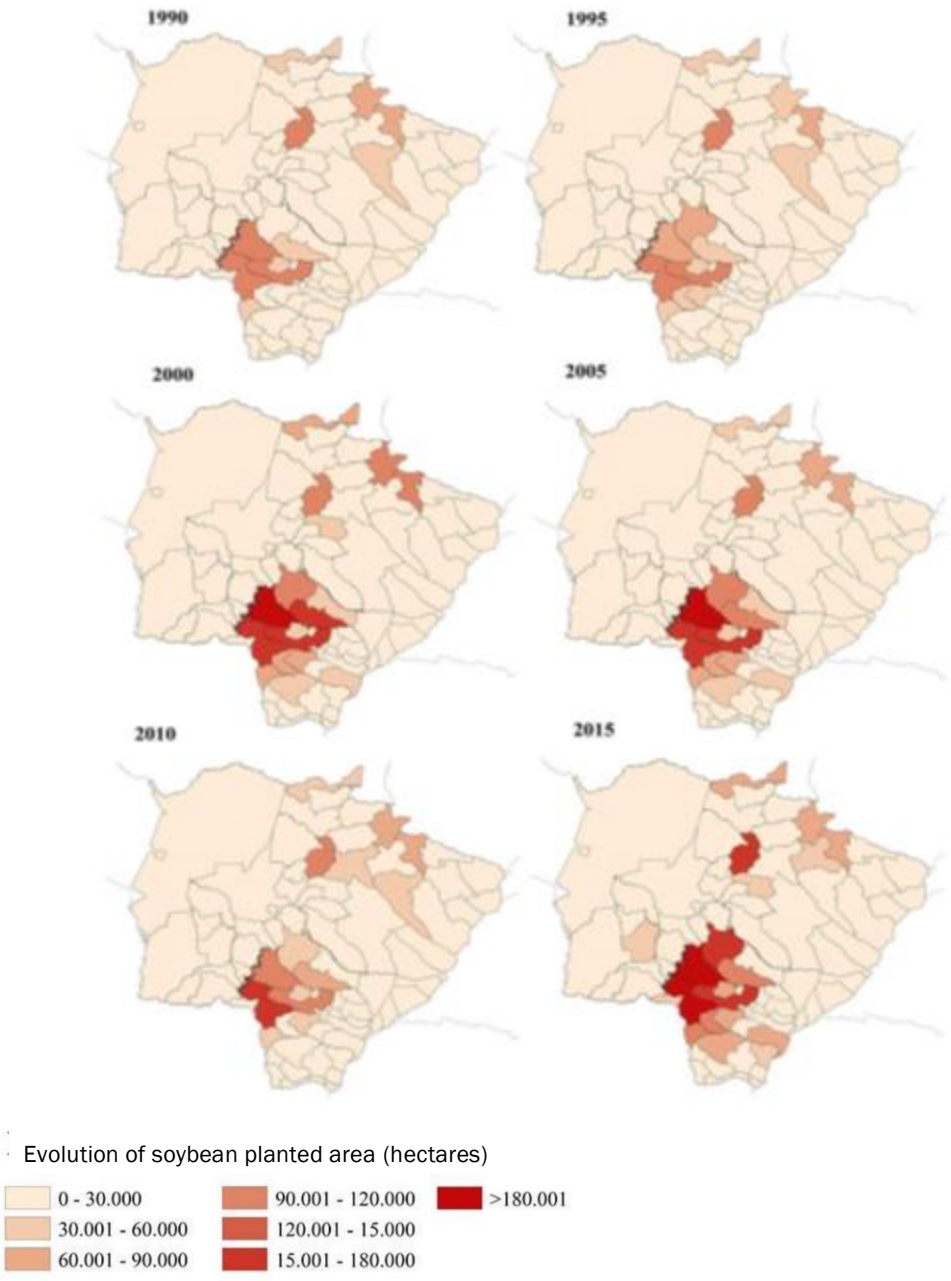

Figure 53 - Mato Grosso do Sul. Evolution of soybean planted area: 1990, 1995, 2000, 2005, 2010 and 2015.[31]

It is a fact that the expansion of commodity cultivation encounters few obstacles in frontier agricultural areas, suggesting that the growing volume of soybean production in the state rather occurs because of horizontal expansion (occupation of new areas) than vertical expansion (increase in yield).

Nevertheless, according to MapBiomas[1], the total area destined for soy farming at the city where the project is located was over 10,000 ha in 2017, and is credible to assume that the project area could be destined for such activity, considered this is the previous land use. The costs for implementing such activities are estimated as R$2,964.86/ha per cutting cycle, according to the Agrianual, published in 2020[30].

Although the cities where the project is located might not have been impacted by the increase of soy production at the state, this activity is still present at the region.[1] Therefore, Scenario 03 is deemed as a plausible alternative land use scenario to the project activity.

SCENARIO 04: Land use within the project boundary for sugar cane farming

Scenario 04 refers to the destination of the areas within the project boundary to sugar cane production. Although soy farming may be considered the most usual agricultural culture under the state of Mato Grosso do Sul, Sugar Cane production is the more common at the cities where the project is located.[1] The expansion of sugar cane cultivation in Brazil happened because of a series of technical and political factors. These range from technological innovations, such as the development of the mills to proper factories, to the implementation of laws to incentive alcohol and sugar cane production, the *Proalcool*.[34]

In the period between January and Semptember 2020, sugar exports (one of the main products of processing sugar cane) in the state of Mato Grosso do Sul grew almost 3.5 times if compared to the same period in 2019.[35] According to the IBGE, as highlighted by **Figure 54**, the state of São Paulo is the one who concentrates the major part of sugar cane production in Brazil, and due to the proximity of the cities where the project is located to the State, they also have sugar cane farms.[36]

[34] RODRIGUES, Gelze Serrat de Souza Campos; ROSS, Jurandyr Luciano Sanches. A trajetória da cana-de-açúcar no Brasil. EDUFU, 2020. Available at: <http://www.edufu.ufu.br/sites/edufu.ufu.br/files/edufu_a_trajetoria_da_cana-de-acucar_no_brasil_2020_ficha_corrigida.pdf>. Last access: 8th July 2022.

