MONITORING REPORT
CARBONO NASCENTES DO XINGU

Document Prepared By Instituto Socioambiental (ISA)

Project Title	Carbono Nascentes do Xingu
Version	V
Date of Issue	March 20th, 2023
Project Location	Brazil, Mato Grosso
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Project Lifetime	October 1st 2011 – October 1st 2042; 30 years after planting.
GHG Accounting Period	October 1st 2011 – October 1st 2042; 30 years after planting.
Monitoring Period of this Report	01 October 2017 - 26 August 2022
History of CCB Status	The Project was validated on October 17th, 2016.

	The Project 1st verification was issued on July 23rd, 2018. The current monitoring report correspond to the second verification.
Gold Level Criteria	Not applicable

Monitoring Period	Version	Date
2017 - 2022	0.1	26/08/2022
2017 - 2022	0.2	24/10/2022
2017 – 2022	0.3	11/01/2023
2017 – 2022	0.4	10/03/2023
2017 – 2022	0.5	17/03/2023

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1 SUMMARY OF PROJECT BENEFITS

This section highlights some of this project's important benefits. Section 1.1 (Unique Project Benefits) should be aligned with a project's causal model and is specific to this project. Section 1.2 (Standardized Benefit Metrics) is the same quantifiable information for all CCB projects. This section does not replace the development of a project-specific causal model or the monitoring and reporting of all associated project-specific impacts (positive and negative) in Sections 2-5 of this document.

1.1 Unique Project Benefits

Outcome or Impact	Achievements during the Monitoring Period	Section Reference	Achievements during the Project Lifetime
1) Dialogue between opposite groups that until then didn't relate to each other.	The strict relation between the Project and the strengthening of Xingu' Seed Network is proven by Projects' communities' objective (PDD) and other documents presented in Annex 13 Therefore, Xingu' Seed Network expressive growth in the current monitoring period, highly contributes to the construction of relationships between landowners, indigenous peoples and family farmers.	The section 4.1.1 describes the number of seed collectors of Xingu' Seeds Network, the number of landowners involved, and the amounts and price of seeds. Those points highlight the importance of the project for Xingu' Seed Network and,	Through the Campaign 'Y Ikatu Xingu, as consequence of landowner's seed demand and indigenous and family farmers' seed supply ,in the context of Seeds Network Xingu, a communication and a common interest was established in sectors that until then were antagonistic and did not dialogued - rural landowners and indigenous communities.

		indirectly, to the connection between antagonistic actors.	
2) Aggregate value to standing forests	The strengthening and development of the commercialization of seeds through Xingu' Seeds Network, promotes forest restoration activities in the scope of the 'Y Ikatu Xingu Campaign in general and of the Project Carbono Nascentes do Xingu, in particular, and so contribute to aggregate value to non-timber forestry activities, to native seeds, therefore, to standing forests, and as a consequence, to reduce deforestation pressure. During the current monitoring period, areas restored by the Project became seed collection areas and demonstrate high potential for those activities (Annex 6[1]), since most of species planted are commercialized within Xingu' Seed Network, as they were all planted with Seeds commerciliazed by the Network.	5.3	By promoting seeds' commercialization through Xingu's Seeds Network, the activities of forest restoration within the scope of the Campaign 'Y Ikatu Xingu in general and of the Project Carbono Nascentes do Xingu in particular, contributes to valuing forestry activities not related to logging companies, generating value to native seeds, aggregating value to forests and, indirectly contributing to reduce deforestation pressures.

[1] In Annex 6 a declaration signed by two seed' collectors is provided, to certificate that seed collection have occurred in the areas of the Project.

3) Development of forest restoration technique	The planting sites have demonstrated a very satisfactory development, in terms of structure and biodiveristy, ratifyng the success of the technique used in the project - mechanized planting of native seeds. Therefore, at the current monitoring period, the plantings work as demonstration sites of the applied technique, proving the reduced costs and maintenance involved among several other aspects, as elucidated in Annex 7, in which there are different scientific works conducted within the project areas .As demonstrated in climate monitoring, density of trees is high and the areas are stable, do not demanding maintenance.	3.1	The 'Y Ikatu Campaign Xingu has been working, since its implementation, developing planting techniques that could result in reduced costs and improved efficiency. The mechanized seed planting has been proven to be an excellent technique which has been improved over the years. The plantings carried out under the Project Carbono Nascentes do Xingu contribute to the development of forest restoration techniques in two directions: on one hand it increases the plantation scale, generating the conditions for technique' improvement. On the other hand, landowners incorporate it with their own knowledge and machinery usage, contributing with suggestions and to the improvement of the technique. This technique has been disseminated to other regions of Brazil, now present in more than 8,000 hectares under ecological restoration (www.caminhosdasemente.org.br)
4) Promotion to forest restoration practice and carbon market in Santa Cruz do Xingu Municipality.	The Project contributes to promoting the culture of forest restoration and carbon market in Santa Cruz do Xingu. Landowners who	The main indicator of that benefit, is the project developed by the AXS	The Project Carbono Nascentes do Xingu also contributes to the promotion of forest restoration' practice and carbon market' development in Santa

	participate in the project were able to understand the importance of riparian areas restoration to water conservation, the need of environmental regularization, and the opportunities and challenges of the carbon market. As a consequence, AXS has developed restoration projects without the participation of ISA and has negotiated a carbon contract directly with the buyer. Another positive sign is that the project team has been questioned by rural landowners who heard about the project and have interest in restoring areas, which is a permanent benefit of the Project. After Xingu Seed Network became an Association, it has contributed to the promotion of more than 7.000 ha of forest restoration trough the seeling of seeds, which was possible due to its grownth during the last years.	in august 2016. 4.3.1	Cruz do Xingu municipality. The landowners who participate the project became aware of riparian areas' importance to water conservation (in quantity and quality), about the need of proper environmental regularization and about carbon market opportunities and challenges. An example of that is that AXS is developing projects without ISA participation and negotiating a carbon contract directly with the buyer. In addition, landowners who don't participate the Project have approached the Project's team in the streets interested in restoring their riparian areas, led by the positive impacts related to the Project that they have perceived and heard about.
5)			

1.2 Standardized Benefit Metrics

Category	Metric	Achievements during Monitoring Period	Section Reference	Achievements during the Project Lifetime
GHG emission reductions & removals	Net estimated emission removals in the project area, measured against the without-project scenario	24.285,25 tCO_2	3.3.1	33.357,25 tCO_2
	Net estimated emission reductions in the project area, measured against the without-project scenario	Not applicable		Not applicable
Forest[2] cover	For REDD[3] projects: Number of hectares of reduced forest loss in the project area measured against the without-project scenario	Not applicable		Not applicable
	For ARR[4] projects: Number of hectares of forest cover increased in the project area measured against the without-project scenario	0	3.3	412,7[5] hectares
Improved land management	Number of hectares of existing production forest land in which IFM[6] practices have occurred as a result of the project's activities, measured against the without-project scenario	Not applicable		Not applicable
	Number of hectares of non-forest land in which improved land management has occurred as a result of the project's activities,	Not applicable		Not applicable

[2] Land with woody vegetation that meets an internationally accepted definition (e.g., UNFCCC, FAO or IPCC) of what constitutes a forest, which includes threshold parameters, such as minimum forest area, tree height and level of crown cover, and may include mature, secondary, degraded and wetland forests (*VCS Program Definitions*)
[3] Reduced emissions from deforestation and forest degradation (REDD) - Activities that reduce GHG emissions by slowing or stopping conversion of forests to non-forest land and/or reduce the degradation of forest land where forest biomass is lost (*VCS Program Definitions*)
[4] Afforestation, reforestation and revegetation (ARR) - Activities that increase carbon stocks in woody biomass (and in some cases soils) by establishing, increasing and/or restoring vegetative cover through the planting, sowing and/or human-assisted natural regeneration of woody vegetation (*VCS Program Definitions*)
[5] Currently, the total validated area of Carbono Nascentes do Xingu' Project is 412,7 hectares distributed in Xingu River Waterbasin, however the present Monitoring Report encompasses only the areas included in the first planting wave of the project, which corresponds to 180,7 hectares.
[6] Improved forest management (IFM) - Activities that change forest management practices and increase carbon stock on forest lands managed for wood products such as saw timber, pulpwood and fuelwood (*VCS Program Definitions*)

Category	Metric	Achievements during Monitoring Period	Section Reference	Achievements during the Project Lifetime
	measured against the without-project scenario			
Training	Total number of community members who have improved skills and/or knowledge resulting from training provided as part of project activities	204	2.2.13	293
	Number of female community members who have improved skills and/or knowledge resulting from training provided as part of project activities of project activities	85	2.2.13	126
Employment	Total number of people employed in project activities,[7] expressed as number of full time employees[8]	246,3	2.2.14	253,9
	Number of women employed in project activities, expressed as number of full time employees	9	2.2.14	13
Livelihoods	Total number of people with improved livelihoods[9] or income generated as a result of project activities	557	4.1.1	583
	Number of women with improved livelihoods or income generated as a result of project activities	365	4.1.1	365
Health	Total number of people for whom health services were improved as a	Data not available		Data not available

[7] Employed in project activities means people directly working on project activities in return for compensation (financial or otherwise), including employees, contracted workers, sub-contracted workers and community members that are paid to carry out project-related work.
[8] Full time equivalency is calculated as the total number of hours worked (by full-time, part-time, temporary and/or seasonal staff) divided by the average number of hours worked in full-time jobs within the country, region or economic territory (adapted from UN System of National Accounts (1993) paragraphs 17.14[15.102];[17.28])
[9] Livelihoods are the capabilities, assets (including material and social resources) and activities required for a means of living (Krantz, Lasse, 2001. *The Sustainable Livelihood Approach to Poverty Reduction*. SIDA). Livelihood benefits may include benefits reported in the Employment metrics of this table.

Category	Metric	Achievements during Monitoring Period	Section Reference	Achievements during the Project Lifetime
	result of project activities, measured against the without-project scenario			
	Number of women for whom health services were improved as a result of project activities, measured against the without-project scenario	Data not available		Data not available
Education	Total number of people for whom access to, or quality of, education was improved as a result of project activities, measured against the without-project scenario	40	4.1.1	93
	Number of women and girls for whom access to, or quality of, education was improved as a result of project activities, measured against the without-project scenario	14	4.1.1	35
Water	Total number of people who experienced increased water quality and/or improved access to drinking water as a result of project activities, measured against the without-project scenario	57 [10]	4.1.1	178 directly affected and every people that live in Xingu Waterbasin is indirectly impacted
	Number of women who experienced increased water quality and/or improved access to drinking water as a result of project activities, measured against the without-project scenario	7	4.1.1	22 directly affected and every women that live in Xingu Waterbasin is indirectly impacted
Well-being	Total number of community members whose well-being[11] was improved as a result of project activities	614	2.2.4 and 4.1.1	704

[10] The reduction in the number of people living in the farms is directly related to soybean culture, which requires less human labour, and so configures rural exodus tendency increase in the region.

[11] Well-being is people's experience of the quality of their lives. Well-being benefits may include benefits reported in other metrics of this table (e.g. Training, Employment, Health, Education, Water, etc.), but could also include other benefits such as empowerment of community groups, strengthened legal rights to resources, conservation of access to areas of cultural significance, etc.

Category	Metric	Achievements during Monitoring Period	Section Reference	Achievements during the Project Lifetime
	Number of women whose well-being was improved as a result of project activities	372	2.2.4 and 4.1.1	372

Category	Metric	Achievements during Monitoring Period	Section Reference	Achievements during the Project Lifetime
Biodiversity conservation	Change in the number of hectares significantly better managed by the project for biodiversity conservation,[12] measured against the without-project scenario	Carbono Nascentes do Xingu Project has already restored 180,7 hectares in Xingu River Waterbasin, activity that would not have occured in the absence of the project, since Mato Grosso State concentrates a high index of areas that are not restored according to law, namely Permanent Preservation Areas (APP) and Legal Reserve (RL)[13]. Xingu' Seed Network has already promoted the restoration of 7,4 thousand hectares[14]. As described in following sections, the streghtening of the Seed Network is strictly related to the Project.	3.3	The project have already promoted the restoration of 412,7 hectares within Xingu Waterbasin[15]

[12] Biodiversity conservation in this context means areas where specific management measures are being implemented as a part of project activities with an objective of enhancing biodiversity conservation.
[13] Source: Termômetro do Código Florestal (OCF). Available on: https://observatorioflorestal.org.br/avaliacao-do-codigo-florestal-2017-2020/?doing_wp_cron=1666379725.9798910617828369140625
[14] Available on: https://www.sementesdoxingu.org.br/historia-da-rede-de-sementes-do-xingu
[15] However, Xingu' Seed Network has already promoted the restoration of 7,4 thousand hectares Available on: https://www.sementesdoxingu.org.br/historia-da-rede-de-sementes-do-xingu

Category	Metric	Achievements during Monitoring Period	Section Reference	Achievements during the Project Lifetime
	Number of globally Critically Endangered or Endangered species[16] benefiting from reduced threats as a result of project activities,[17] measured against the without-project scenario	(2) Crypturellus parvirostris' population is carachterized as decreasing ; Tapirus terrestris (1) classified as vulnerable ; Priodontes maximus (1 or more) classified as vulnerable ; 2 groups of 'Macaw' [18]	5.3.1	3 species classified as endangered and 3 in some level of vulnerability - added to species of 'Macaw' that could not be identified in the field.

[16] Per IUCN's Red List of Threatened Species

[17] In the absence of direct population or occupancy measures, measurement of reduced threats may be used as evidence of benefit

[18] The region is habitat for different species of 'Macaw', and huge diversity of birds that are suffering from some level of threat. Since it was not possible to identify the proper scientific name of 21 birds species, it is not possible to consider those species in the list.

2 GENERAL

2.1 Project Goals, Design and Long-Term Viability

2.1.1 Implementation Schedule (G1.9)

The present document is constructed based on CCB Program Rules v3.1, and CCB Standards v3.1.

Date	Milestone(s) in the project's development and implementation
01-10-2011	Project's start date
01-10-2011 to 01-03-2012	Planting activities – Year 1
01-10-2012 to 01-03-2013	Planting activities – Year 2
01-10-2011 to 01-10-2016	Xingu's Seed Network Training
01-08-2012 to 01-03-2016	Forest Restoration Monitoring
02-03-2015 to 06-03-2015	Imaflora third part audition to CCB validation
17-10-2016	CCB validation issuance by Rainforest Alliance
11-09-2017 to 16-09-2017	1st Period - Climate, Community and Biodiversity Monitoring
01-11-2022 to 08-11-2022	2nd Period – Climate, Community and Biodiversity Monitoring

2.1.2 Minor Changes to Project Design (*Rules* 3.5.6)

Adoption of Chave et al. (2014)' allometric model for aboveground biomass

In the PDD, Chave et al (2005) allometric model was defined to be used for aboveground biomass estimation, however, in the last monitoring the allometric model developed by Chave et al in 2014 was adopted for aboveground biomass estimation. The most recent model development was based in a bigger individuals' database and in a bigger DBH' range, and also includes a climate factor, generating a more robust and precise allometric model. For that reason, that is a permanent change adopted by the project.

Number of plots

According to Project Design Description, the climate monitoring would be carried out by the implementation of 9 plots of 1.000 m^2, for the forest inventory. However, in the monitoring period it was evaluated that the increase in the number of plots would improve sample sufficiency. For that reason, it was implemented 16 plots of 1.000 m^2. That's a minor change applied in the previous monitoring period, that is also being conducted in the current monitoring period, because of the Tool used for climate monitoring, that involves the re-measurement of sample plots (AR-TOOL14). That is a permanent change, therefore, applies for the current monitoring period.

Methodology for height' correction

In the last monitoring, a factor was developed and used to correct the height of individuals that had more than one trunk. That change does not apply to the current monitoring period, since individuals with more than one trunk had all of them measured.