[35] ARMÔA, Marcelo. Indústria sucroenergética de MS amplia em 3.5 vezes o volume de açúcar exportado em 2020. SEMAGRO, 2020. Available at: < http://www.ms.gov.br/industria-sucroenergetica-de-ms-amplia-em-35-vezes-o-volume-de-acucar-exportado-em-2020/>. Last access: 8th July 2022.

[36] IBGE. Cerrado Paulista concentra 1/3 da área cultivada de cana-de-açúcar do país. 2017. Available at: < https://censoagro2017.ibge.gov.br/agencia-noticias/2012-agencia-de-noticias/noticias/19008-cerrado-paulista-concentra-1-3-da-area-cultivada-de-cana-de-acucar-do-pais>. Last access: 8th July 2022.

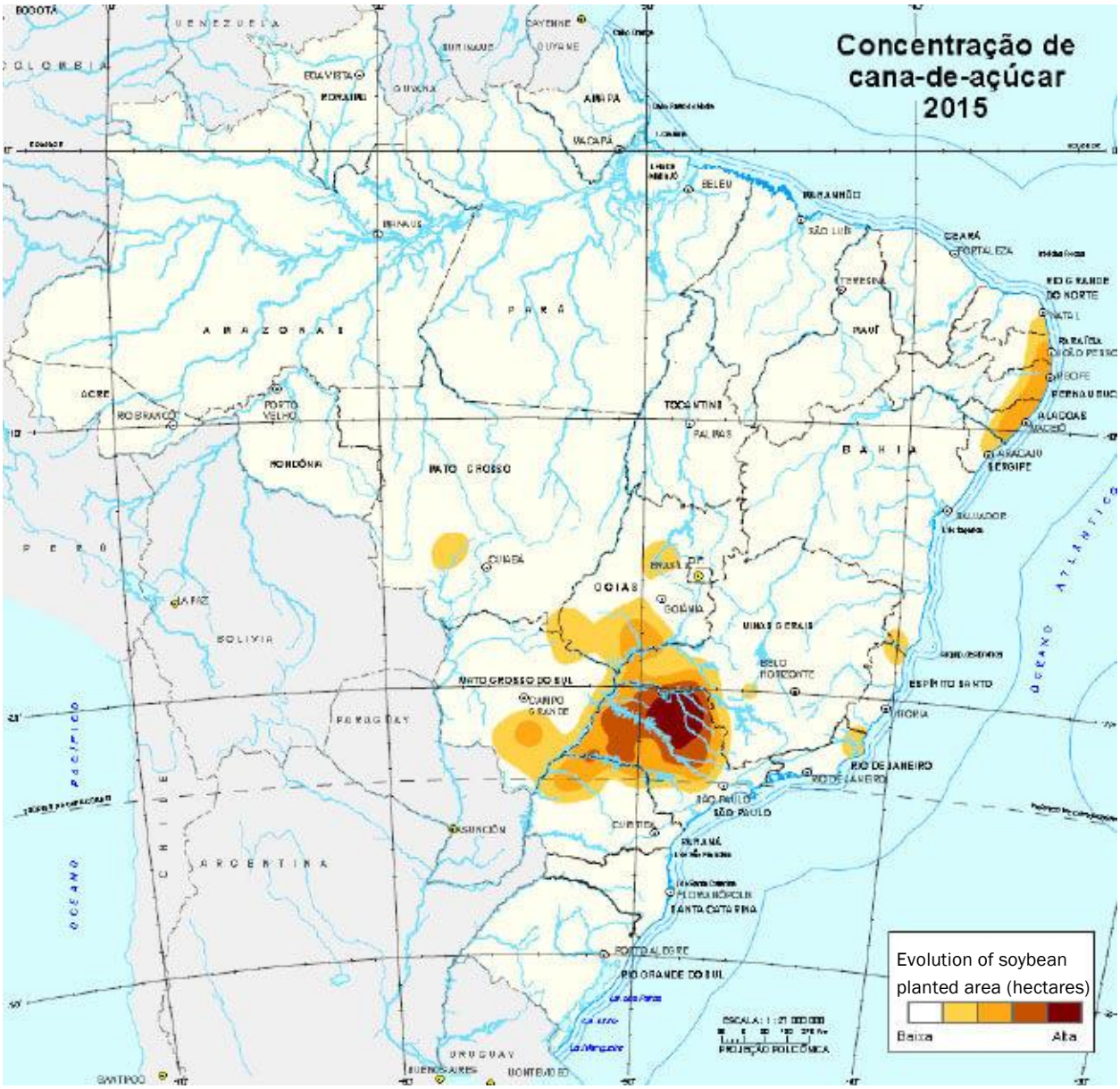

Figure 54 – Sugar cane concentration in 2015 [36]

Nevertheless, according to MapBiomas[1], the total area destined for sugar cane farming at the city where the project is located was over 30,800 ha in 2017, and is credible to assume that the project area could be destined for such activity, considered this is the previous land use. The costs for implementing such activities are estimated as R$40,399/ha per 5 year cutting cycle, according to the Agrianual, published in 2020[30].

Therefore, Scenario 04 is deemed as a plausible alternative land use scenario to the project activity.

Outcome:

As an outcome of sub-step 1a. the following alternative land uses were identified: Cattle farming, afforestation of the land within the limits of the project carried out without registration as an AFOLU VCS project activity, soy farming and sugar cane farming.

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

This step requires the demonstration that all land use scenarios identified in the sub-step 1a are in compliance with all mandatory applicable legal and regulatory requirements.

The implementation of all the scenarios is deemed legal considered the laws in Brazil for these activities. According to the Brazilian Forest Code, at least 20% of the area must be preserved. However, the implementation of such scenarios would take place on the other 80% of the areas of the farms. Therefore, all scenarios follow mandatory applicable legal and regulatory requirements. A list of other laws for executing such activities are listed below, however, they do not prevent the implementation of the scenarios.

SCENARIO 01: Continuation of extensive cattle farming

The applicable laws for the continuation of extensive cattle farming are:

- Law n. 6.938, from 31 August 1981, which states the necessity to register the activity under the Federal Technical Record, at the IBAMA, for potential pollutant activities;
- Law n. 12.727 from 17 October 2012, which states the standards for the protection of the vegetation, areas for permanent preservation, Legal reservation, as well other guidelines;
- Law n. 8.171/1991: National outlines for agriculture and instruments for agriculture, livestock, aquiculture and forestry.

SCENARIO 02: Afforestation of the land within the limits of the Project carried out without registration as an AFOLU VCS project activity

The most relevant regulations and laws for the forest plantation activity are mentioned at subsection 1.14.

SCENARIO 03: Land use within the project boundary for soy farming

The applicable laws for the continuation of extensive soy farming are:

- Law n. 12.727 from 17 October 2012, which states the standards for the protection of the vegetation, areas for permanent preservation, Legal reservation, as well other guidelines;
- Law n. 8.171/1991: National outlines for agriculture and instruments for agriculture, livestock, aquiculture and forestry;
- Law n. 13.366 from 1 December 2016: Guidelines for plantation and commercialization of the genetically modified soy production from 2004 and other guidelines;
- Law n. 5.025 from 19 July 2017: Sanitary measures for preventing, controlling and eradicating the Asian Soybean Rust and other guidelines;
- Law n. 11.105 from 24 March 2005: States the standards and guidelines for safety surveillance mechanisms of activities that involve Genetically Modified Organisms.

SCENARIO 04: Land use within the project boundary for sugar cane farming

The applicable laws for the continuation of extensive sugar cane farming are similar to soy farming:

- Law n. 12.727 from 17 October 2012, which states the standards for the protection of the vegetation, areas for permanent preservation, Legal reservation, as well other guidelines;
- Law n. 8.171/1991: National outlines for agriculture and instruments for agriculture, livestock, aquiculture and forestry;

- Law n. 8.817 from 15 January 2008: States about the phasing out of burning sugar cane straw;
- Law n. 11.105 from 24 March 2005: States the standards and guidelines for safety surveillance mechanisms of activities that involve Genetically Modified Organisms.

Outcome:

All scenarios are in accordance with applicable laws and regulations and would not be prevented from implementation. The alternative land use scenarios are Cattle farming, afforestation of the land within the limits of the project carried out without registration as an AFOLU VCS project activity, and soy farming.

STEP 2. Identification of barriers that would prevent the implementation of at *least one alternative land use scenarios*

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

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

Identify realistic and credible barriers that prevent realization of the land use scenarios identified in Sub-step 1b. The barriers should not be specific for the project participants but should apply to the proposed VCS project activity as such, even if similar project developers would have developed the project activity.

BARRIERS RELATED TO LOCAL TRADITION OF LAND USE:

Local tradition of land use is a barrier for the implementation of scenarios 02, 03 and 04, considered cattle ranching (scenario 01) is widely spread at the project region.

In the state of Mato Grosso do Sul, livestock and more recently also agriculture are essential to the state'' economy since it boosts the industrial sector and services.

Livestock farming is a cultural legacy in the region, which gave the state a prominent position among the other Brazilian federations, with the 5t^{h} largest effective herd in the country, reaching the mark of 19.5 million cattle heads and a production of 424

million liters of milk in the latter. It is an activity transmitted through generations of local producers.

During the last two decades, there has been an effective advance in the implementation of agricultural crops (soybean, corn, rice, etc.) and forest plantations.

According to the last agricultural census in the State of Mato Grosso do Sul, livestock represents 44.3% of land use, being the most representative activity, followed by agricultural crops with 11.8%, and by forest plantations, which represents only 3.3% of the land use in the State[37].

Although there is an initiative for implementing other activities in the agricultural sector, the current situation of land use in the State reflects, without objections, the inclination of the local tradition to the permanence of livestock, to the detriment of agricultural crops and even more so to the activity of reforestation.

Considered the trends for the cities where the project is located, cattle ranching represented 73.7% of areas occupied for agriculture, cattle ranching and other agricultural practices in 2017, before the project implementation, while eucalyptus plantations represented 14.8% of the area. In 2020, the most recent information available under the MAPBiomas, the numbers for cattle ranching were 71,0%, whereas for eucalyptus plantation the number was equal to 17,6%[38]. Hence, and in spite of the trends observed of increase to eucalyptus plantations and decrease on cattle ranching, it will still take years before other practices are to overcome the cattle ranching scenario, and it is an unlikely alternative to be materialized, even at the cities where the project activities are being implemented. Moreover, it is important to highlight that native vegetation area decreased since the project start date (from 2017 to 2020) in 2.7%. This is also an important aspect under second scenario, and corroborates the consideration that there are significant barriers considered local tradition of land use.

Therefore, the historical context and the strong local tradition suggests that the most likely land use scenario in the absence of the ARR Horizonte Carbon Project would be characterized by livestock farming. Hence, local tradition is considered a barrier for Scenario 02, 03 and 04.

[37] IBGE – Censo Agropecuário, Mato Grosso do Sul. Available at: <https://cidades.ibge.gov.br/brasil/ms/pesquisa/24/0>. Last Access: 26th November 2021.

[38] MAPBIOMAS, Coleção 6 (1985-2020). Available at: <https://mapbiomas.org/>. Last access: 18th March 2022.