Accounting individuals with DBH< 5 cm.

As occurred in the last monitoring period, the plantings show a significant number of individuals with DBH smaller than 5 cm, threshold for the inclusion in allometric model used (Annex 9). And as that class of individuals had an important share of carbon storage in the last monitoring, it was evaluated that the inclusion of those individuals in the present monitoring is pertinent. That minor change permanence will be evaluated in the next monitoring, according to its suitability for the plantings.

The biomass' measurement of those individuals was done as described in paragraph 2 and 3 from Appendix 1 of AR-AM TOOL 14. In addition, due to difficulty in acquiring a stove for assess dry weight, it was applied a value for dry matter content of forest biomass, using a factor that was calculated for tropical forest.

Indicators for evaluation of impacts on communities

The Project Carbono Nascentes do Xingu was issued as a grouped project because it was expected that new areas would be included along the period of project's duration. However, as the stakeholders took active part in Project's implementation, new areas were included in the general scope of Xingu's Seed Network, but their verification is going to be led in different period. For that reason, some of the indicators proposed for community's impact monitoring, do not fit the current moment of the Project, in which the areas are established and require maintenance and monitoring. However, as those indicators do not imply in significant negative or positive impact of project activities (as defined in CCB Program Rules, v3.1), actually it only reflects natural development of forest restoration activities and the situation of the verification project in which no new areas are being verified, it is not understood as a project description deviation, but as a minor change. Considering that and to incorporate the particularity of the current moment of the plantings (established plantings) and of the monitoring (no inclusion of new areas for verification), it is necessary to build indicators related to the actual activities and stakeholders currently involved in the Project. The following paragraphs describes the context and justification for the new indicators included.

The Xingu' Seed Network was created in 2007, as referenced in the book "Y Ikatu Xingu' and 'Livro do Coletor', as a consequence of the demand for seeds generated by the campaign 'Y Ikatu Xingu, in which the main purpose was to increase the reforestation in Xingu' headwaters. Both the creation of the campaign and the Network are fruit of demands exposed by indigenous peoples and rural communities living within Xingu Waterbasin that were experiencing consequences of the deforestation occurring in the region. Until then, the Network was linked to ISA and at the time of the proposal sent to Project' client, the Network was very incipient and the Proponent seeked its expansion towards a formal seed's commercialization channel, as described in 'Projeto Natura 2008 FINAL'. In 2014, the Network became an Association and, therefore an agreement between ISA and the Xingu' Seed Network was signed (Annex 13) to formalize the partnership.

The document attached in Annex 13, describes the amounts of seeds commercialized and the revenue of the Seed Network since its creation, in 2007 until 2021. According to the document, the number of collectors and amount of seeds have expressively increased after the Project was sent to the buyer, that is between 2008 and 2009. After that, at the time the Project have formally started in 2011, the table presents the significant increase in the Network' revenue and income per collector, improvements generated because of Project implementation, since the amount of seed demanded was very expressive. As intended and described in Project Description Document, especially in the cover page' table and in G1, item 2. the strengthening of the Network was one of the objectives concerning communities' impacts, which was successfully achieved considering the above cited documents, and the other evidence described in the present Monitoring Report.

The paragraph below transcribes the item 2, in G1 of PDD, in which the Climate, Community and Biodiversity objectives are described:

"From community' impacts point of view, the project aims to strengthen the Xingu Seed Network, promoting the acquisition of large amounts of seeds from the Network, generating income for indigenous peoples and family farmers, and creating a social and commercial arrangement that allows forest restoration on large scale without the need of inclusion of a social actor external to the region."

Thus, measures that are related to Xingu' Seed Network are part of the objectives previewed and intended to be generated with Project' implementation.

That said, Xingu' Seed Network development and strengthening will be included in the scope of action of the Project. Although its general scope of action wasn't initially included in Carbono Nascentes do Xingu' Project indicators, documents and context presented above sign the strict relation between Xingu' Seed Network' development and strengthening and the present Project, and so are understood as a *minor change*. CCB Rules 3.1 item 3.5.7., states that only significant changes in activities and nature of impacts are considered as *project description* deviations.

Therefore, the new indicators available to measure project's communities' impacts are: the development of Xingu's Seed Network evaluated by the growth in seed collection' areas and groups, and the quantity of seeds commercialized by Xingu' Seed Network between 2017 and 2022. That is a permanent minor change because it applies to the main social goal of the Project.

2.1.3 Project Description Deviations (*Rules* 3.5.7 – 3.5.10)

The current monitoring period do not experience any project description deviations.

2.1.4 Risks to the Project (G1.10)

To assess the Risks associated to the Project's, the AFOLU Non-Permanence Risk Tool: VCS Version 3.2 was used at the time of Project' validation, as shown in PDD, which aims to calculate a share of emissions to be kept as a safeguard, and finally a 'buffer' area to be used in case the Project suffers any kind of interference. According to the conclusions reached through the Tool, the Project's main risks are: forest fire and absence of fence, allowing cattle's entry into the Project's plantings.

To prevent forest fire, the Agreement (Annex 1) signed by landowners between the proponent and the buyer, previews that landowners ensure the availability of water trucks, well prepared fire brigades and in some cases, firebreaks. The Agreement also states landowners' responsibilities in fence implementation and maintenance in the surrounding of all planting areas, to prevent cattle entering the areas.

In the last monitoring period, there were 02 focus of fire and 02 properties where the fence was damaged. At the present monitoring period there were no fire occurrence in Project activities' areas. The maps for the analysis of focus of fire for each property is in Annex 2. Concerning cattle entry in project areas, only one area had its fence disrupted, allowing for cattle entry. That's the case of Santa Maria do Mato Grosso II' Farm, where the cattle has open access and caused impact in understory vegetation. However, the consequences are only perceived in the perimeter of part of the area. In addition, in Brusque do Xingu's Farm, the planting is bordering a crop area in which chemical inputs application impacts the vegetation bordering the planting area. Concerning those two situations, the proponent has already notified ASX twice, institution responsible for contacting landowners and ensuring their commitments. The report containing the communication and observation of field visits led by ISA, can be found in Annex 3.

In the respective Sections concerning negative impacts in communities and biodiversity (4.1.2 and 5.1.2) it is possible to assess more detailed information that the project does not result in negative impacts for any of those indicators.

2.1.5 Benefit Permanence (G1.11)

The planting methodology used in the Project, guarantee the areas are not dependent of much management efforts; that's because the seed planting in high density, using appropriate proportion of different successional groups, allied with green manure planting, ensures the areas are rapidly covered – reducing the need of weed control, and enrichment planting. For that reason, the last management was done in 2015, three years after the plantings, when it was conducted enrichment planting and invasive plants control. As ratified in the Agreements attached in (Annex 1), landowners are responsible for proper management and reporting, from third year ahead. However, ISA has led some visits to the restoration areas during the monitoring period, as well as some seed collectors that go through the areas.

A report recently constructed by ISA (Annex 3) details the areas' situation and confirms that the plantings experience a satisfactory development. Besides the two situations described above, the plantings are structured and diversified.

In addition to all the measures taken to ensure the permanence of the Project's activities as mentioned above, all the areas were implemented in riparian areas, that supported by Law N°12.651/2012, are Permanent Preservation Areas (APP) and should be restored with native vegetation and protected.

2.1.6 Grouped Projects

In the last verification, new areas of the project were included and validated. However, at that moment Sustainable Xingu Association took a different role in project implementation and monitoring, therefore, Project Proponent and the Association understood to be more appropriate to verify those areas in another moment. That's due to the availability of the Association to contribute to verification process and also to ensure the plantings establish a bigger amount of biomass, since some of the areas were planted in 2018/2019.

2.2 Stakeholder Engagement

2.2.1 Stakeholder Access to Project Documents (G3.1)

The stakeholders have access to Project' Documents and updates through Xingu' Seed Network periodic meetings, that happen in different locations in Xingu's water basin, as well as in its website (https://www.sementesdoxingu.org.br/) , and ISA's website (https://www.socioambiental.org/) and social media. Those different virtual channels are used to spread the documents, reports and milestones related to verification process. The reports of the latest meetings of Xingu' Seed Network can be found in Annex 4, however due to the COVID-19 pandemic, the 2020 meeting could not happen, and in 2021 the Network realized an online assembly. In 2022 a meeting happened in September in which the verification process and milestones were disclosed, as exposed in Annex 4, 2022 meeting schedule.

2.2.2 Dissemination of Summary Project Documents (G3.1)

According to CCB Rules v3.1, a summary project description and monitoring report must be provided in the regional language of the project. As the PDD is already available in Portuguese, a summary Monitoring Report was prepared containing the appropriate sections, as stated by section 3.5.12 of the above mentioned document:

"For projects located in countries for which English is not a widely used language among communities, the project proponent shall develop at least a summary of the project description and/or monitoring report in a relevant local or regional language. This shall be the same summary disseminated to communities"

For the current verification a news was posted in the respective website, with a link that direct to Project's documents (ISA and RSX)[19]. In addition, in the 'search' tool of each website is possible to access the documents – if 'carbono' is inserted in the tool, the documents are shown.

Considering landowners, personal contacts are often used to ensure a direct contact, which evidence can be found in Annex 3, where images of conversations with association' president is attaches (Fokko) and e-mails can also be found in the same annex.

2.2.3 Informational Meetings with Stakeholders (G3.1)

After the implementation, it wasn't realized any meeting exclusively dedicated to Project' dissemination. However, during Xingu's Seed Network' meetings, eventual updates are shared as

[19] Summary Monitoring Report (PT), Monitoring Report (EN), Project Description Design (PD)

well as the importance of the Project is evaluated, since for the current period, the planting areas became potential areas for seed collection. Unfortunately, the pandemic created a new scenario of meeting's possibilities and priorities; that's why in 2020 it was not possible to conduct a presential meetings, and in 2021 an online assembly was organized, evidence that can be found in Annex 4 In September 2022 a presential meeting happened, setting up a great opportunity to disseminate the actual stage of the Project.

Picture 01: Xingu' Seed Network 2022' Meeting

Picture: Erik Vesch/Cama Leão/ISA

Picture 02: Xingu' Seed Network 2022' Meeting

Picture: Erik Vesch/Cama Leão/ISA

Concerning landowners, ASX is an association constituted by landowners, who actively participate events and meetings in Santa Cruz do Xingu, and for that reason have easy access to those who participate the project. Despite the possibility of contact with landowners through ASX, the most frequent way to contact them is directly in their proprieties and personal contacts, because of long distances and intense agricultural activities. Therefore, in Annex 3, images of conversations with Fokko are attached to evidence communication about the process in course.

In addition, as described in section 2.1.2 plantings are established and demand no interventions, except for the situations pointed out in Section 2.1.4 that were correctly addressed.

2.2.4 Community Costs, Risks, and Benefits (G3.2)

. The main information about the Project is discussed in Xingu's Seed Network meetings, that happen usually in mid-year in different locations inside Xingu's water basin, since the communities who participate the Network are actively participating the project as co-developers. As mentioned above, the pandemic changed the possibility of the meetings, but in 2021 an online meeting was conducted and a face-to-face meeting occurred in September, as proven in Annex 4, together with all the meetings conducted in the current monitoring period. As mentioned above, all the documents are published in ISA and Xingu Seed Network website[20].

Concerning an environmental aspect, exceeding the limit of seed's collection would cause a disturbance on gene flow, natural regeneration and a reduction in the availability for fauna. For that reason, it was defined in 2009 on the IV meeting of the Xingu's Seed Network, that the threshold for harvesting fruits and seeds, it's 50% of tree's availability. This value is periodically

[20] Monitoring Report (EN)
Summary Monitoring Report (PT)

reviewed by technicians of Xingu's Seed Network and its partners, such as Instituto Socioambiental (ISA), Associação Nossa Senhora da Assunção (ANSA), ATV (Associação Terra Viva), Comissão Pastoral da Terra (CPT) e Operação Amazônia Nativa (OPAN). The value of 50% was stipulated based on studies that show that the rate of natural seed predation (mainly due to the action of fungi and bacteria) is usually greater than 80%, and often reaches 100% of the seeds that fall under the canopy of trees, because of the highest concentration of seeds and, consequently, of predators during their fruiting period. A regional condition that attenuate this risk is remaining fragments of native vegetation, that makes it impossible for collectors to harvest all the trees of some species and cause a significant impact on the maintenance of its population.

From an economic point of view, there could be a negative impact if income generation promoted by seed's collection, caused some kind of community breakdown or cultural mischaracterization. However, it does not happen with communities of family farmers, as their livelihood depends on money, nor with the indigenous communities, which despite maintaining strong cultural tradition, are used to dealing with both the logic of money and projects through the governance of their community organizations.

The Project consists of the restoration of riparian degraded areas, along Xingu's River water basin. Therefore, all the benefits attached to natural vegetation cover are prone to be observed along the Project area. Regarding landowners and people who currently live in the rural properties (57) included in the Project, they report the improvement of water quality, especially concerning its turbidity.

Carbono Nascentes do Xingu is inserted in a bigger context of action: the Xingu' Seed Network, and so the benefits generated by the Project are extremely related to that general scope. In that sense, the Project have great contribution to territorial protection of groups that suffer with huge pressure of large-scale agriculture in the region, because it promotes seed collectors' as protagonists with autonomy, dignity, and social and economic justice. Because of that, the network has already won several awards, thanks to the numerous environmental and social benefits it promotes[21].

The Xingu' Seed Network also has a peace-building effect by bringing together different groups in society that have conflicting historical relationships, such as large landowners and indigenous peoples who share the same territory. Also, many seed collectors report positive psychological effects from engaging in seed collection; a social, economic and environmental activity that has a practical and long-term result - planting the forests of the future, therefore perceived as extremely significant for the community and the world. Thus, focusing on Network's social impacts, it plays a key role in the inclusion of women, as it encourages them to manage production, occupy leadership spaces in their communities and in the network itself, such as Elas (representatives of the groups), or as in many indigenous communities, where women organized themselves into groups to collect the seeds and achieved higher status in their communities by managing their own income. As a result, currently women account for more than 60% of seed collectors and are also the majority in decision-making at the Network's central instances. It also became a low-income activity for people living in poverty and has changed many lives, who have even left their jobs to dedicate themselves fully to seed's collection through the Network. And finally,

[21] Available on: https://www.sementesdoxingu.org.br/noticias/rede-de-sementes-do-xingu-ganha-premio-equatorial-2022-do-pnud

it promotes the importance of local/traditional knowledge about forest seeds, since it is extremely valuable for identifying the impacts of climate change, for example, on rainfall patterns that affect flowering and seed formation in different species.

The network also innovates by adopting a market approach, organizing seed collectors on the one hand and prospecting potential customers on the other; those who are interested in forest restoration, either because of a legal requirement, in the case of farmers and companies, or because it may be an economic opportunity in degraded areas – as seed mixtures can be customized to implement agroforestry systems, providing a variety of potential products from the future forest. In addition, the Network is a relevant contribution to the discussion on the drivers of deforestation, since forest restoration is often a requirement that is difficult to comply with for producers who have illegally deforested. The Network offers a cheap and efficient way for producers to adequate their environmental liabilities, improving their life quality and value chains.

2.2.5 Information to Stakeholder on Verification Process (G3.3)

The Verification Process was disseminated trough ISA's[22] and Xingu's Seed Network[23] website, as mentioned above. Landowners are informed by AXS, that reaches them through virtual channels, such as e-mail and personal contacts (telephone and instant message). It was also published in respective social media and disclosed in Xingu's Seed Network 2022 meeting, that occured in September (Annex 4), also Xingu Seed Network representative was communicated through e-mail, as shown below.