Moreover, considered the size of the magnitude of the project, both activities to plant eucalyptus and recover native vegetation and the particularities of the social activities that will be implemented, local tradition is a strong barrier. As for the size and nature of the eucalyptus plantation project, no project this size would be observed on this area if not implemented by a robust company such as Suzano. In addition, local community had no experience to implement by itself the social activities planned for this project the size Suzano is planning. Nevertheless, it is not usual for the cities where the project is located to restore native vegetation outside RLs and APPs.

INSTITUTIONAL BARRIERS:

Institutional barriers are relevant for the second scenario, considered the number of incentive actions that have been developed for fomenting the other scenarios.

When reviewing the structure of the national agribusiness productive chain, it is noticeable that the State has a major role, which can clearly be attributed to the period known as the "modernization of agriculture". During that period, public policies were established seeking to intensify economic transactions through political and social discounts, whether in the commercial, financial or technological ambit, for the agricultural, industrial and service sectors.

Studies based on official data have highlighted the importance of State intervention in the process of transformation of the regions, which have been under analysis since 1970. For example, the implementation of Prodecer (Japan-Brazil Agricultural Development Cooperation Program of the Cerrado Region) was fundamental for the introduction of soybean cultivation and to attract farmers from other regions of the country.

Nevertheless, on a national level, it is important to mention the Proalcool program[34], which was implemented on the 70s, to promote the production of alcohol, which is based on sugar cane processing mainly, in order to provide an alternative for the exceeding sugarcane produced based on the demand for sugar. This initiative brought highly important technology advancements, not only for the sugar and alcohol industries, but also for vehicles, which had motors developed to work by alcohol as a fuel as well.

Despite the recent institutional uncertainty in the country, agribusiness in Brazil is recognized for its participation in the national economy, which safeguards its support even in times of institutional crisis. A survey by the National Confederation of

Agriculture and Livestock (CNA) shows that the Gross Value of Production in 2020 reached R$ 728.6 billion, which is the highest real figure in the history of the sector. Compared to 2019, the sector had an increase of 11.8%. Amid the pandemic, agribusiness is expected to account for 23.6% of the country's total GDP.

These statistics corroborate State initiatives to promote Brazilian agribusiness, such as the recent Agribusiness Law (Law No. 13,986/20), created on April 7, 2020, which deals with incentives created by the government to stimulate the sector after the Covid-19 pandemic. In a brief description, the Agribusiness Law presents legislative innovations in several areas of agribusiness, addressing topics ranging from financing to rural credit, which brings a relevant increase in legal security for domestic and foreign investors.

On the other hand, although Brazil has one of the world's largest forests, the Brazilian federal legislation still does not define planted forests, though the term is inserted in Decree No. 5,975/06, Law No. 11,284/06 and the current Forest Code No. 12,651/12. In fact, Brazil's current participation in the world market of forest products is the result of private initiative. There is an important gap to be filled by the State as an inducer of development, capable of planning and working on public policies aimed at fostering and financing the planted forest sector.

Based on the information exposed, it can be assessed that institutional interference has been and is still fundamental to agriculture and cattle ranching activities. Given its relative size to the country's economy, it is highly unlikely that this institutional support may be discontinued in the future. Thus, the lack of similar structures to the forestry sector are major setbacks for implementing such activities and can be defined as a barrier for the scenario.

In the last few years, the political scenario also testified how the rural entities gained power. Currently, the Agrobusiness Parliamentary front counts with over 280 politicians, from senators to deputies.[39]

Under the perspective that other activities receive support from the national and federal institutions, whereas the second scenario activities do not, the implementation of the project can face major setbacks. It takes a strong company to

[39] Frente Parlamentar da Agropecuária. Members. Available at: <https://fpagropecuaria.org.br/todos-os-membros/>. Last access: 29th November 2021.

implement a project the size of this project activity, so that institutional barriers may not prevent the implementation of the project.

TECHNOLOGICAL BARRIERS:

Technological barriers do impact the implementation of the Scenarios 02 and 03.

Access to technological inputs is strongly related to financial incentives for the modernization of agriculture and technology transfer. The profitable production of crops such as soybeans are closely linked to the implementation of such technologies.

Soy was commercially introduced in Brazil in the 1960s in Rio Grande do Sul and for the last 50 years it has expanded to all regions of the country. However, there are still two major bottlenecks regarding technological components which impact the profitability of agricultural crops: low productivity and high production costs).

The lower levels of productivity are related to the occurrence of the Asian rust disease, which fostered the Brazilian producers' choice to an intense use of fungicides. The control of the disease has been threatened by the progressive resistance of the fungus to agrochemicals, hence, efficiency has been lost during the last years, making it increasingly difficult to limit the damage caused by rust.

Another aspect related to the decrease in productivity is the spontaneous, or invasive, presence of weeds. To maintain high yields of commercial crops, there has been control of spontaneous species in order to avoid competition for environmental resources, or even to avoid reduction of the technical harvest coefficient and an increase in the percentage of impurity and humidity of grains.

In 2006, the first cases of resistance were detected, and since that date, resistant biotypes of Lolium multiforum (azevém), Digitaria insularis (capim-amargoso), Eleusine indica (capim-pé-de-galinha), and three species of buva (Conyza canadenses, Conyza sumatrensis and Conyza bonariensis) are present in the production areas. Areas infested with resistant weeds are more difficult to manage and have higher production costs. Productivity losses can vary depending on the species and the infestation but can reach 70% in the most serious cases. It is estimated that the current average cost of weed's resistance in Brazil is almost R$ 5 billion. When adding the losses from the competition, this value can reach R$ 9 billion annually.

Even with institutional incentives, it is important to highlight that technological setback is still present in soy farming to be able to treat and prevent such diseases. Weed competition is a great problem for soy farming, and has a technological barrier associated. Studies show that it could compromise up to 90% of the soy harvest, and its impacts can vary according to the edaphoclimatic conditions over the years, making it hard to foresee and to deal with[40].

The joint analysis of the limiting aspects for the implementation of soy farming corroborates the preference of rural producers in Mato Grosso do Sul to remain with the cattle ranching activities that are already consolidated in the region. These activities are under an extensive management that does not demand any kind of great technological commitment, instead of incurring the risks of producing soy and other grains which are extremely dependent on technological inputs, as previously explained. Hence the identification of the barrier for the third scenario.

However, the scenario for sugarcane farming is different from the soybean farming. As previously mentioned, the Proalcool program brought uncountable benefits for processing and destining the products of sugar cane, especially for increasing sugar cane production, modernization and expansion of distilleries, implement new industries and build storing facilities. This program also brought incentives to the production of ethanol, so that it could be used as a fuel for vehicles, or to be added to gas to power the same vehicles[34]. Under the light of such program, no institutional barriers could prevent the implementation of the scenario 04, only promote it.

The project activity presents a different scenario. Forest planting is not a traditionally widespread activity and demands previous technical knowledge about planning and cultivation techniques. The success of a forest plantation, whether for restoration or wood production, is closely related to the technical mastery of aspects such as the choice of species for cultivation, ecological suitability, management and conservation of soil for cultivation, silvicultural treatments suitable for the conduct of the species, management techniques, and harvesting. As a matter of fact, the project proponent had to develop a specific technological area to foster and develop better techniques

[40] Brighenti, Alexandre, et al. Períodos de convivência entre plantas daninhas e a cultura da soja; Available at: <https://www.scielo.br/j/pd/a/6k78YFNt5qJ5PxDPpkRd4vF/?format=pdf&lang=en >. Last access 05th July, 2022.

for planting Eucalyptus, which reinforces the low availability of information and technology at the market[41].

The logistics involved in harvesting and transportation operations are also critical for forest production, where all the operations involved must be optimized. The logistics aspects are mentioned in the Investment barrier analysis. Furthermore, to control for the activities to be carried out, it is necessary to know, with the greatest possible precision, the restrictions and alternatives inherent to each operation. The most common restrictions that involve such operations are, among several others, the slope of the land, planting spacing, volume of trees, management adopted, and power and productivity of the machines.

In addition to these aspects, the reforestation activity has additional costs compared to other agricultural activities, such as the removal of stumps after harvesting. This is an onerous activity necessary to convert the area into other uses after the rotation cycle, which makes the activity even less attractive to rural producers. Hence the identification of the barrier for the second scenario, not to mention the additional costs for restoring completely degraded areas with native vegetation, and the costs for implementing social activities.

Based on what has been discussed above, there is a clear barrier for producers to opt for cattle ranching and sugar cane plantations over soy plantations and forestation activities. For all the activities, it is necessary to mobilize a considerable number of resources, as well as technology and knowledge, which is scarcely available on the market.

INVESTMENT BARRIERS:

The lack of access to credit is a barrier for implementing the second scenario.

As previously mentioned, agribusiness in Brazil contributes significantly to the development and growth of the country by placing it in a prominent position, especially regarding food production and the export of primary products.

With the country achieving a higher market share in the world market for food and primary products, government investments in favor of rural producers are growing to

[41] SUZANO. Centro de Tecnologia da Suzano em Jacareí desenvolve projeto inovador de clones de eucalipto. 2020. Available at: <https://www.suzano.com.br/centro-de-tecnologia-da-suzano-em-jacarei-desenvolve-projeto-inovador-de-clones-de-eucalipto/>. Last access: 15th July, 2022

optimize their productive activities. Thus, through public policies, rural producers feel safer to make investments that allow for an increase in income.

A relevant factor when considering an investment is the return time of the amount invested. It is known that reforestation activities require a significant investment, which is determined according to the technical, operational, and economic planning of the enterprise. Assuming that the risks are overcome, planting needs a much longer period than the return of annual agricultural activities. When considering a short cycle for eucalyptus production, the financial return would be after 7 years. Meanwhile, the area is occupied without generating income.

In addition, in the last decade, the value of reforestation wood in general, oscillated below the Inflation, which denotes low wood prices and brings dissatisfaction to producers. Recent studies point out a trend of a reduction in wood prices following the supply growth, as it is a product substituted by native wood. [42]

For the eucalyptus forests in Mato Grosso do Sul, a relevant complication is the distance between the forests and the industries. A radius of 150 kilometers is usually a threshold from which the transportation of the raw material (wood) is no longer viable. Despite this, there are many planted forests located in areas of difficult access or with precarious roads, which makes the costs of bringing the raw material to the industries too expensive.[43]

Under such conditions, farmers are unlikely to take the risks and challenges of long-term investment, rather than continuing with a well-known land use activity, with higher financial returns that also occurs on a short-term horizon, which constitutes an investment barrier for forest plantations.

Moreover, it must also be taken into consideration the second project activity which is not to generate any profit besides the one from carbon credits revenue, and the importance of the social activities included under this project. Such activities would not be implemented by Suzano if the credits revenue were not a possibility. Although Suzano has the funds to implement such activities and did not have to find a lender,

[42] ALMEIDA, Jaqueline Sousa. Dinâmica temporal dos preços de madeira serrada de Eucalyptus sp. No estado de São Paulo. Available at: < https://www.eumed.net/rev/oel/2019/03/precos-madeira-serrada.html>. Last Access: 29th November 2021.

[43] ORTIGOZA, Francielly de S. S.; SENNA, Ricardo J.. Caracterização do segmento de florestas plantadas de eucalipto em Mato Grosso do Sul. Available at: <https://seer.sede.embrapa.br/index.php/RPA/article/download/1126/1001>. Last access: 29th November 2021.

it is not the standard procedure, and it had to develop a specific conception for such activities, and request for additional funds, considered the revenue of the credits.

These are unfavorable aspects to reforestation in the region where the present project will be implemented, the low price of wood added to the high costs of logistic operations and the direction of State incentives to competing activities, makes the activity far less attractive and, thus, in line with the generation of carbon credits.