2.2.6 Site Visit Information and Opportunities to Communicate with Auditor (G3.3)

At the 2022 Meeting of the Xingu Seeds Network that will happen in September, there was a specific moment to talk about the project and inform about the verification process, as showed in Annex 3. Also, RSX' president and coordinator was copied in the e-mails communicating about the on-site visit, as shown in the figure below. The rural landowners involved had already been informed about the process in course, specially through virtual channels (email and instant message), and were informed about verification via email and personal contacts (Annex 3).

Figure 01. Xingu Seed Network communication

[22] https://www.socioambiental.org/noticias-socioambientais/isa-planta-florestas-no-mato-grosso-para-combater-mudancas-climaticas
[23] https://www.sementesdoxingu.org.br/noticias/instituto-socioambiental-planta-florestas-em-mt-no-combate-a-mudanca-climatica

2.2.7 Stakeholder Consultation (G3.4)

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The Project is included in a larger context that involves the Xingu's Seed Network and the 'Y Ikatu Xingu Campaign, as described in the PDD. For that reason, it is not possible to separate the identification and analyses of stakeholders, who have not gone through a specific process, because it is already contemplated in 'Y Ikatu Xingu Campaign and Xingu' Seed Network development and strengthening. The Campaign and the Xingu's Seed Network counts on periodic meetings where all stakeholders participate of the sharing of information. Therefore, all stakeholders of the Project are already involved in the 'Y Ikatu Xingu Campaign, following its development, informing and being informed, through the meetings of the campaign and the Xingu's Seed Network. Concerning landowners, Universities and municipalities, although some of them often participate those meetings, specific conversations and punctual meetings are established to share information about the Project (Annex 3).

The first meeting of Xingu's Headwaters occurred in October 2004, (Annex 13) , and the second, in October 2008, both in Canarana Municipality. After that moment, the annual meetings of Xingu's Seed Network became the official space where stakeholders are informed of the Project. Since 2009 there were 17 meetings, and the respective reports and presence list for the current monitoring period are in Annex 4.

As previously described, the plantings under verification are established and do not require maintenance, except for the situations already presented and detailed in Annex 3, which were addressed by Project proponent. In addition, as presented in Annex 1, landowners are responsible for maintenance of areas after the third year, and from this moment on ISA carries out occasional visits in the areas. Therefore, the agreements signed, the methodology used, and the conversations

with Sustainable Xingu Association (Annex 3), via personal contacts, meet the need for stakeholders' consultation.

2.2.8 Continued Consultation and Adaptive Management (G3.4)

As explained in the PDD and in section 2.1.2, the Carbono Nascentes do Xingu P roject is part of a largest context that have the Xingu Seeds Network as the articulating center. The actions and mechanisms used in the project – mechanized planting of seeds, mobilization of stakeholders and acquisitions of the Xingu's Seeds Network –, are the same used in the current actions of the Seed Network articulations. The only difference between the Project and the Xingu' Seed Network's actions is that the carbon captured by the forest is commercialized and is one of the financial sources of the activities and acquisitions. Consequently, some different rules also apply in relation to monitoring and audits.

Therefore, the forum that encompass all the discussion about the project, its achievements and its needs, have been the annual meeting of the Seeds Network of the Xingu (Annex 4). In those meetings, the projects in progress are reviewed, and the specificities of projects that include carbon as a financial component and that follow the premises of the CCB, are discussed.

Concerning landowners, ISA contacts ASX' responsible and the Association contact landowners, which is led, mainly by virtual channels, such as email and instant menssage(Annex 3).

Fortunetely, the Project have not received any grievance during its period of existence, and no adaptive management was needed nor required until now.

2.2.9 Stakeholder Consultation Channels (G3.5)

Community involvement is central for Xingu's Seed Network' functioning, given that the collectors are community members, and that they are responsible for the collective and continuous development of Newtork's action plan. To ratify that, is possible to check the description of the Xingu's Seed Network presented in the indicator G1.5 of the PDD, in the website of the Seeds Network (https://www.sementesdoxingu.org.br/) and also the meetings' annual reports of the Xingu Seeds Network presented in Annex 4 and also the "Livro do Coletor" (Annex 13), that describes the structure of the Network and the evidence of a participatory work

Concerning landowners, the recruitment was led in a voluntary manner and they formed an Association to participate the Project, that is, an organization structured to operate in a participatory manner. After that, they all signed an agreement, in which the responsibilities were defined and stated (Annex 1 and 3) Instant messages are constantly exchanged with landowners, specially their representative in the Association (Fokko) (Annex 3), however it is not possible to share all the messages exchanged, only those concerning the audit and the process in course are registered in the correspondent Annex.

Instituto Socioambiental's work takes place through Programs and Projects that are articulated at different levels, requiring an organizational structure that is integrated and at the same

time independent. That is, governance takes place through the coexistence of a central structure, represented in its decision-making and management instances, with a management structure of the Programs, with relative autonomy.

Thus, all communication about Instituto Socioambiental's projects is received by this central structure through our institutional communication channel in the "Talk to Us" section of the website (https://www.socioambiental.org/contato). All these contacts and messages are received by the Executive Secretariat at isa@socioambiental.org, and forwarded to the respective responsible parties. In the case of this project, communications and messages are directed to the local technical team, the coordination of the Xingu Program and the central partnership team.

In addition to this ongoing process, we are structuring the new Communication and Denouncement Channel, responsible for receiving and forwarding all queries, complaints, suggestions, and messages in general, both from employees and external partners and other stakeholders. It will be managed by the Compliance Committee, already formed with five members: one person representing the Board of Directors (external member), one person representing the Assembly (external member), one person representing the Legal Department (external member), and two people representing Internal Team (internal members).

2.2.10 Stakeholder Participation in Decision-Making and Implementation (G3.6)

As mentioned above, the meetings of Xingu's Seed Network and its structure provide a very participatory process among all its members. Today, the Network is made up of more than 560 collectors, which configures up to 25 collection groups, spread across three Indigenous Territories, 21 municipalities, and 16 family farming settlements. Of that total, 65% — that is, the majority — are women (Annex 13)

There are several courses and meetings held with seed collectors along the year, in all of them there is opportunity to participate in Project' decision making (Annex 4 and 10). Also, there is a group in an App of instant messages in which there is constant exchange of ideas. Concerning landowners, the nature of the Association (ASX) is prone to equal participation in decision making, which is held in specific intern meetings and instant messages (Annex 3). In addition, in Annex 14 there is a file of an specialized consultancy hired by Project proponent to ensure the effective participation of all people, in terms of cultural and gender aspects, and in Annex 15 is possible to find Project proponent's policies and codes of conducts. .

2.2.11 Anti-Discrimination Assurance (G3.7)

The institutions involved in the design and implementation of the project are the Instituto Socioambiental (ISA), the Xingu's Seeds Network and the Sustainable Xingu Association (ASX). The ISA is recognized as an institution that understands and values social, sexual and religious diversity, and promotes a continuous effort towards anti-discrimination among its partners and society. During project meetings with AXS, Xingu's Seeds Network meetings, as well as internally to ISA, gender issues have been brought up and debated, generating internal processes to address these issues. In addition, the institutions own their statute, in which the respect and defence of human rights is emphasized (Annex 15).

2.2.12 Grievances (G3.8)

Not applicable. The Project has not received any grievance during the monitoring period.

2.2.13 Worker Training (G3.9)

Trainings and experience exchange concerning identification of species, collection, processing, and management of seeds are constantly led by ISA and Xingu's Seed Network. During the pandemic, it happened mostly through Network' Whatsapp group in which videos, texts and references were shared among participants. There were also courses about management process[24], specialists[25], seed's quality, and the Network meeting itself, that allows a significant exchange of information. The presence list of each training accounted for the current monitoring period, considering the strengthening of Xingu' Seed Network as an objective and achievement of Carbono Nascentes do Xingu' Project, is described in Annex 10 and 21.

An App called 'Redário' was used to improve the management of the group in: information monitoring, such as inclusion of collectors in the App and of availability of collection, order organization, collection' information and production reports.

For the monitoring, 4 employees from ISA and 3 from Xingu Forest, a seed-collector owned business, conducted climate monitoring in the project's area, and went through training, that can be also found in Annex 10. In addition, the Xingu Seed Network is currently constituted by 568 people, that directly or indirectly have taken action in the Project.

2.2.14 Community Employment Opportunities (G3.10)

The participation in Xingu's Seeds Network is voluntary and open for individuals and groups, always based on the established criteria, present in 'Livro do Coletor' inside Annex 13. Since the Project represent an enhancement on areas for seed collection, it contributes to the development of the Network. Thus, the description provided in the PDD is still valid:

"The Xingu Seed Network (RSX) is open to the entry of new groups thus, has grown over the years. To join the RSX as a collector it is necessary to make your potential collection list and be organized into a group in which there is at least one person who can dedicate themselves to the work of articulation, to centralize the communication of the community with the Network. This person must participate in meetings and training and guide the collectors of the group, manage orders, collections, issuance of invoices and payments. In addition, it is necessary that the candidate for RSX collector respects the rules of operation of the Network and do not make irrational use of fire and collaborate with environmental education and restoration of degraded areas in the region where it operates".

[24] Management process are dedicated to contribute for those who are responsible for managing the seed's collection, production and commercialization inside each collection group that constitute the Xingu' Seed Network.
[25] Courses directed to technicians from ISA.

Project proponent have also hired an specific consultancy to develop an intern procedure for an affirmative hiring policy, to ensure the equal participation of vulnerable social groups (Annex 14).

For the monitoring activities, 2 employees from Xingu Forest were hired and 4 from ISA were responsible for leading monitoring and verification process. In addition, to develop carbon assessment and verification process, a specific consultancy was hired. All the agreements related to the above hires, can be found in Annex 14. The description of employments generated by the project in the current monitoring period as full-time jobs, is attached in Annex 21.

2.2.15 Relevant Laws and Regulations Related to Worker's Rights (G3.11)

List of applicable Laws and regulations:

- Decree-Law nº 5.452, of May 1st, 1943
- Law nº 13.429, of March 31st, 2017
- Law nº 10.406, of January 10th, 2002
- Provisional Measure, n° 2.200-2, of August 24th, 2001.

The employees of the organizations that develop the Project are duly contracted and comply with all applicable labor legislation[26]. The activities of intervention in the field are carried out by employees of the participating properties, whose owners assume, in a contract, a commitment to respect labor legislation. Specifically, the owners commit to:

- Do not employ a person younger than 18 (eighteen) years of age, including a minor apprentice, in places that are harmful to their development, their physical, psychological, moral and social development, as well as in places and dangerous or unhealthy services, at times that do not allow attendance at school and in night time;

- Do not use illegal work and do not use slave-like labor or hand labor practices, children's work and person younger than 18 (eighteen) years of age, either directly or indirectly, except for a learner from 14 (fourteen) years of age to 16 (sixteen) years of age age, persuant to applicable labor legislation.

2.2.16 Occupational Safety Assessment (G3.12)

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The estimated risks for the project activities are minimal, however, the Project ensures that the worker's hiring complies with Brazilian labor legislation prescribed under the CLT, which, to guarantee the safety and well-being of the worker, provides, among many benefits the stipulation of the workday maximum in eight hours a day with breaks for rest and food, and the provisions of Law 6514, of December 22, 1977, concerning the occupational health and safety and other provisions.

[26] They are hired under the labor laws governed by the Consolidation of Labor Laws (CLT), which guarantee the employee the benefits present in Decree - Law No. 5.452, of May 1, 1943.

ISA also complies with the Regulatory Norm (NR) 31, which establishes the precepts to be observed in the organization and in the work context, in order to make compatible the planning and development of agriculture, livestock, forestry, forestry exploration and aquaculture with the safety and health. The Regulatory Norm (NR 31) includes aspects about personnel protection equipment, ergonomics, chemichal inputs among others. Project Proponent also owns a Policy on Security, including field work and security information (Annex 15), additionally all ISA employees have life and health insurance. During the period encompassed by the present Monitoring Report, no situation that offers risks to workers was registered.

2.3 Management Capacity

2.3.1 Required Technical Skills (G4.2)

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Community participation and biodiversity conservation are inherent consequences of 'Y Ikatu Xingu and Seeds Network Campaign's existence and is absolutely linked to the livelihood of the populations involved. That said, qualified personnel integrate the team responsible for community engagement and biodiversity assessment, as well as its monitoring, Project Proponent' activities report are provided in Annex 16 and can prove that. .

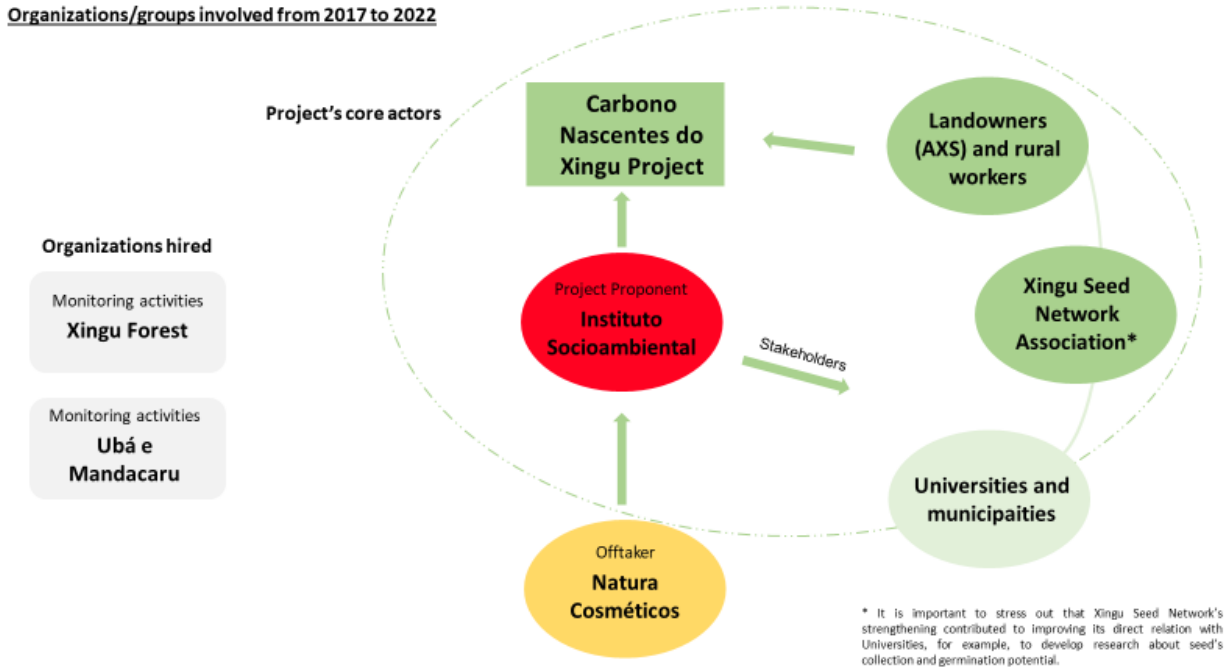
Carbon monitoring is ISA's responsibility, which has in its technical staff qualified team and hires independent consultancies when necessary, as it is the case of the present carbon monitoring (Annex 14). The organizations responsible for carbon monitoring gather more than 15 years of experience with carbon market and measurement. The field technicians are also hired for that specific task, and the team is composed by qualified personnel.

2.3.2 Management Team Experience (G4.2)

The 'Y Ikatu Xingu Campaign was created in 2004 with the aim of restoring the headwaters and riparian forests in the Xingu Waterbasin and the creation of the Xingu's Seeds Network in 2007 is its main conception. Therefore, for almost 15 years, forest restoration activities are developed with appropriate learning and adaptations until today, and the teams involved - ISA, AXS, Seeds' Network – have been achieving positive results to date. Project Proponent is a NGO founded more than 20 years ago, with 6 pillars of action. The results are well documented in the references already presented and in the Seed's Network and ISA web pages, trough the transparency portal and supports can be found in respective annex (Annex 13 and 16)

In addition, several smaller voluntary initiatives and other institutional arrangement have taken place, since 3 agreements were signed with Natura that articulated and trained all parties involved. As mentioned above, in specific cases, individual consultants are hired to support the team when needed, as described in Annex 14. The figure below illustrates the institutional arragements involved in the current monitoring period.

Figure 02. Project's Institutional Arrangement



2.3.3 Project Management Partnerships/Team Development (G4.2)

The entire operation of the Xingu' Seeds Network, planting activities, monitoring, etc. occurs perfectly within the scope of the already consolidated institutions that are in the territory – ISA, AXS, Seed Network.

For five-year climate monitoring, plots' measurement, counting and modeling, an organization was hired to help the proponent. Furthermore, a team was hired for the field work, and together with Project's team went to planting sites for climate monitoring (Annex 14).

2.3.4 Financial Health of Implementing Organization(s) (G4.3)

As presented in the PDD, ISA is a well-established and recognized organization that annually goes through audit processes with consequent publication of a financial report[27] and annual activities, more detailed information can be found in Annex 16.

AXS is formed by rural producers from the municipality of Santa Cruz do Xingu, whose titles are all regular and with agricultural production. Within the scope of the project Carbono Nascentes do Xingu, their guarantee to Natura is backed by cattle. In the contract established with Natura, which provides the financial resources for the project, all institutions, as well as their leaders and the rural producers involved went through documentary evaluation attesting to its suitability.

2.3.5 Avoidance of Corruption and Other Unethical Behavior (G4.3)

[27] Available on: https://www.socioambiental.org/transparencia

The institutions involved in the Project Xingu are recognized nationally or regionally. ISA is an established institution with more than 25 years, that has its internal governance mechanisms well established and reported annually. It is recognized for its performance in socio-environmental rights and related themes. The Xingu' Seeds Network, which has been operating for about 15 years, created its legitimacy and regional recognition by different stakeholders from different spectrums of political and action fields. Its greatest strength is its collective management, consolidated by its seed collectors. On the other hand, AXS is formed by landowners who restore Permanent Preservation Areas (APPs) on their properties and, due to their productive activities, respect the rules established in the country and are verified accordingly.

In the contracts established with Natura, which provides the financial resources for the project, all institutions, as well as their directors and the rural producers involved went thorough documentary evaluation attesting its suitability. Annex 15 contains ISA's Code of Conduct and other related policies.

2.3.6 Commercially Sensitive Information (*Rules* 3.5.13 – 3.5.14)

Not applicable. The full version of the Project have been provided.

2.4 Legal Status and Property Rights

2.4.1 Recognition of Property Rights (G5.1)

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The Xingu's Waterbasin in the state of Mato Grosso, the project zone in the Carbono Nascnetes do Xingu Project, presents a very diverse land network. There are small, medium and large properties, agrarian reform settlements, indigenous lands and conservation units. In terms of area, private properties are the majority within the basin, but the emphasis is on the Xingu Indigenous Park, which is located around the Xingu River, although its headwater are located outside the Park.

The region has an historical context of land conflicts, mainly between small farmers and peasants and large landowners, and also there were some conflicts related to landowners and indigenous communities. However, currently the land tenure situation is quite consolidated, and the existing problems are punctual and reduced. All those remaining conflicts are located far from Project Area and, in addition to not affect or be affected by the project's actions, those conflicts vastly outweigh the capacities, competences and proposal of both the project and the 'Y Ikatu Xingu Campaign. These conflicts are judicialized, as is the case of the Maraiwatesede Indigenous Land, in which in January 2013 the land was completely removed and the indigenous people returned to their territory.

All the properties participating the project are private properties with adequate land tenure (Annex 1 and 12), and the participation under the Project is voluntary, consolidated with an agreement signed by all parts.

2.4.2 Free, Prior and Informed Consent (G5.2)

The project's activities are limited to degraded riparian areas in private properties. There are no institutional, ecological and economic conditions for the project advance in other areas. The expansion of agriculture on forest areas is significant, and forest restoration implies opportunity costs for rural producers, in addition to planting's costs. The seeds' collection in indigenous areas is done by the indigenous themselves and without impact on local vegetation.

There are no actions in the project that affect the property rights of third parties. Landowners involved in restoration actions are the only to have their properties affected, and they not only consent to activities since it contributes to properties' law adequation, but actively participated in actions, negotiations agreements with Natura (buyer of Emission Reductions) and even constituted the Sustainable Xingu Association (ASX) to participate in the project.

2.4.3 Property Right Protection (G5.3)

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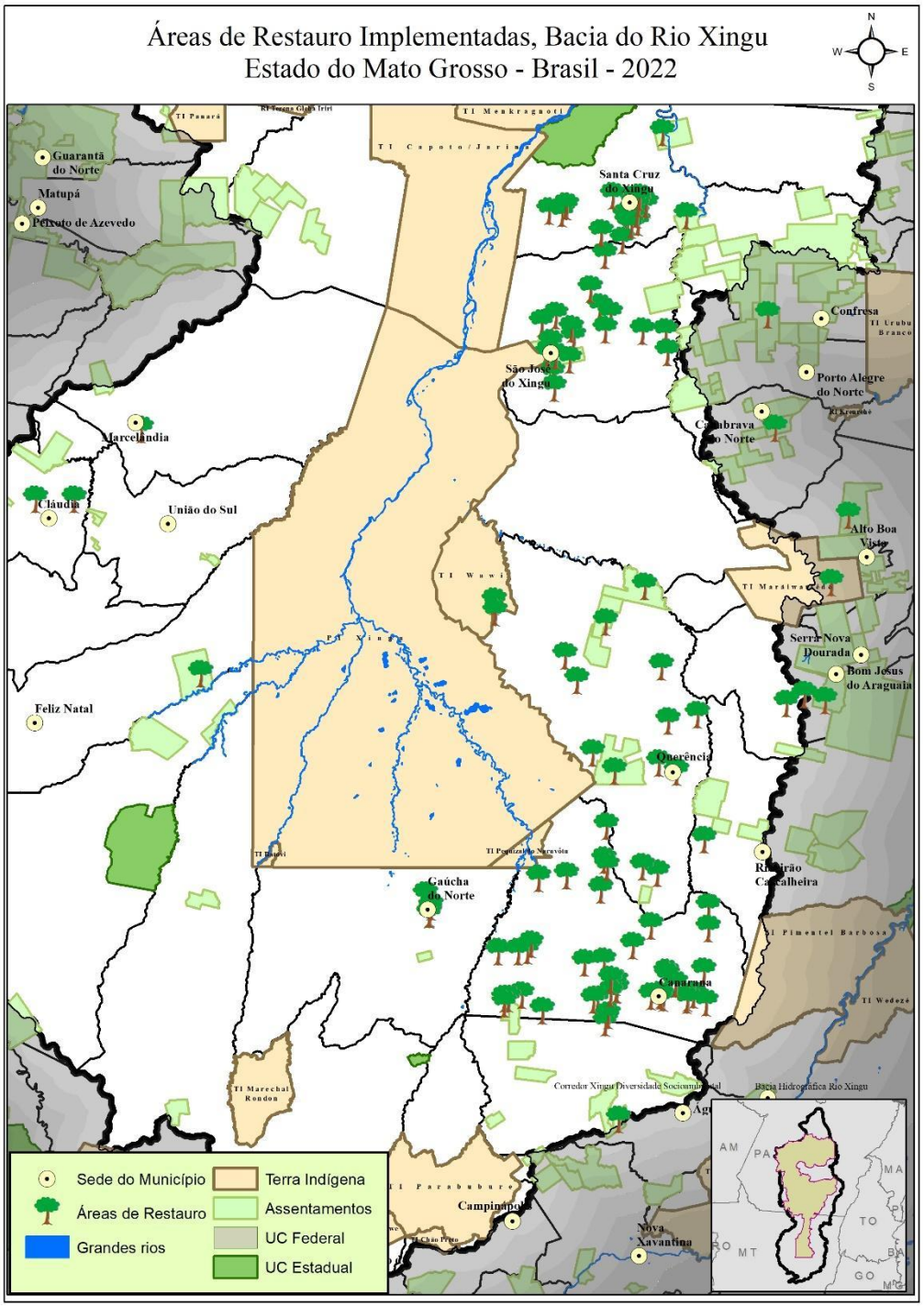
All activities are developed within areas protected by Brazilian Law Nº 12.651/2012 and are located in private properties, whose owners have voluntarily entered the Project, agreeing with activities and responsibilities (Annex 1), and own regular land tenure (Annex 12). ISA conducts online monitoring of the project's areas through Xingu+ Observatório[28]. Annex 17 provides detailed information about all the regulations involved in the plantings, as well as maps ensuring compliance with it.

2.4.4 Identification of Illegal Activity (G5.4)

There are no illegal activities that could affect the benefits of the project. Even though there is a great variety of types of land use and social actors in Xingu's headwaters, most of the land in the region is already consolidated and with well-established' rights and recognized property.

The conflict that exists in the region involves the limits of some Indigenous Lands. However, all these conflicts are in court and the Project has no contact or even physical proximity to these conflicts. Although the Project Area encompasses all the Xingu River Waterbasin, the plantings only take place in private properties with regular land tenure (Annex 1 and 12). The map below demonstrates the indigenous land within Xingu' River Waterbasin and all the plantings implemented by ISA – not only those included in the present project.

[28] https://www.xingumais.org.br/observatorios



2.4.5 Ongoing Disputes (G5.5)

As mentioned in the previous monitoring report, although the region faces some disputes concerning indigenous land, no conflict is related to the project, since all the planting are located within private land, with regular land tenure, as demonstrated in Annex 12. All the private lands

that participate the project must have regular land tenure, which ensures that no disputes take place in project's areas.

2.4.6 National and Local Laws (G5.6)

During the current monitored period, there was no change in any legislation or regulations that affect the project activities.

- Native Vegetation Protection Law nº 12.651/2012
- Decree nº 1.491, May 15th 2018 (MT).
- Complementary Law nº 592, May 26th 2017 (MT)
- Decree nº 8.235, May 5th 2014

Mato Grosso Stated had developed an independent Program to promote the adequation of properties in 2008, (Programa Mato Grossense de Legalização Ambiental Rural), according to the Native Vegetation Protection Law in effect at the time (Law n° 4.771/1965). However, in 2012, a new "Forest Code" was instituted and with that the Program had to adequate to the new law. At that time, landowners had already signed a Conduct Adjustment Term (TAC – Brazilian acronym) which defined the areas to be restored. As the Forest Code changed, and all the Rural Environmental Registry (CAR – Brazilian Acronym) are currently under analysis, no property submitted yet a Project of Restoration of Degraded and Modified Area (PRADA – Brazilian acronym), as demonstrated by Complementary Law n° 592 and Decree n° 1.491 – mentioned above. Nevertheless, all the plantings were implemented with the respective methodological procedure approved at the time, namely Normative Instruction n° 5, from September 8th 2009.

The main law concerning the plantings is: Native Vegetation Protection Law nº 12.651/2012. In accordance with that law, all the plantings were implemented respecting the minimum width required, as shown in the maps attached in Annex 17. .

Concerning the methodology used, Decree nº 1.491, of May 15th, 2018 states the currently allowed methodologies for forest restoration in riparian areas, which converge with the technique used in the project's areas.

2.4.7 Project Benefit Crediting (G5.9)

The greenhouse gas emission reductions generated by the project are property of only one beneficiary, as the Program is not included in any GHG program and is not implemented in any jurisdiction or sector with mandatory GHG emission limits.

Landowners who receive project funds sign a contract committing not to commercialize the generated RVEs with any other institution.

3 CLIMATE

3.1 Net Positive Climate Impacts

3.1.1 Net Impact (CL2.2, CL3.1, CL3.3)

According to the validated Project, the without-project scenario is the permanence of agricultural land use, establishing a baseline of carbon removals equal to 0, at the same time as emissions promoted by leakage are also 0 – as detailed in the present monitoring report. Project Proponent monitors the areas through Xingu' Observatory, available in: https://www.xingumais.org.br/observatorios/degradacao, and Sinrad platform, available in: https://xingumais.org.br/siradx.

For that reason, the removals resulting from project activities measured in the present monitoring period, consists of the difference between the total carbon removal in the first monitoring and the current total carbon removal.

Carbon Stocks in baseline scenario

The baseline scenario for the Project Area is the continuation of agricultural use. The methodology AR-AMS0007 "Small-scale Methodology: Afforestation and Reforestation project activities implemented on lands other than wetlands" determines that the possible carbon stock variations in the Project Areas are evaluated before the start of Project's activities. According to the selection of carbon pools to be monitored, such variations will be determined based on aboveground and belowground stocks of the living biomass of trees and shrub species and also in dead biomass and litter.

As described in PDD, the baseline scenario for both land use of pastureland and conventional agriculture, there are no trees or shrubs as possible reservoirs to determine their carbon stocks. In view of this, it is possible to consider that there were no emissions in the baseline scenario.

According to the methodological tool "Estimation of carbon stocks and change in carbon stocks in trees and shrubs in A/R CDM project activities", carbon stocks in trees in the baseline can be considered as zero if the following conditions are met:

(a) Trees found in the pre-project scenario are not removed over the period of project activity;

(b) The trees found in the pre-project scenario do not suffer mortality from competition with trees planted by the project, or damaged by the implementation of the project activity, at any time during the period of project activity;

(c) The trees found in the pre-project scenario are not inventoried together with the trees planted by the project during the monitoring of carbon stocks, but their continued existence, consistent with the baseline scenario, is monitored throughout the project activity period.

All of the above conditions apply to the Project. Furthermore, as established in the PDD, the trees found in the pre-project scenario have been geospatialized so that they are excluded from the accounting of removals. Thus, in case such individuals are found during the monitoring, they were not accounted for in the project scenario, based on the notes made in field.

Therefore, there are no net GHG removals by sinks in the baseline scenario of the project, in accordance with the explanation described above.

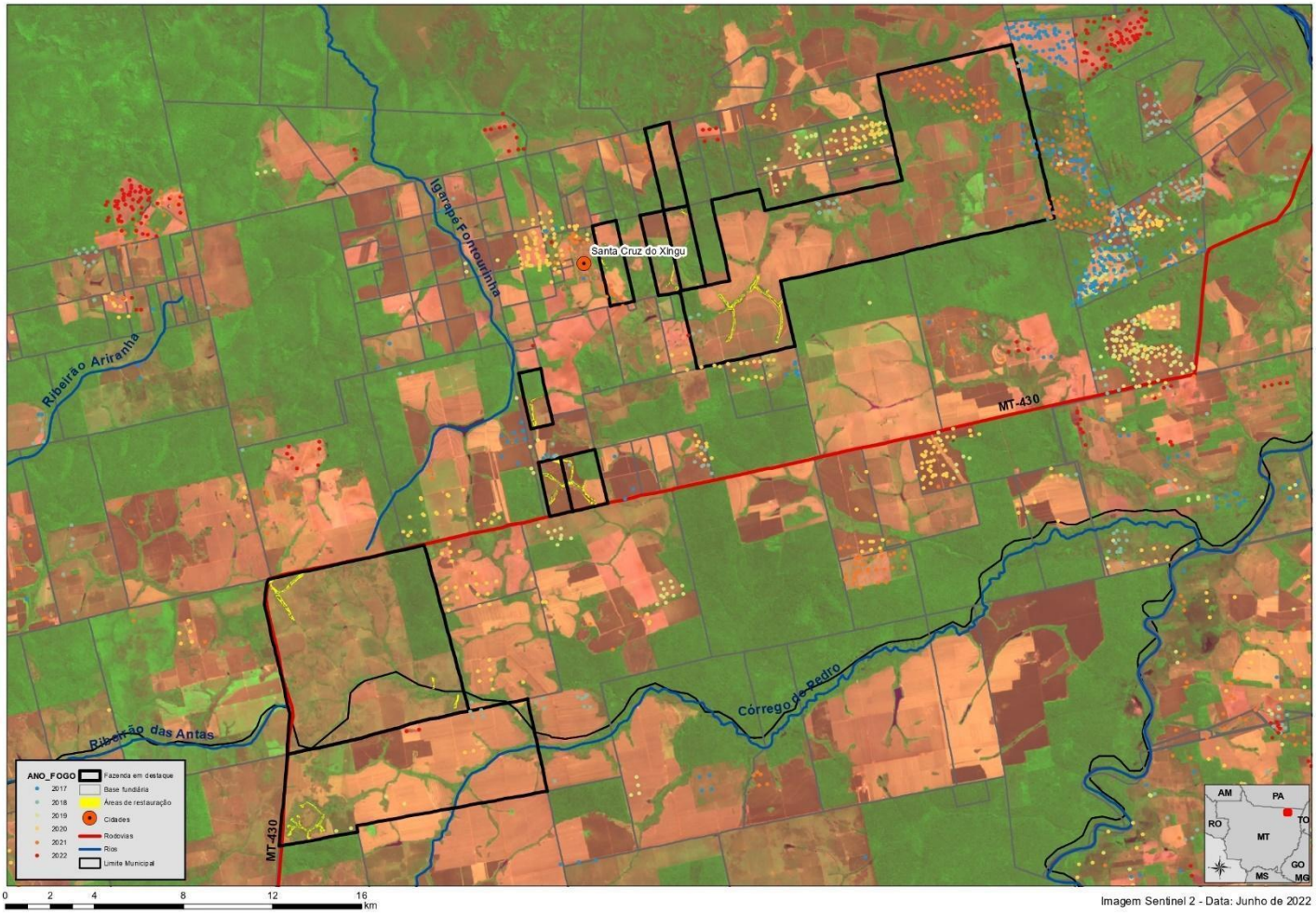
Emissions of non-CO_2 gases resulting from the burning of biomass

The increase in non-CO_2 GHG emissions at the project boundary as a result of the implementation of project activities, must be calculated according to the equation established in the A/R methodological Tool:"Estimation of non-CO_2 GHG emissions resulting from burning of biomass attributable to an A/R CDM project activity".