BARRIERS BY SOCIAL CONDITIONS:

The lack of skilled and/or properly trained labor force can be a major setback for the Scenarios 02, 03 and 04.

Technology transfer in rural areas occurs through rural extension, whose main tool is technical assistance. This has been pointed out in several studies as one of the main bottlenecks for the implementation of new crops and technology among rural producers. Technical Assistance and Rural Extension Services do not reach all farmers, as the agricultural census points out. Technical guidance reaches only 22% of establishments, this indicates a serious failure in the transfer of technology to the rural environment. This gap in the technical assistance service is associated with staff shortages and the extinction of the Ministry of Agrarian Development, which was the governmental representative that would be responsible for managing rural extension policies at the federal level.

The success of a forestry or agricultural company also depends on professionals with adequate technical competence, capable of indicating solutions to challenges such as the absence of adequate infrastructure for production outflow, lack of fiscal incentives and instability of the foreign exchange market. These challenges highlight the importance of good management of all processes in the forest chain, from the planning stages, definition of the wood purchasing market, choice of the best suppliers of materials, and services and efficient control in the purchase of inputs. In eucalyptus production chain, for example, to preserve the quality of the logs, the cutting and delivery logistics for the industry must be just in time. For this, the planner must be equipped with solid information on the productivity of forests, quality, strategy, and logistics. In other words, the technical competence of the manager, such as the eucalyptus planted forests, is a determining factor as to whether the activity is bound to be successful and whether local labor force lacks skilled professionals for this position.

Another characteristic of the planted forest sector at the cities where the project is located is the need to improve the coordination issues, especially the alignment among agents for knowledge generation, planning and technology transfer to the local population, who traditionally does not have the knowledge for the proper development of activities other than cattle raising, highlighting the lack of qualified labor in the region.

The need for technical and highly specified knowledge is evident, as it is generally inaccessible to a rural producer simply interested in such activity. This is another reason for the rural producer in Mato Grosso do Sul to prefer to continue the use of land for livestock, rather than opting for activities such as reforestation or soybean plantations.

Moreover, Suzano has developed a training procedure in order to ensure all the workforce hired has the adequate skills and training for conducting their activities. This is needed considered the low availability of trained professionals where its activities are implemented.

Outcome:

Significant barriers have been identified for some of the scenarios identified on Step 1: Barriers related to local tradition of land use; Institutional barriers; Technological barriers; Barrier to investment and Barriers by social condition.

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

Determine which land use scenarios identified in the Sub-step 1b are prevented by at least one of the barriers listed in sub-step 2a. Substantiate, that the barrier identified as preventing realization of a land use scenario is valid and conclusive in the context of the land use scenario in question. The assessment of a barrier may take into account the level of access to and availability of information, technologies and skilled labour in the region where the planned VCS project activity is located. Eliminate these scenarios from further consideration.

If the land within the boundary of the proposed of the VCS project activity was at least partially forested since 31 December 1989 and the land is not a forest at the project start, identify reasons/actions/incentives that allowed for the past forestation and demonstrate that the current legal/financial or other applicable regulations or socio-economical or ecological or other local conditions have changed to the extent that allows for conclusion

that repetition of the forestation performed without being registered as the VCS project activity is not possible.

Include all land use scenarios that were identified in the Sub-step 1b and were not eliminated in the Sub-step 2b into the list of land use scenarios that are not prevented by any barrier.

The following table identifies which barrier applies to each scenario, as described under the sub-step 2.a:

SCENARIO ***BARRIER***	***SCENARIO 01:*** *Continuation of extensive cattle farming*	***SCENARIO 02:*** *Afforestation of the land within the limits of the Project carried out without registration as an AFOLU VCS project activity*	***SCENARIO 03:*** *Land use within the project boundary for soy farming*	***SCENARIO 04:*** *Land use within the project boundary for sugarcane farming*
Barriers related to local tradition of land use		*X*	*X*	*X*
Institutional barriers		*X*		
Technological barriers		*X*	*X*	
Barrier to investment		*X*		
Barriers by social conditions		*X*	*X*	*X*

Outcome:

Given the barriers identified for scenario 02, scenario 03 and scenario 04, only the first scenario is still applicable. Therefore, the list of land use scenarios that are not prevented by any barrier is composed by Scenario 01: Continuation of extensive cattle farming.

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

Apply the following decision tree to the outcome of sub-step 2b:

Is forestation without being registered as an A/R CDM project activity included in the list of land use scenarios that are not prevented by any barrier?

→ If yes, then: Does the list contain only one land use scenario?

→ If yes, then the proposed A/R CDM project activity is not additional.

→ If no, then continue with Step 3: Investment analysis.

→ If no, then: Does the list contain only one land use scenario?

→ If yes, then the remaining land use is the baseline scenario. Continue with Step 4: Common practice test

→ If no, then through qualitative analysis, assess the removals by sinks for each scenario and select one of the following options:

Option 1: Baseline scenario is the land use scenario that allows for the highest baseline GHG removals by sinks. Continue with Step 4: Common practice test,

Option 2: Continue with Step 3: Investment analysis.

Outcome:

The forestation without the AFOLU VCS project activity is not included in the list of land use scenarios not prevented by any barrier. The list contains only one scenario. Proceed to step 4.

STEP 3. Investment analysis

This step serves to determine which of the remaining land use scenarios identified in the Sub-step 2b is the most economically or financially attractive. For this purpose, an investment comparison analysis is conducted.

Sub-step 3a. Determine appropriate analysis method

Determine whether to apply simple cost analysis, investment comparison analysis or benchmark analysis. If the planned VCS project activity generates no financial or economic benefits other than VCS related income, then apply the simple cost analysis (Option I).

Otherwise, use the investment comparison analysis (Option II) or the benchmark analysis (Option III). Note, that Options I, II and III are mutually exclusive hence, only one of them can be applied.