Biomass burning is not a practice used for soil preparation for project activity implementation, nor for cleaning the pre-planting land. Regarding the burning of biomass by forest fires, a geospatial analysis of the incidence of hotspots and burnt areas was conducted with data from Xingu Observatório[29], for the last 5 years, referring to the period of project monitoring (Map 01). Images referring to all properities included in the project can be found in Annex 2.

Map 01. Focus of fire analysis within the project areas included in the current verification process.

Focos de calor na Zona do Projeto Carbono Nascentes do Xingu



[29] Available on: https://xingumais.org.br/observatorios/degradacao

The analysis shows that there wasn't any fire hotspont inside the Project Area, which indicates that the emissions of non-CO_2 resulting from the burning of the biomass equal to zero.

3.2 Offsite Climate Impacts (Leakage)

3.2.1 Leakage Mitigation (CL3.2)

The PDD shows that leakages are not expected for the project, as only one of the participating properties had to isolate the area from the entrance of cattle and that there was empty pasture to reallocate those cattle.

The Project's proponent team has led visits to project's areas, at project' start, to verify that there was no leakage, and if cattle had to be moved, to ensure there was open pasture available for it, avoiding deforestation of reforested areas. It was concluded that during the current monitoring period, none of these complications occurred and that there was also no communication from the participating landowners with the executing team (AXS and ISA) to report this type of problem.

Added to the monitoring carried out by the Project team, landowners sign an Agreement that ensures that in case of deforestation led by agricultural activities that were previously developed in the areas to be restored, the property is excluded from the project and its climate, biodiversity and communities' benefits, are not considered.

To ensure that no areas are degraded or deforested for the reallocation of cattle, ISA uses online platforms:

- https://www.xingumais.org.br/bservatories/degradacao
- https://xingumais.org.br/siradx

Sinrad issues montlhy reports, analyzing the rate and places of deforestation taking place in Xingu Waterbasin, therefore contributinh to the understanding of displacement of activities inside the propreties.

3.3 Climate Impact Monitoring

3.3.1 Climate Impact Monitoring Results (CL4.1)

Methodologies used

- AR-AMS0007. A/R Small-scale Methodology: Afforestation and reforestation project activities implemented on lands other than wetlands. Version 03.1, EB 85, Annex 21.

- AR-TOOL 03. A/R Methodological Tool: Calculation of the number of sample plots for measurements within A/R CDM project activities. Version 02.1.0. CDM-UNFCCC, EB 58, Annex 15.

- AR-TOOL 14. A/R Methodological Tool: Estimation of Carbon Stocks and change in carbon stocks of trees and shrubs in A/R CDM Project activities. Version 04.2. CDM-UNFCCC, EB 85, Annex 22.

- AR-TOOL 15. A/R Methodological tool: Estimation of the increase in GHG emissions attributable to displacement of pre-project agricultural activities in A/R CDM Project activity. Version 02.0. 4 CDM-UNFCCC, EB 75, Annex 28.

- A/R Methodological Tool Estimation of non-CO2 GHG emissions resulting from burning of biomass attributable to an A/R CDM project activity. Versão 04.0.0. EB 65, Annex 31.

- A/R Methodological Tool Demonstrating appropriateness of allometric equations for estimation of aboveground tree biomass in A/R CDM project activities. Versão 01.0.0. EB 65, Annex 28.

Re-measurement of sample plot

As defined in the last monitoring, the change in carbon stock is estimated by the direct re-measurement of sample plot. At the current monitoring, the same plots installed in 2017 were re-measured to estimate the change in carbon stocks – there are 16 plots, of 1.000 m^2 each, resulting in a total of 1,6 ha sampled, or 0,9% of total area in verification process, considering the total area under verification – 180,7 hectares.

The plots were then divided in strata according to the biomass' amplitude of the plots in 2022. The distribution of plots among the strata (n_i), the respective amplitude and area of each strata (A_i) is as follows:

Minimum (t/ha)	Maximum (t/ha)	Strata	n_i	A_i (ha)
18,67	60,30	I	6	35,6
60,30	101,93	II	4	78,5
101,93	143,56	III	6	66,6
		Total	16	180,7

Direct re-measurement of sample plots

Sample plot installation and re-measurement

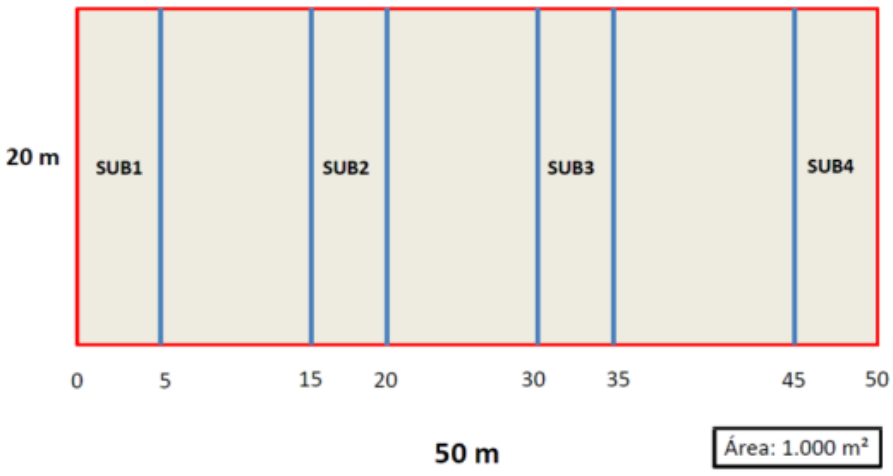
A GPS was used to find the coordinates of the 4 (four) vertices and central point of each plot, and guide the initial direction of the re-measurement.

Table 01. Coordinate of sample plots' central point.

Plot	Strata	Property	Geographical Coordinates of central point	
1	II	Flor da Serra	-52,35414	-10,165687
2	I	Santa Sofia	-52,38419	-10,14993
3	I	Rio Bonito	-52,35235	-10,134058
4	II	Brusque do Xingu	-52,31283	-10,181194
5	III	Brusque do Xingu	-52,3237	-10,16342
6	III	Brusque do Xingu	-52,33494	-10,169889
7	I	Vale do Sonho	-52,38738	-10,251669
8	III	Lopes	-52,40179	-10,233726
9	III	Lopes	-52,40281	-10,247131
10	II	Vale do Sonho	-52,38738	-10,251669
11	II	Faz. Sta Maria do Mato Grosso I	-52,5121	-10,294605
12	III	Faz. Paranotapa	-52,41289	-10,217375
13	II	Sta Maria do Mato Grosso II	-52,50657	-10,280638
14	II	Sta Maria do Mato Grosso I	-52,50336	-10,372761
15	III	Sta Maria do Mato Grosso II	-52,51539	-10,281735
16	II	Sta Maria do Mato Grosso I	-52,51178	-10,381968

Inside each plot, 4 sub- plots with 10 meters between each one, were installed to measure regenerating individuals – those which DBH smaller than the size required by the allometric equation used. That's also described as a minor change in the appropriate section of the present document, and justified by the significant representation of this diametric range in the biomass stock of the plantings, as proven in the last monitoring.

Figure 03. Subplots for regenerating individuals measurement



Aboveground Biomass estimation for individuals with DBH bigger than 5 cm

The methodology for data collection determines that all trees in a sample plot above a minimum size are measured and the biomass of each tree is estimated. The minimum diameter of 5 cm was selected due to the applicability of the allometric model used for biomass estimation.

To carry out the inventory in the field, the forestry inventory protocol developed particularly for the present Project (Annex 5) was used. As stated in PDD, existing trees prior to project implementation, are not harvested neither accounted in forest inventory. To ensure that, those trees were georreferenced and their coordinates were inserted in GPS during forest inventory, so they are not measured in the field. The shapefile containing those trees is in Annex 5, and those inside sample plots are separated in a different file containing their coordinates. For each individual within the minimum collection diameter, the following field information was taken (except for trees that were already present in project area):

- Circumference at breast height (1.30 m) or above any irregularity when presented (short roots, lumps in the trunk, etc.). There was significant attention to always keep the measuring point clean to avoid errors;
- Botanical identification through specialized taxonomists in the region;
- Total height of all individuals through Haglof clinometer.

Picture 03. Forest inventory

The individuals that were already included in the inventory had only its measures taken (not identified), while individuals that met the requirement of DBH size and so could be included in the

present monitoring, were botanically identified and marked with the respective number, following the plot order. The total number of individuals measured in all the plots was 2. 469, the minimum DBH was 5 cm and the maximum 62,1, while the smallest in terms of height was 1,7 meters and the tallest 27,5 meters. The average density of individuals with DBH bigger than 5 cm, is 1543 individuals/hectare.

Aboveground Biomass estimation for individuals with DBH smaller than 5 cm

According to Appendix 1 of the AR-TOOL14, in case the areas present a large number of individuals with a diameter below the diameter range applicable to the allometric equation, as is the case of the plantings of the present Project, the average biomass of these individuals can be estimated through destructive sampling of some individuals outside the area of the sample plot , as follows:

(1) Determine the diameter mid-way between the diameter of the smallest sapling existing and the smallest diameter allowed by the allometric equation;
(2) Harvest from outside the plot area a few saplings having diameter close to the mid-way diameter and obtain the mean biomass per sapling;
(3) Count all the saplings in the sample plot and multiply this number by the mean sapling biomass to obtain their contribution to the plot biomass.

Thus, in each sample plot of 1,000 m^2, all individuals with diameter minimum of 5 cm were measured, while in the 4 sub-plots of 100 m^2 all individuals that did not reach the minimum diameter were counted, to estimate the biomass of the individuals that belongs to the lower diameter range.

Table 02. Counting and Aboveground Biomass of individuals with DBH smaller than 5 cm

Plot	Property	sub1	sub2	sub3	sub4	Ind/ha	AGB (t/ha)
1	Flor da Serra	39	46	46	54	4625	10,5
2	Sta Sofia	7	59	26	77	4225	9,6
3	Rio Bonito	25	41	27	58	3775	8,5
4	Brusque do Xingu	29	93	40	53	5375	12,2
5	Brusque do Xingu	132	59	110	155	11400	25,8
6	Brusque do Xingu	47	53	43	36	4475	10,1
7	Vale do Sonho	16	23	40	105	4600	10,4
8	Lopes	88	33	120	81	8050	18,2
9	Lopes	114	128	121	156	12975	29,3
10	Vale do Sonho	46	57	60	70	5825	13,2
11	Sta Maria do MT II	22	21	5	29	1925	4,4
12	Paranotapa	71	45	42	48	5150	11,6
13	Sta Maria do MT II	70	62	107	78	7925	17,9
14	Sta Maria do MT I	97	79	89	78	8575	19,4
15	Sta Maria do MT II	104	89	127	140	11500	26,0
16	Sta Maria do MT I	38	40	47	77	5050	11,4
	Subtotal	945	928	1050	1295	6590,6	14,9

Destructive sampling of individuals with a diameter below the applicable diameter range to the allometric equation was carried out to estimate the biomass of that class of individuals. To accomplish that, 100 individuals with DBH around 3,0 cm were harvested and its leafs, branches and trunk were separated to be weighed in the field. A detailed description of field procedures to destructive sampling can be assessed in Annex 5, Document 2, and pictures in Annex 6.

Pictures 04. Destructive sampling: separating leafs, branches and trunk

Thus, to estimate the biomass of the lower diameter class per plot, the average dry weight calculated from the amount of biomass estimated by the destructive sampling, was multiplied by the average number of individuals per plot, which were accounted in the sub-plots. To ensure a more accurate calculation, weighted average was applied in individuals' CBH (Circunference at Breast Height), ranging from 10 to 14 cm, to guarantee DBH around 3,0 cm is better represented. Thus, individuals with CBH between 10 and 11 cm were weighted 3 and those with CBH between 14 and 15, 2. The table below illustrates the weighted average:

Table 03. Destructive sampling weighted average

CBH	Weight (value)
10	3
11	2
12	1
13	1
14	1

To access the dry weight content of those individuals, a dry matter content factor was applied, according to appropriate reference, generated in tropical forest restoration areas (Annex 8). As a result, the average dry weight of individuals with DBH smaller than 5 cm, was estimated in 2, 26 Kg, allowing the calculation of dry biomass and carbon content in that range of individuals.

A total of 4.218 individuals were counted in the 4 sub-plots of the 16 sample plots, which represented an average density per hectare of 6.590,6 individuals with diameter between 0 and 5 cm.

Ex-post stratification and sample intensity verification

In order to separate the population into more homogeneous subpopulations, three strata for the total project area were defined in the first monitoring, using aboveground biomass as a stratification factor, named I, II and III. This method is more efficient when the sample plots are optimally allocated to the strata, keeping the expected average tree biomass per hectare and its variability across strata. In the last monitoring, the strata were defined with the Software ArcMap10.6.1 and the number of sample plots and their allocation among strata were estimated according to the methodological tool A/R-03 "Calculation of the number of sample plots for measurements within A/R CDM project activities". In the current monitoring period, the same plots were re-measured, but they were re-organized among the three strata, according to the actual biomass amplitude calculated after forest inventory.

To ensure the total number of plots, and number of plots per strata was appropriate to the current moment of the plantings, sample intensity was calculated using methodological tool A/R-03 "Calculation of the number of sample plots for measurements within A/R CDM project activities":

$$n = \frac{N * t_{VAL}^{\ 2} * \left(\sum_i w_i * s_i \right)^2}{N * E^2 + t_{VAL}^{\ 2} * \sum_i w_i * s_i^{\ 2}}$$

Where:

n	Number of sample plots required for estimation of biomass stocks within the project boundary; dimensionless
N	Total number of possible sample plots within the project boundary (i.e. the sampling space or the population); dimensionless
t_{VAL}	Two-sided Student's t-value, at infinite degrees of freedom, for the required confidence level; dimensionless
w_i	Relative weight of the area of stratum i (i.e. the area of the stratum i divided by the project area); dimensionless
s_i	Estimated standard deviation of biomass stock in stratum i; t d.m. (or t d.m. ha^{-1})
E	Acceptable margin of error (i.e. one-half the confidence interval) in estimation of biomass stock within the project boundary; t d.m. (or t d.m. ha^{-1}), i.e. in the units used for s_i
i	*1, 2, 3, …* biomass stock estimation strata within the project boundary

Table 04. Sample intensity and strata distribution

Tool	Equation	Parameter	Result
		n	5,6

AR AM TOOL 03, V2.1	(1) # plots			
AR AM TOOL 03, V2.1	Paragraph 13	**n 2ª iteration**	6,3	
AR AM TOOL 03, V2.2	(4) # plots/strata	**ni**	I	1,5
			II	2,2
			III	2,6

The results prove that the number of samples and its distribution among strata are appropriate to the Ex-post estimation.

Estimation of Above and Belowground Biomass

Determination of Aboveground and Belowground Biomass per hectare

Internationally, several studies such as Chave et al. (2004; 2005; 2014), Pearson and Brown (2005) and PICARD et al. (2012), have been carried out to obtain equations that can accurately estimate the forest biomass for different forest typologies. In scientific community there is consensus that the estimation of tree biomass should be performed using allometric models that gather the largest number of independent variables related to tree weight (Chave et al. 2009; Chave et al. 2014). The main variables related to tree weight are DBH, total height and wood density (Chave et al. 2014).

In the study conducted by Chave et al. (2005), the aim was to generate equations that could be used in several regions within the Pan–tropical belt. The authors of this study, in partnership with other researchers, constituted a large database of samples collected in studies carried out in tropical forests around the world, containing a total of 2.410 trees sampled with diameters between 5 and 156 cm, where an equation with a coefficient R_2 of 0.989.

The goal of an even more robust equation that could reliably estimate forest biomass, especially where there were gaps in samples, fostered progress in studies, including Chave et al. (2014) who published improved equations with wider range of use. The study had the collaboration of many researchers around the world who helped to compose the database of 4,004 trees in the range of diameters from 5 to 212 cm, which allowed the improvement of previously developed models. In these new equations, the authors of the work added a factor that portrays the climatic characteristics of the place where the equation is applied which made the equations more accurate for forest biomass estimation.

This model was selected for the following reasons: (1) it was adjusted from a higher number of cubed trees (4,004 individuals); (2) encompasses a wide range of DAP, height and density of wood from different tropical regions (Chave et al. 2014) and; (3) has a low residual standard error (RSE = 0.357), this means that the model has improved performance and results in highly accurate estimates.

Wood density was compiled from the literature from a global database (Key et al. 2005) and with Chave et al (2014) database[30], developed with the aim of providing standardized information on the density of the wood per species to be used in allometric models for biomass estimation. Regarding the estimate of belowground biomass, the model that was used (Cairns, 1997) is indicated by the methodological tool AR-TOOL14 in Equation 4.

Concerning individuals with DBH smaller than 5 cm, the average biomass of each strata per hectare was obtained by multiplying the average density of individuals that was measured in the field per strata and the average weight per individual determined through the destructive method. The belowground biomass of the individuals of the lower diameter class was calculated by the same allometric equation of individuals with DBH bigger than 5 cm.

Therefore, aboveground tree biomass was estimated indirectly through the allometric model of high precision developed by Chave et. al (2014) for tropical regions. This model employs three (3) independent variables (or predictors): DBH (in centimeters, total height (in meters), and wood density (in grams per cubic centimeter). And belowground biomass was determined with the rate calculated with Cairns et al (1997) equation, which uses ABG biomass as the variable predictor. The equations and respective references are described in the table below.

Table 05. Allometric equations used for ABG and BG biomass determination

Reference	Pool	Allometric equation
Chave et al. (2014)	ABG	BPA = 0,0673 x (ρ x DAP2 x Ht)0,976
Cairns (1997)	BG	BRA = exp(-1,085 + 0,926 x ln(BPA))

With that in hand, the AR-TOOL 14 was used to conduct the conversion of the volume of individual trees into biomass, as described below:

$$B_{TREE,l,j,p,i} = f_j(x_{1,l}, x_{2,l}, x_{3,l}, \dots) \times (1 + R_j)$$

$$B_{TREE,l,j,p,i} = V_{TREE,j}(x_{1,l}, x_{2,l}, x_{3,l}, \dots) \times D_j \times BEF_{2,j} \times (1 + R_j)$$

Where:

$B_{TREE,l,j,p,i}$ = Biomass of tree *l* of species *j* in sample plot *p* of stratum *i*; t d.m.

[30] Availavle on: https://esapubs.org/archive/appl/A016/075/

$f_j(x_{1,l}, x_{2,l}, x_{3,l}, \ldots)$ = Above-ground biomass of the tree returned by the allometric equation for species *j* relating the measurements of tree *l* to the above-ground biomass of the tree; t d.m.

Note. The allometric equation used may be based on different units of inputs and outputs. For example, input values of diameter at breast height (dbh) may be in inches and output of biomass may be in pounds, rather than dbh in cm and biomass in kg or t d.m. In such a case, the function should be applied consistently (e.g. convert the dbh values from centimetre to inch units, obtain the tree biomass in pound, and then convert the biomass into metric tonne).

R_j = Root-shoot ratio for tree species *j*; dimensionless

The value of R_j is estimated as $R_j = \frac{e^{(-1.085+0.9256\times\ln b)}}{b}$ where b is the above-ground tree biomass per hectare (in t d.m. ha^{-1}), unless transparent and verifiable information can be provided to justify a different value.

Note. If trees have grown as coppice regeneration after a harvest, then the value of R_j should be multiplied by a factor equal to $v_{HARVEST}/v_{TREE}$ or 1, whichever is greater, where $v_{HARVEST}$ is the volume per hectare of trees harvested and v_{TREE} is the volume per hectare of trees standing in the plot at the time of measurement.

$V_{TREE,j}(x_{1,l}, x_{2,l}, x_{3,l}, \ldots)$ = Stem volume of tree *l* of species *j* in sample plot *p* of stratum *i*, estimated from the tree dimension(s) as entry data into a volume table or volume equation; m^3

Note. Where the volume table or volume equation predicts under-bark volume (i.e. wood volume, rather than gross stem volume), suitable correction should be applied to estimate the over-bark volume.

D_j = Density (over-bark) of tree species *j*; t d.m. m^{-3}

Values are taken from Table 3A.1.9 of IPCC GPG-LULUCF 2003 unless transparent and verifiable information can be provided to justify different values.

Note. Where density (specific gravity) of the bark of a tree species is different from the density of the wood, suitable correction should be applied to estimate a conservative value of the overall (over-bark) density of tree stem.

$BEF_{2,j}$	=	Biomass expansion factor for conversion of tree stem biomass to above-ground tree biomass, for tree species *j*; dimensionless For ex-ante estimation, the value of $BEF_{2,j}$ is selected by applying, *mutatis mutandis*, the procedure described in paragraph 7 below. For ex-post estimation the conservative default value of 1.15 is used, unless transparent and verifiable information can be provided to justify a different value.

Plot biomass, that is biomass per hectare considering individuals with DBH bigger and smaller than 5 cm, was then determined as defined in AR-TOOL 14:

$$b_{TREE,p,i} = \frac{B_{TREE,p,i}}{A_{PLOT,i}}$$

$$B_{TREE,p,i} = \sum_{j} B_{TREE,j,p,i}$$

$$B_{TREE,j,p,i} = \sum_{l} B_{TREE,l,j,p,i}$$

Where:

$b_{TREE,p,i}$	=	Tree biomass per hectare in sample plot *p* of stratum *i*; t d.m. ha^{-1}
$B_{TREE,p,i}$	=	Tree biomass in sample plot *p* of stratum *i*; t d.m.
$A_{PLOT,i}$	=	Size of sample plot in stratum *i;* ha
$B_{TREE,j,p,i}$	=	Biomass of trees of species *j* in sample plot *p* of stratum *i*; t d.m.
$B_{TREE,l,j,p,i}$	=	Biomass of tree *l* of species *j* in sample plot *p* of stratum *i*; t d.m.

The results presented in the table below shows that the majority of the plots had a continuation of its development, such as plot number 12, at the same time as the ones that had incipient development in the last monitoring, are still in lower ranges of biomass, such as plot number 2.The change in biomass stock, is calculated as the difference between biomass stock in 2022 and 2017.

Table 06. Aboveground and Belowground biomass per plot

Plot	Strata	Property	ABG (t/ha)	BG (t/ha)	Total Biomass (t/ha)	Change in total biomass (t/ha) Δ=2022-2017
1	II	Flor da Serra	69,0	17,6	86,5	59,68
2	I	Santa Sofia	18,7	5,3	24,0	14,26
3	I	Rio Bonito	52,5	13,7	66,1	58,55
4	II	Brusque do Xingu	43,1	11,5	54,7	28,92
5	III	Brusque do Xingu	53,6	14,2	67,7	17,36
6	III	Brusque do Xingu	92,9	23,0	115,9	73,09
7	I	Vale do Sonho	23,2	6,5	29,7	24,61
8	III	Lopes	87,6	22,1	109,7	61,97
9	III	Lopes	126,2	31,0	157,2	119,16
10	II	Vale do Sonho	122,8	29,8	152,6	116,78
11	II	Sta Maria do Mato Grosso II	50,5	13,1	63,6	34,03
12	III	Paranotapa	104,1	25,6	129,7	78,76
13	II	Sta Maria do Mato Grosso II	121,8	29,7	151,6	125,11
14	II	Sta Maria do Mato Grosso I	88,4	22,3	110,6	84,63
15	III	Sta Maria do Mato Grosso II	143,6	34,8	178,3	141,10
16	II	Sta Maria do Mato Grosso I	106,5	26,1	132,6	99,72

Determination of Aboveground and Belowground biomass change per strata

To calculate the stocks, it was necessary to estimate the average biomass change of the tree component per hectare in each strata and the associated variance, according to equations 16 and 17 of AR-TOOL 14:

$$\Delta b_{TREE,i} = \frac{\sum_{p=1}^{n_i} \Delta b_{TREE,p,i}}{n_i}$$

$$s^2_{\Delta,i} = \frac{n_i \times \sum_{p=1}^{n_i} \Delta b^2_{TREE,p,i} - \left(\sum_{p=1}^{n_i} \Delta b_{TREE,p,i}\right)^2}{n_i \times (n_i - 1)}$$

Where:

$\Delta b_{TREE,i}$ = Mean change in tree biomass per hectare in stratum *i*; t d.m. ha^{-1}

$\Delta b_{TREE,p,i}$ = Change in tree biomass per hectare in plot *p* in stratum *i*; t d.m. ha^{-1}

$s^2_{\Delta,i}$ = Variance of mean change in tree biomass per hectare in stratum *i*; (t d.m. ha^{-1})^2

n_i = Number of sample plots, in stratum *i*, in which tree biomass was re-measured

The results of the average change of tree biomass above and below ground estimated by strata are shown in Table 6 below. As expected, strata III presented higher tree biomass average per hectare and variance.

Table 07. Change in Biomass stock among strata and statistics associated

	Δbtreei	Δbtree	s2Δi
Estratos	Average Δ Biomass per strata (t/ha)	Average Δ Biomass stratified (t/ha)	Variance Δ Biomass (t/ha)
I	29,6	5,8	253,6
II	69,8	30,3	131,5
III	113,4	41,8	467,3

Picture 05. Strata I

Picture 06. Strata II

Picture 07. Strata III

Determination of change in carbon stock and uncertainty

The change in carbon stock in the trees was estimated using the estimation method by re-measurement of sample plots, based on the forest inventory sample plots installed in different strata, according to the climate impact monitoring plan. According to stratified sampling method, the sample plots are randomly installed between the strata and then measured.

The average change in carbon stock of trees within the tree biomass estimation stratum and the associated uncertainty were estimated using equation AR-TOOL 14:

$$\Delta C_{TREE} = \frac{44}{12} \times CF_{TREE} \times \Delta B_{TREE}$$

$$\Delta B_{TREE} = A \times \Delta b_{TREE}$$

$$\Delta b_{TREE} = \sum_{i=1}^{M} w_i \times \Delta b_{TREE,i}$$

$$u_{\Delta C} = \frac{t_{VAL} \times \sqrt{\sum_{i=1}^{M} w_i^2 \times \frac{s_{\Delta,i}^2}{n_i}}}{|\Delta b_{TREE}|}$$

Where:

ΔC_{TREE}	=	Change in carbon stock in trees between two successive measurements; t CO_2e
CF_{TREE}	=	Carbon fraction of tree biomass; t C (t d.m.)$^{-1}$ A default value of 0.47 is used unless transparent and verifiable information can be provided to justify a different value.
ΔB_{TREE}	=	Change in tree biomass within the biomass estimation strata; t d.m.
A	=	Sum of areas of the biomass estimation strata; ha
Δb_{TREE}	=	Mean change in tree biomass per hectare within the biomass estimation strata; t d.m. ha^{-1}
w_i	=	Ratio of the area of stratum *i* to the sum of areas of biomass estimation strata (i.e. $w_i = A_i/A$); dimensionless
$\Delta b_{TREE,i}$	=	Mean change in carbon stock per hectare in tree biomass in stratum *i*; t d.m. ha^{-1}
$u_{\Delta C}$	=	Uncertainty in ΔC_{TREE}
t_{VAL}	=	Two-sided Student's *t*-value for a confidence level of 90 per cent and degrees of freedom equal to *n* – *M*, where *n* is total number of sample plots within the tree biomass estimation strata, and *M* is the total number of tree biomass estimation strata
$s^2_{\Delta,i}$	=	Variance of mean change in tree biomass per hectare in stratum *i*; (t d.m. ha^{-1})^2
n_i	=	Number of sample plots, in stratum *i*, in which tree biomass was re-measured

From the average change of tree biomass calculated per hectare, the tree biomass in the total area of the strata was then converted into carbon stock and removals (Table 08). The Project Carbono Nascentes do Xingu was able to store, during the current monitoring period (2017 to 2022), **a total of 24.285,3 tons of CO2.**

Table 08. Change in total carbon stock and uncertainty

Tool	Equation	Parameter	Result
AR AM TOOL 14, V4.2	(4) Change in total biomass stock (t d.m.)	**ΔBtree**	14.092,02
AR AM TOOL 14, V4.2	(6) uncertainty	**μΔc**	0,0975
AR AM TOOL 14, V4.2	(3) change in total carbon stock (t CO2)	**ΔCtree**	24.285,3

The uncertainty associated with carbon stock estimates was calculated using the equation and resulted in a value of 9,75%. As the uncertainty was less than the minimum parameter in which discounts are applied, namely 10% as presented in Appendix 2 of the AR-TOOL 14 methodological tool, the estimates are statistically consistent and therefore uncertainty discounting does not apply.
Thus, we have a total of removals without discount resulting in **24.285,3 tCO_2.**

3.3.2 Dissemination of Monitoring Plan and Results (CL4.2)

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The results of the monitoring are published on ISA and Xingu Seeds Network' websites, respectively: https://www.socioambiental.org/ and https://www.sementesdoxingu.org.br/[31] and was also presented at the annual meeting of Xingu' Seed Network. As already mentioned in this report, the dissemination was led through personal channels (Annex 3), annual meeting (Annex 4, 2022 meeting) and trough a news published in the websites, where all the documents concerning the project, including the present monitoring report, are published.

3.4 Optional Criterion: Climate Change Adaptation Benefits

Not applicable.

3.4.1 Activities and/or Processes Implemented for Adaptation (GL1.3)

Not applicable.

3.4.2 Adaptation Monitoring (GL1.4)

Not applicable.