Outcome:

Given the barrier analysis identifies only one alternative land use scenario, it is not necessary to proceed with step 3. However, as shown under the non-permanence risk, the activity does not present the most profitable scenario among the alternative activities identified. It is also important to highlight that the eucalyptus plantations have the highest payback period, considered the revenues from the activity will only occur after harvesting cycles, which are to take place 7 years after the planting activity.

Sub-step 3b. – Option II. Apply investment comparison analysis

Identify the financial indicator, such as IRR, NPV, payback period, cost benefit ratio most suitable for the project type and decision-making context.

Outcome:

Given the barrier analysis identifies only one alternative land use scenario, it is not necessary to proceed with step 3.

Sub-step 3c. Calculation and comparison of financial indicators (only applicable to options II and III)

Calculate the suitable financial indicator for the proposed VCS project activity without the financial benefits from the VCS and for all the land use scenarios that are not prevented by any barrier. Include all relevant costs (including, for example, the investment cost, the operations and maintenance costs), and revenues (excluding VCU revenues, but including subsidies/fiscal incentives where applicable), and, as appropriate, non-market cost and benefits in the case of public investors.

The following decision tree must be applied:

Is forestation without being registered as an A/R CDM project activity included in the list of land use scenarios that are not prevented by any barrier?

→ If yes, then: Has the proposed A/R CDM project activity a less favorable financial indicator (e.g. IRR), than at least one land use scenario that is not prevented by any barrier?

→ If yes, then select as the baseline scenario the land use scenario that allows for the highest value of the financial indicator (e.g. IRR).

Proceed to Sub-step 3d. Sensitivity analysis.

→ If no, then the proposed A/R CDM project activity is not additional.

→ If no, then: Select as the baseline scenario the land use scenario that allows for the highest financial indicator (e.g. IRR). Proceed to Sub-step 3d. Sensitivity analysis

Outcome:

Given the barrier analysis identifies only one alternative land use scenario, it would not be necessary to proceed with step 3. Nevertheless, it is important to highlight that eucalyptus plantations have longer payback than other activities[44]. In addition, as shown under the Non-permanence risk assessment, even when credits revenue is considered, the project payback would be in 10 years, which would be less financially attractive if compared to soy farming payback, which occurs within the first year of plantation.

STEP 4. Common Practice Analysis

Provide an analysis to which extent similar forestation activities to the one proposed as the VCS project activity have been implemented previously or are currently underway. Similar forestation activities are defined as that which 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, subject to further guidance by the underlying methodology. Other registered VCS project activities shall not to be included in this analysis. Provide documented evidence and, where relevant, quantitative information. Limit your considerations to any period since 31 December 1989.

[44] REIS, Julio Cesar dos; et. al. Sistema de integração lavoura-pecuária-floresta como estratégia de desenvolvimento sustentável no estado de Mato Grosso. CEPAL (Comissão Econômica para a América Latina e o Caribe das Nações Unidas), 2020. Please note that activities including forest implementation has higher payback than alternative scenarios as indicated under table 1. <https://archivo.cepal.org/pdfs/bigpushambiental/Caso72-SistemadeIntegracaoLavouraPecuariaFloresta.pdf>. Last access on 16 May 2022.

If forestation activities similar to the proposed VCS project activity are identified, then compare the proposed project activity to the other similar forestation activities and assess whether there are essential distinctions between them. Essential distinctions may include a fundamental and verifiable change in circumstances under which the proposed VCS project activity will be implemented when compared to circumstances under which similar forestations were carried out. For example, barriers may exist, or promotional policies may have ended. If certain benefits rendered the similar forestation activities financially attractive (e.g., subsidies or other financial flows) explain, why the proposed VCS project activity cannot use the benefits. If applicable, explain why the similar forestation activities did not face barriers to which the proposed VCS project activity is subject.

The eucalyptus plantation is not a common practice under the Mato Grosso do Sul state, given its small representativeness when land use is put into perspective. According to the last agricultural census, only 3,3% of the State area is dedicated to forest plantation, a small number when compared to cattle ranching and soy plantation, occupying 44,3% and 11% of the total area, respectively[37].

Also, the native revegetation activity is even more important when deforestation is put into perspective. Since the year of the project start date (2017) to 2020, almost 2.6% of the reminiscent natural vegetation area was deforested. It is also important to take into perspective that that the state has the highest deforestation rates under the Cerrado biome, which has been the second most impacted biome by deforestation in the country, with 33,5% of the deforested areas[1].

In the state of Mato Grosso do Sul there are three projects registered as ARR projects at the VCS database, these projects are in the municipalities of Costa Rica and Campo Grande, and near the Nascentes do Rio Taquari State Park and have the following similarity: being in the same state; having similar dimensions; being maintained by medium and small entrepreneurs.

However, whereas two of the mentioned registered projects consists in eucalyptus planting, the eldest one consists in recovering native vegetation. Differently, The ARR Horizonte Carbon Project, will be implemented in a strategic location and can be described as a bigger forestation project, with a proposed forestation area of 13,295 ha with eucalyptus plantations and 1,090 ha of native revegetation, on a higher

dimension than the other registered projects, which combined cover an area of 1,217 ha [45].

Furthermore, Suzano is of one of the largest companies in the Brazilian forestry sector, an important differential when compared to the entrepreneur profile of the aforementioned ARR projects. This initiative may represent the establishment of a new level for ARR projects in Brazil.

It is also worth mentioning that the way this project activity was designed is unusual even for the project proponent business, where it takes responsibility not only for planting the eucalyptus areas, but to restore native vegetation outside RLs and APPs, which compose the second project activity, and to recover the legally required areas, which are inside the RLs and APPs for the leased lands. Another great highlight of this project are the additional social activities, that will bring benefits to the local community.