4 COMMUNITY

4.1 Net Positive Community Impacts

4.1.1 Community Impacts (CM2.1)

Community Group	Rural landowners of the 9 properties where restoration activities in riparian areas took place and 57 people who live in the properties (Annex 21)
Impact	Consolidation of the restoration of degraded riparian areas in the

[31] Monitoring Report
Summary Monitoring Report (PT)

	Adequation of the property according to the law
Type of Benefit/Cost/Risk	The impact is positive, since the landowners are legally obliged restore/conserve riparian areas, even if the legislation is not always enforced. It is also positive because it contributes to the provision of several ecosystem services in the property and surroundings, such as attracting fauna and, mainly, conserving the soil and water resources. It is a current and ongoing benefit.
Change in Well-being	The 180,7 ha. of riparian areas restored in the project had increase in biomass in the same proportion as indicated in the carbon monitoring results, in addition, landowners declare benefits mainly related to water quality and turbidity . Although a specific assessment was not conducted, several scientific studies prove the importance of riparian areas for the maintenance of water quality and quantity[32], corroborating with the statement of well-being and water improvement due to restoration of riparian areas in Xingu Waterbasin, therefore, for people who live within it.

Community Group	328 indigenous people – 270 women and 58 men – from 6 ethnic groups and 17 villages, collectors of the Xingu' Seed Network, and indirectly the indigenous communities of the Xingu Indigenous Park[33]
Impact	Indigenous communities are indirect beneficiaries of forest restoration activities, since their livelihood are directly linked to the water resources and the forests and every initiative that promotes conservation and/or restoration of water quality and forests are positive. Restoration of degraded riparian areas contributes to the conservation or restoration of water courses and consequently, of the Xingu River. Furthermore, the commercialization of seeds generates income for indigenous communities, encouraging the economy based on the standing forest.
Type of Benefit/Cost/Risk	The impact is positive, since besides the benefits attached to the conservation of water resources, indigenous communities benefit from the promotion of non-timber forestry activity.

[32] Restauração ecológica de matas ripárias: uma questão de sustentabilidade / Albuquerque, Lidiamar Barbosa... [et al]. – Planaltina, DF: Embrapa Cerrados, 2010

[33] The number of indigenous people participating the Xingu Seed Network has increased in 53 people since last monitoring and in 148 since its foundation.

Change in Well-being	In 2021 the Xingu' Seed Network have commerciliazed 32 tons of seeds, resulting in the generation of R$ 898.000,00. In 2020 and 2021, the Network has commercializaed and generated, respectively, 19 tons and R$ 440.000,00, and 28 tons and R$ 673.000,00. If compared with the last monitoring, the grownth in seeds' commercialiation and resourses generated is expressive. Although it is not a measurable relation, the contribution of the present project for the promotion of the Xingu' Seed Network is very significant, as proved in 2.1.2 and consequently, for all who work with it. It is important to stress out, that the initiative to promote the restoration of Xingu River headwaters and riparian areas of its waterbasin, was a demand of inidigenous peoples living in Xingu Indigenous Park, who were experiencing changes in water cycle. Therefore, the restoration of riparian areas was initially conducted to improve water, well-being and livelihood in Xingu Waterbasin. Although a specific assessment was not conducted, several scientific studies prove the importance of riparian areas for the maintenance of water quality and quantity[34], corroborating with the statement of well-being improvement due to restoration of riparian areas in Xingu Waterbasin, therefore, for people who live within it.

Community Group	183 family farmers – 83 women and 100 men – from 16 agrarian reform settlements and small properties of land, seed collectors of the Seed Network of the Xingu.
Impact	The project's impact on family farmers is the same for indigenous peoples. It directly affects the seed collectors and indirectly all farmers relatives
Type of Benefit/Cost/Risk	Family farmers also benefit from improved water quality in the region and by promoting the economy of non-timber forest products. Directly, the 183 farmers family members who are collectors of the Xingu Seed Network benefit from income generation.
Change in Well-being	In 2021 the Xingu' Seed Network have commercialised 32 tons of seeds, resulting in the generation of R$ 898.000,00. In 2020 and 2021, the Network has commercializaed and generated, respectively, 19 tons and R$ 440.000,00, and 28 tons and R$ 673.000,00.

[34] Restauração ecológica de matas ripárias: uma questão de sustentabilidade / Albuquerque, Lidiamar Barbosa... [et al]. – Planaltina, DF: Embrapa Cerrados, 2010

	If compared with the last monitoring, the growth in seeds' commercialization and resources generated is expressive. Although it is not a measurable relation, the contribution of the present project for the promotion of the Xingu' Seed Network is very significant, as proved in 2.1.2, and consequently, for all who work with it. It is important to stress out that the initiative to promote the restoration of Xingu River headwaters and riparian areas of its waterbasin, was a demand of in digenous peoples living in Xingu Indigenous Park, who were experiencing changes in water cycle. Therefore, the restoration of riparian areas was initially conducted to improve well-being and livelihood in Xingu Waterbasin. Although a specific assessment was not conducted, several scientific studies prove the importance of riparian areas for the maintenance of water quality and quantity[35], corroborating with the statement of well-being and water improvement due to restoration of riparian areas in Xingu Waterbasin, therefore, for people who live within it.

Community Group	Sustainable Xingu Association - AXS
Impact	AXS strengthening, capacity building and local empowerment. AXS was created with the purpose of representing the rural producers associated with the Project Carbono Nascentes do Xingu. The creation of AXS was considered a positive impact of the project, as it strengthens the union of producers in Santa Cruz do Xingu in their common interests, especially, but not exclusively, those related to carbon markets. In the five-year period evaluated, AXS has been impacted by the pandemic context and the change in its board, and again the Project has contributed for the structuring of the organization, since AXS has direct responsibilities in the present process of verification. And as already mentioned, AXS has even presented a project to Natura with new areas.
Type of Benefit/Cost/Risk	It is a positive indirect impact of the project, which extends to other context, since the strengthening of the AXS can bring other benefits to landowners of Santa Cruz do Xingu and for the region.
Change in Well-being	The benefit of the Association' structuring can not be measured, but have significant impact on local context.

[35] Restauração ecológica de matas ripárias: uma questão de sustentabilidade / Albuquerque, Lidiamar Barbosa... [et al]. – Planaltina, DF: Embrapa Cerrados, 2010

Community Group	Municipalities of the main cities where there are activities of the Campaign and the xingu' Seeds Network, especially those where there are seed's room and partnerships with city halls –Canarana, Querência, São José do Xingu, Santa Cruz do Xingu and Comfresa.
Impact	Strengthening and diversifying the local economy
Type of Benefit/Cost/Risk	It is an indirect benefit of the project. Because of, the 'Y Ikatu Xingu Campaign, it was necessary to structure nurseries and seed houses, both to store the seeds collected by the seed collectors, and also to produce seedlings that are also used in activities of forest restoration. The construction and improvement of nurseries and seed houses are positive impacts of the project for the municipalities where these structures are located, since, in addition to the creation of employment and generate income in the municipality, creates the basis for the diversification of economic activities and, mainly, to expand forest restoration and adaptation activities environment of the municipal properties. Even though, the current monitoring period has not directly promoted the construction of seed's room, the experience and structure promotoed by the Project is a permanent benefit.
Change in Well-being	This is an impact that cannot be measured. However, the strengthening and diversification of local economy, creating the basis for non-timber forestry activity and for the restoration of degraded areas are certainly positive. The Present project had significant share on the structuring of that economy and culture in the region. Besides that, the Project has direct contribution to the regularisation of rural properties according to national and local law, which contributes to the reduction of efforts coming from public service. In addition, one of ASX participants is vice Mayor.

Community Group	40 Students and researchers that could improve their knowledge within the restoration areas of the project and Xingu Seed Network experience
Impact	Contribution to students and researchers who can use the restored areas under for learning and improve forest restoration techniques, measures of biomass, etc. The articles and scientific research conducted in Project's areas can be found in Annex 7.

Type of Benefit/Cost/Risk	That's a current, direct and permanent benefit of the Project, since forest activities can be used as experimental sites for several researches.
Change in Well-being	In the current monitoring period, two articles were published and one Master paper were produced, based on the Projecr planting sites.

4.1.2 Negative Community Impact Mitigation (CM2.2)

As presented in the PDD, there are no negative impacts observed on stakeholders and/or communities. In fact, the one and only impact identified in the last monitoring, was the application of chemicals for invasive plants control, which did not occur during the current monitoring period since the areas are already covered with native vegetation, that breaks growth of invasive grass.

In addition, the maintenance of HCV are ensured, as Mato Grosso State experience a very high index of deforestation and non-compliance with Law[36] (Annex 17), and the plantings ensure a crucial function of enhancing genetic variability, ecological corridors, buffer areas to protect HCV and native vegetation surface. Also, the plantings were all implemented with seeds collected in the region, which guarantees that species planted are native to that specific location. The maintenance of the plantings, that for itself function as a protection for HCV, is done through Xingu+ Observatory, field visits and AXS.

It is important to stress out again, that the Project is included in the Campaign 'Y Ikatu Xingu, which main objective is to promote the restoration of watersprings and riparian areas within Xingu Waterbasin, to generate positive impacts for the communities. The plantings were implemented according to the law, the species planted are native to the location and so undoubtedly the Project has significant positive impact for communities and population living within the Basin. That is proven by numerous scientific studies[37] that prove the importance of native vegetation cover in riparian areas to ensure maintenance of water cycle – in quantity and quality, people will be positively impacted by the changes in hydrological cycle promoted by Project's activity.

[36] Source: Termômetro do Código Florestal (OCF). Available on: https://observatorioflorestal.org.br/avaliacao-do-codigo-florestal-2017-2020/?doing_wp_cron=1666379725.9798910617828369140625

[37] 1) Restauração ecológica de matas ripárias: uma questão de sustentabilidade / Albuquerque, Lidiamar Barbosa... [et al]. – Planaltina, DF: Embrapa Cerrados, 2010

2) Cadernos da Mata Ciliar / Secretaria de Estado do Meio Ambiente, Departamento de Proteção da Biodiversidade. - N 1 (2009)--São Paulo: SMA, 2009

3) TAMBOSI, Leandro Reverberi; VIDAL, Mariana Morais; FERRAZ, Silvio Frosini de Barros; METZGER, Jean Paul. Funções eco-hidrológicas das florestas nativas e o Código Florestal. Estudos Avançados, [S.L.], v. 29, n. 84, p. 151-162, ago. 2015. FapUNIFESP (SciELO). http://dx.doi.org/10.1590/s0103-40142015000200010.

4) NISHIZIMA, Mariana Lopes; HILÁRIO, Giovana Piai. Restauração Ecológica de Áreas de Preservação Permanente e Pagamentos por Serviços Ambientais. Geoatlas, Online.

4.1.3 Net Positive Community Well-Being (CM2.3, GL1.4)

As presented, no negative impacts were identified for any community or groups, nor to biodiversity, actually, all the impacts of Project implementation are positive. Therefore, the impacts on the well-being of stakeholder groups are also positive.

To enforce that, it is possible to assess some of the scientific references (29) concerning the benefits of ecological restoration for water cycle, along all the Waterbasin. That benefit is even bigger, considering that absolutely all species planted were collected in the region, except for the green manure leguminous plants that have left the system in its 3rd/4th year, which means that the plantings were implemented with species native to the region. Therefore, the community is benefited from the improvement of water quality and quantity in the region. In addition, community is involved in the commercialization of the seeds, as that's main community' objective of the Project. Benefits related to that are: the increase in revenue[38], community aggregation, participation in trainings and courses, possibility of livelihood improvement, among others. Thus, the benefits of participating the Network involve revenue, but it is not limited to it, since many collectors report well-being improvement from participating the Network.

To sum up, considering that without the project those areas could not have been restored – as proven by the systematic non-compliance of the Forest Code (Annex 17), and that, if restored, could not have promoted Xingu' Seed Network through the acquisition of seeds, as the most conventional planting is through seedlings, those are net positive impacts promoted by the project.

4.1.4 Protection of High Conservation Values (CM2.4)

The main goal of forest restoration within the scope of the 'Y Ikatu Xingu Campaign, as already mentioned, is the protection and strengthening of socio-environmental diversity and water quality in the Xingu water basin. The forest restoration activities contribute to the improvement and conservation of resources water resources of the Xingu Basin.

4.2 Other Stakeholder Impacts

4.2.1 Mitigation of Negative Impacts on Other Stakeholders (CM3.2)

As described in Sections 4.1.2 and 4.1.3, the Project provide direct positive impacts for those directly participating, and indirect positive impact for other stakeholders, for example population living within Xingu Waterbasin[39]. Therefore, as described before, the plantings followed all the

[38] https://www.uol.com.br/ecoa/ultimas-noticias/2022/11/03/moto-carro-e-casa-familia-muda-de-vida-e-ajuda-clima-com-sementes.htm

[39] **1)** Restauração ecológica de matas ripárias: uma questão de sustentabilidade / Albuquerque, Lidiamar Barbosa... [et al]. – Planaltina, DF: Embrapa Cerrados, 2010
2) Cadernos da Mata Ciliar / Secretaria de Estado do Meio Ambiente, Departamento de Proteção da Biodiversidade. - N 1 (2009)--São Paulo: SMA, 2009
3) TAMBOSI, Leandro Reverberi; VIDAL, Mariana Morais; FERRAZ, Silvio Frosini de Barros; METZGER, Jean Paul. Funções eco-hidrológicas das florestas nativas e o Código Florestal. **Estudos Avançados**, [S.L.], v. 29, n. 84, p. 151-162, ago. 2015. FapUNIFESP (SciELO). http://dx.doi.org/10.1590/s0103-40142015000200010.
4) NISHIZIMA, Mariana Lopes; HILÁRIO, Giovana Piai. Restauração Ecológica de Áreas de Preservação Permanente e Pagamentos por Serviços Ambientais. Geoatlas, Online.

proper regulation, agreements for workers during the current monitoring period (Annex 14) are provided and converge with National Labor Law, and with ISA's policies and statutes. To conclude, the Project do not generate negative impact in other stakeholders.

4.2.2 Net Impacts on Other Stakeholders (CM3.3)

The previous sections demonstrate that planting native vegetation in riparian areas provide positive impact for the populations living in the respective waterbasin. In addition, no grievance has been received and Project Proponent have a stable and positive relation with investors, municipalities, universities, landowners and seed' collectors. This can be proved through Activity Report from ISA (Annex 16), that demonstrate that ISA's activities are in constant development due to its positive impacts. The Project is certainly part of that context of action, as ISA established several plantings in the region, with the same procedural and stakeholders as the present Project, although not CCB certified. The increase of that activities, prove that the net impacts are positive

4.3 Community Impact Monitoring

4.3.1 Community Monitoring Plan (CM4.1, CM4.2, GL1.4, GL2.2, GL2.3, GL2.5)

As detailed in the appropriate section (2.1.2), it was concluded that for the present monitoring report, the indicators constructed to evaluate community impacts, do not apply to the current report, since most of them are related to the inclusion of new areas or planting activities realized in the project's area. However, as the areas validated in the last monitoring period are not being verified in the present monitoring, and as there was no enrichment planting conducted in the planting areas, because of the satisfactory development of the areas, the indicators do not contemplate the current situation. For that reason, it was understood that evaluate the development of Xingu' Seed Network is appropriate, because Project communities' objective is Xingu' Seed Network constitution and development, and also considering the long-term benefits provided by the expansion of natural vegetation cover for Network's action Concerning HCVs, the increase in areas restored with the contribution of Seed Network, constitutes a very positive impact for those areas' conservation and maintenance. Genetic variability and ecological corridors ensure those areas are more resilient and are maintained throughout time.

Table 09. Data collected for community' impacts monitoring.

Data monitored	Source	Data Unity	Measured/calculated or estimated	Comments	August 2022
Seeds acquisition for restoration activities in the project	Maps of restoration areas	R$	Estimated	As the plantings took place before the current monitoring period, so all enrichment planting has already occurred, and for the present monitoring new areas are not being verified , that's an indicator that does not fit the current moment of the plantings	-
Billing of Xingu' Seed Network in year t	Seed Network organization	R$	Estimated	Data obtained with Xingu Seed Network responsible people	R$ 898.000,00
Number of seedlings used by the project in year t	Team involved in field activities	Quantity	Calculated	Same as above: no enrichment planting was conducted in the monitoring period, and no new areas are in verification proccess	-
Average seedlings' price in the region of the project in the year t	Team involved in field activities	R$	Estimated	Same as above: as no seedlings were acquired in the current monitoring, it is not possible to estimate seedlings price.	-
Increase in areas for seed collection	Seed Network organization and project proponent	Hectares	Measured	The numbers are separeted according to two approaches: # hectares directly related to the Project + # hectares related to general RSX and ISA work	180,7+7219,3
Increase in seed collectors' groups	Seed Network organization	Quantity	Measured	Increase in number of seed collectors group since 2017 to 2021	9
Tons of seeds commercialized by RSX (2018-2022)	Seed Network organization	tons	Calculated	Those seeds correnspond to the general scope of Seed Network action	97

Source: Project's team[40].

[40] The 'Billing of Xingu' Seed Network' corresponds to the total income generated by the organization in 2021

4.3.2 Monitoring Plan Dissemination (CM4.3)

The results of the current Monitoring Period for social, climate and biodiversity impacts, remain available on the internet at ISA and the Seeds Network websites, through a news published in each site and also in the collection of publication of each institutions[41]. Internet is the most accessible channel to communicate with the wide diversity of stakeholders encompassed by the Project. However, to ensure more people are aware of the results, Project Proponent also uses personal contacts (Annex 3) and Xingu' Seed Network annual meeting. In 2022, during the annual meeting, the team in charge of the project inside ISA, had a a specific moment to communicate about the process in course and the related documents (Annex 4).

4.4 Optional Criterion: Exceptional Community Benefits

The Project is not under validation for Gold Level benefits.

4.4.1 Short-term and Long-term Community Benefits (GL2.2)

Not applicable.

4.4.2 Marginalized and/or Vulnerable Community Groups (GL2.4)

Not applicable.

4.4.3 Net Impacts on Women (GL2.5)

Not applicable.

4.4.4 Benefit Sharing Mechanisms (GL2.6)

Not applicable.

4.4.5 Governance and Implementation Structures (GL2.8)

Not applicable.

4.4.6 Smallholders/Community Members Capacity Development (GL2.9)

Not applicable.

5 BIODIVERSITY

5.1 Net Positive Biodiversity Impacts

5.1.1 Biodiversity Changes (B2.1)

Biodiversity monitoring is carried out together with climate monitoring, every five years, in the same plots as forest inventory. The data obtained within the plots are used to calculate indicators

[41] Monitoring report
Summary Monitoring Report

of ecological richness and flora diversity. Diversity is sampled using the active search method, noting all species observed during sampling. The areas selected for allocation of plots of permanent monitoring are travelled on foot and the names of species are noted, separating them between “planted” and “natural regeneration”, which is consists of post field work. That’s done by crossing all the list of species planted by the project, and those found in the area that were not planted, characterizing a natural regeneration process conducted by fauna or other mechanisms of dissemination. The biggest number of species in the natural regeneration of a given area indicates that the presence of native fauna, resuming its ecological successional process and functioning as corridor for biodiversity. Footprints and other evidence of the presence of fauna in the areas sampled are also recorded with GPS points and photos, and the detailed table with the evidence of species planted x regenerated, and animals can be found in Annex 6.

Change in Biodiversity	Presence of regenerating plant species that were not planted by the project
Monitored Change	The impact is positive and direct. 75 species were planted and 32 species that were not planted by the project were identified.
Justification of Change	The number of regenerating species of a given area indicates the presence of native fauna, proving its ecological succession process and functioning as a corridor for biodiversity. The higher the number of naturally regenerated species, the greater the use of area by native fauna. Biodiversity monitoring is carried out together with climate monitoring, every five years, in the same areas where the plots are located.

Change in Biodiversity	Record of animal species or evidence (trails, footprints, feces, etc.) found at the monitoring.
Monitored Change	Increasing occurrence of animal species (tair, deer, capybara, paca, agouti, giant armadillo, anteater, coati, macaque capuchin, howler monkey, blue-and-white macaw, among other birds) that possibly increased due to project actions (animal dispersal through the developing forest).
Justification of Change	Footprints and other evidence of the presence of fauna in the areas sampled are also recorded with GPS points and photos (ODK). See attachment 6. This indicates that the area is being used by the native fauna, resuming its ecological succession and contributing as a corridor and source of wildlife resources. During the first quinquennium monitoring,

	122 records of 26 animal species and 11 not identified. Details of the species and traces found are in Annex 6.

5.1.2 Mitigation Actions (B2.3)

In the last monitoring period, chemical inputs were applied to control eventual exotic species used in the plantings, such as green manure. As the plantings experience different development stage, those species are not present anymore, and so no chemical input was applied. That said, there were no need for mitigation action, since no damaging impact was generated in the current monitoring period. Considering that all the species planted are not only native in the region, but also its seeds were collected within Xingu Waterbasin, it ensures that the plantings encompass only native vegetation of the region. That said, and considering that the impacts generated by the plantings, such as sedimentation reduction, increase in ecological corridors and genetic variability are very positive for HCV, the Project ensure an increase in HCV attributes.

The Xingu Seed Network has as a collection procedure that prohibits the collection of more than 50% of the seeds that a tree can produce in the year, to allow its natural reproduction and also the consumption of its fruits and seeds by the fauna. With this rule and the structure in 25 different communities, the Xingu Seed Network is able to provide seeds of native species with high genetic variability, which is desirable in ecological restoration to form forests resilient to pests and environmental changes, at the same time as protect and conserve native vegetation (Annex 13, 'Livro do Coletor').

5.1.3 Net Positive Biodiversity Impacts (B2.2, GL1.4)

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In the absence of the project, the number of native species in Project areas would not have increased, neither the hectares of native vegetation surface, which configures the project as additional (Annex 17). Therefore, the demonstrated biodiversity impacts are the direct net impacts of the project to the biodiversity (Annex 6), since none of it would have occurred as demonstrated by systematic non-compliance of Forest Code (Annex 17), and the species planted could have not been native to the region. Indirectly, the impacts can be larger, even if not measurable, since the improvement in water quality, vegetation cover and the constitution of ecological corridors generates positive impacts on regional biodiversity, by increasing its habitat and resilience of native vegetation.

5.1.4 High Conservation Values Protected (B2.4)

The project is constituted so it does not generate any negative impact. The safeguards carried out, and already mentioned in this report, for example, with the training of seed's collectors from the Xingu Seed Network, ensures that there is no negative impact on areas of High Conservation Value. In fact, the different aspects monitored - monitoring the quality of the restoration, field activities and monitoring of the carbon stocks – ratify that there was no negative impact on biodiversity and on water resources arising from project activities.

5.1.5 Invasive Species (B2.5)

The list provided by the inventory led to calculate carbon removals, proves no exotic species remains in the areas. In Annex 6 is possible to see all the species planted in the areas under verification. Green manure species was planted to improve soil attributes and to reduce the colonization of exotic plants that are more difficult to control, such as grass. Green manure has a short cycle, so it is not in the system anymore, therefore, all the species in the plantings are native.

5.1.6 Impacts of Non-native Species (B2.6)

Not applicable

5.1.7 GMO Exclusion (B2.7)

The list of species present in the plantings can be found in Annex 6, in addition, as mentioned before, all the seeds from the plantings are collected by Xingu' Seed Network, except for green manure, thus no GMO was planted

5.1.8 Inputs Justification (B2.8).

Not applicable. No input was used during the monitoring period

5.2 Offsite Biodiversity Impacts

5.2.1 Negative Offsite Biodiversity Impacts (B3.1) and Mitigation Actions (B3.2)

As previously mentioned in the present report, and also as described in PDD, the Project do not generate negative impacts outside the Project's Area, because the exotic species used in the plantings has short life cycle, as proven by the inventory led for the current monitoring period. In addition, no GMO are used.

Thus, and added to the fact the plantings are led as recommended by the Law, none of the plantings generate negative impacts for the Project's Area – actually, the plantings contribute to enhance native biodiversity, which directly impacts the resilience of established plantings and natural generation potential in the surroundings, so the Project's activities' impacts on biodiversity are all positive. Also, considering the scope of action of Xingu' Seed Network, seed's collection generate a profitable activity that contributes to the maintenance of forests and its populations.,

5.2.2 Net Offsite Biodiversity Benefits (B3.3)

As previously demonstrated, the forest restoration activities main scope of the project contribute to the increase in vegetation cover, habitats for biodiversity, to the constitution of ecological corridors and to the production and maintenance of the quality of water. As a result, the effects of the project on the biodiversity of the areas outside the project, if any, will certainly be positive.

Exotic species used have short life cycle and do not germinate without light, ensuring they exit the plantings after native species are established.

5.3 Biodiversity Impact Monitoring

5.3.1 Biodiversity Monitoring Plan (B4.1, B4.2, GL1.4, GL3.4)

Biodiversity monitoring reports are carried out every five years, at the same time as climate monitoring reports. The plots defined for the monitoring of climate impacts are the same for monitor indicators of impacts on the project's biodiversity, which are:

- Abundance of plant species and population of identified species, separating them among those that were introduced or not by the project;

- Record of animal species present at the time of field visits or evidence of fauna observed by the technicians who carried out the visit (trails, footprints, feces, etc.).

Exotic species identified in the last monitoring, were controlled as a result of natural sucession process, which is evidence by the inventory led in project's plots and the respective species identified. The areas present satisfactory development and, only two areas had degradation factors identified, which were properly addressed by project proponent (Annex 3). As previewed in the agreements with AXS, the actions to be taken in such cases is landowners' responsibilities, and so ISA have informed AXS and landowners to isolate the areas. As expected, some areas experience greater development than others, however all of them attend to the general expectation about 10 years' planting.

Monitoring visits make it possible to assess the effectiveness of the project to restore the ecological functions of the recovering APPs. The assessment is duly recorded in the monitoring reports prepared every five years. The table below resumes the data collected for biodiversity monitoring.

IUCN Red List[42] is an International recognized list for identification of species' status in the globe. According to that list, *Crypturellus parvirostris*, identified in biodiversity monitoring, has its population decreasing. On the other hand, *Tapirus terrestris,* a remarkable mammal is classified as vulnerable in the same list, and records of its presence in Project' areas were identified in the monitoring. *Priodontes maximus* tracks were also found in more than one plot assessed in biodiversity monitoring, and its population is classified as vulnerable in IUCN list.Table below summarizes biodiversity results, and further information can be found in Annex 6.

[42] https://www.iucnredlist.org/

Table 10. Data collected for biodiversity monitoring.

Data monitored	Source	Data Unity	Measured/calculated or estimated	Frequency	Proportion	Archiving	August 2022
Tree species' richness identified in sample plots	Sample plots	Quantity of species	Measured	5 years	100	Online document	96 species identified in sample plots
Number of species identified that were not introduced by the project	Project area and sample plots	Quantity of regenerating species	Measured	5 years	100	Online document	32 species identified were not introduced by the project
Population of tree species identified	Sample plots	Quantity of individuals per hectare	Measured	5 years	100	Online document	1591 ind/ha
Animal species present in project areas identified through evidence of fauna	Project area and sample plots	Quantity	Measured	5 years	100	Online document	122 observations registered of 26 identified species and 11 not identified species

Source: Project's team

5.3.2 Biodiversity Monitoring Plan Dissemination (B4.3)

The Biodiversity Monitoring results is available in ISA and Xingu Seed Newtork' websites[43], as well as all documents related to the project[44]. Those documents are available in the websites and ISA have also communicated AXS, via email and personal contacts (Annex 3), and Xingu' Seed Participants in 2022' annual meeting (Annex 4).

5.4 Optional Criterion: Exceptional Biodiversity Benefits

The Project is not under validation for Gold Level benefits.

5.4.1 Trigger Species Population Trends (GL3.3)

Not applicable.

5.4.2 Effectiveness of Threat Reduction Actions (GL3.4)

Not applicable.

6 ADDITIONAL PROJECT IMPLEMENTATION INFORMATION

The Project was developed in order to promote benefits for climate, community and biodiversity. To achieve that, the Project do not limit itself in planting seedlings in riparian area to attend national law – it is committed in strengthening sociobiodiversity economy.

Native vegetation play a key role in mitigating and adapting to climate change impacts, however it is known that poor, rural and traditional communities are specially affected by climate changes and not only planting trees is a solution – but ensuring the protection of local native vegetation. The project encompasses activities that contribute to the well-being and livelihood of communities living in Xingu waterbasin, which is the main social objective of the validated project: strengthen a non-timber forest products' organization: Xingu' Seed Network, which is led and managed by communities living within the Waterbasin.

Those communities are not only benefited because of the financial activity involved, but also by the improvement in environmental conditions promoted by the plantings and specially by the mutual engagement, trainings and their visibility in a region they are often undervalued.

[43] Available on: https://acervo.socioambiental.org/adv-search?form_id=advanced_search_form&form_token=O7RxKFE0foSoGbeBWQ1JwJHce0D6bb2aFOPU1csjVOg&form_build_id=form-CN3muL-qv87VLlie3wHhH_jZ_IhSUZy7J3Lwf4kdt9M&search_term=Projeto+Carbono+Nascentes+do+Xingu&content_type=documento and https://www.sementesdoxingu.org.br/noticias/instituto-socioambiental-planta-florestas-em-mt-no-combate-a-mudanca-climatica

[44] Monitoring Report
Summary Monitoring Report

Regarding biodiversity, the Project promotes plantings that are conducted exclusively with native species from the region, contributing with the maintenance of genetic biodiversity, cornerstone for systems' resilience.

That said, the Project have notable measures to mitigate negative impact (CCB Standards v3.1, CM2.3) and B2.3)) due to the mentioned aspects, added to the fact that the participation in the Network and in the plantings is voluntary and they all take place in regular private areas.

7 ADDITIONAL PROJECT IMPACT INFORMATION

Propose positive impacts to traditional and rural communities and indigenous peoples, necessarily implies in engaging some people who are not totally familiarized with modern means of communication – such as internet, telephone and instant message. Considering that, Project Proponent have established the most efficient manner of disseminating the results and process: trough internet and through the organization that have direct contact with many distant communities – the Xingu' Seed Network. As previously shown, the Proponent have used both websites (ISA and Xingu' Seed Network), as well as directly communicating with Network' representative.

As a result of the strict relation between the proponent and the Network, the areas planted by the Project have already entered the scope of action of the Network as seed collection areas – that is, although the modern means of communication is not totally accessed by all Network' participants, the establishment of the planting is known in a way it is important for them: contributing to their livelihood (See Annex - Declaração Coleta de Sementes) - B4.3) and CM4.3).

- **APPENDICIES**

The following appendices may be used if appropriate. Delete the instruction and heading if not used.

- Appendix 1: Project Risks Table

Use this appendix, if necessary, to identify project risks and fulfill the requirements of Section 2.1.4 above. Modify the table, if necessary, to suit the project activities, or delete if not used.

Identify Risk	Potential impact of risk on climate, community and/or biodiversity benefits	Actions needed to mitigate the risk

- Appendix 2: New Project Areas and Stakeholders

Use this appendix, if necessary, to identify new project areas and stakeholders and fulfil the requirements of Sections 2.1.6 above. Modify the table, if necessary, to suit the project activities, or delete if not used

Stakeholder *Identify communities and any community groups within them, any cross-cutting community groups, and list other stakeholders*	Rights, interest, and overall relevance to the project	Demonstrate how they meet the eligibility criteria (G1.14)	Demonstrate how their inclusion does not violate the scalability limits (G1.15)