The project will implement two main additional activities for enhancing the native environment:

1. Ecological Restoration: The program's purpose is to restore the ecological processes, which are responsible for the formation of a functional and sustainable forest. The activities are implemented at Permanent Preservation Areas (APP – *Área de Preservação Permanente,* in Portuguese) and at Legal Reserves (RL – *Reservas Legais,* in Portuguese), going further the legal requirements of protecting such areas, promoting the revitalization of such areas. In addition, Suzano also developed a procedure to identify and characterize the different Phyto physiognomies of the Cerrado biome, in order to implement more assertive activities for restoration of the areas. The program is based on the assumptions for an integrated management at the landscape scale and contributes for the enhancement of biodiversity and environmental services at the region, with the application of the following methodologies: planting seedlings of regional native species, conducting natural regeneration, controlling invasive species and isolating protected areas with passive restoration. The most adequate technical choice depends on environmental conditions of the areas where such activities are implemented, considered the regeneration potential, the presence of degradation factors and its historic, and the verification of the

[45] Verified Carbon Standard – Verra Registry. Please, search for Agriculture, Forestry and other land use at project type, ARR, Registered projects at Brazil. Available at: <https://registry.verra.org/app/search/VCS>. Last Access 23 Nov. 2021

development and results of activities that have already been implemented, through monitoring events. Suzano has committed to renew life and connect half a million hectares of prioritized areas for the conservation of biodiversity of the Cerrado, Atlantic Forest and Amazon biomes.

2. Environmental Monitoring: Suzano assesses the effect of its activities over the quality and quantity of hydrological resources, biodiversity, fauna and flora through a representative monitoring net, considered the scale and intensity of plantation activities, with pre-stablished periodicity, in order to better understand the impacts and implement new action plans, whenever deemed necessary.

This project will also enable the implementation of a series of social activities focused on meeting the needs of the communities surrounding the project, which would not take place without the credit's revenue from this project:

- Inclusive Recycling: This project's target is to implement activities that will promote the inclusion of the members of the recycling community, in a way to improve their income, and to develop, give strength and foster the organized production of cooperatives at the project region. The implementation of this project will contribute to the improvement of public health by helping the government to deal with solid waste, reducing the amount of waste disposed on the landfills. It will also include the individuals at the recycling chain and improve their income. This project targets individuals who lives under a social vulnerability condition.

- Native and ornamental seedlings nursery: This project will target families from the local community in nearby areas from the project implementation. The activity will be based on the implementation of a nursery of seedlings to provide the adequate species for implementing the second project activities, so to ensure the perpetuity of this business and enable project implementation. Nevertheless, ornamental species will also be included in this conception, so that local families can keep the nursery seedling running in a more financially stable condition. All the members of the local community involved in this project will be trained and given the needed resources.

To define which social activities should take place, Suzano's social development team did a thorough research to better understand the local community needs and what activities could benefit the community the most. Therefore, the project develops additional activities directly linked to the project activity that are unlikely to be found

in any other location, even when compared to operations from Suzano. The inclusion of new areas along the project lifetime can and should also bring other social activities to the area, based on the revenue of extra credits.

Outcome:

In addition to eucalyptus and native plantation not being a common practice, in Mato Grosso do Sul State, additional activities will be implemented through the credit's revenue. In doing so, besides removing and reducing carbon emissions, the project will enrich fauna and flora biodiversity, provide a safe habitat to local fauna, recover degraded areas, improve the soil condition, and reduce its erosion, increase water retention, and protect water resources, and improve the microclimate of the region by making local temperatures milder. Furthermore, it will reduce rural exodus through the creation of more job opportunities for local community in areas of economical vulnerability, improve life quality and reduce forest degradation and deforestation in the region.

The project can be considered unique by the way it has been designed, associating social activities to the project activity itself. No other project can be deemed similar to this configuration, even those already implemented by the project proponents and the one also under development by Suzano.

→ *If Step 4 is satisfied, i.e. similar activities can be observed and essential distinctions between the proposed VCS project activity and similar activities cannot be made, then the proposed VCS project activity is not additional. Otherwise, the proposed VCS project activity is not the baseline scenario and, hence, it is additional.*

No similar activity can be observed, this is not a common practice. The project is additional.

Outcome of "Combined tool to identify the baseline scenario and demonstrate additionality in A/R CDM project activities"

Step 0 provides the information to suffice the requirements for starting date of the Project Activity and previous consideration of credit's revenue.

Under Step 1, 4 alternative scenarios were identified: cattle ranching, soy farming the execution of the project without the benefit of carbon credits and sugarcane farming, and Step 2 identifies that only the cattle ranching scenario would not be prevented by any barriers identified. Hence, step 3 was not needed for this additionality assessment.

No similar activity can be observed as determined by Step 4, proving this is not a common practice activity.

Thus, the project is additional.

3.6 Methodology Deviations

No methodology deviations were applied.

4 ESTIMATED GHG EMISSION REDUCTIONS AND REMOVALS

4.1 Baseline Emissions

Section to be completed for the validation and verification analysis

4.2 Project Emissions

Section to be completed for the validation and verification analysis

4.3 Leakage

Section to be completed for the validation and verification analysis

4.4 Estimated Net GHG Emission Reductions and Removals

Section to be completed for the validation and verification analysis

5 MONITORING

5.1 Data and Parameters Available at Validation

Section to be completed for the validation and verification analysis

5.2 Data and Parameters Monitored

Section to be completed for the validation and verification analysis

5.3 Monitoring Plan

Section to be completed for the validation and verification analysis

6 ACHIEVED GHG EMISSION REDUCTIONS AND REMOVALS

6.1 Data and Parameters Monitored

Section to be completed for the validation and verification analysis

6.2 Baseline Emissions

Section to be completed for the validation and verification analysis

6.3 Project Emissions

Section to be completed for the validation and verification analysis

6.4 Leakage

Section to be completed for the validation and verification analysis

6.5 Net GHG Emission Reductions and Removals

Section to be completed for the validation and verification analysis

APPENDIX X

Section to be completed for the validation and verification analysis