EFFECTIVENESS EVALUATION FOR AMAZON FUND/ BNDES

SUPPORTED PROJECTS

SEMAS PARÁ & REFORESTATION IN THE SOUTHERN PART OF THE STATE OF AMAZONAS

DECEMBER
2020

REPORT OF THE EFFECTIVENESS EVALUATION OF THE *SEMAS PARÁ (PARÁ STATE ENVIRONMENT AND SUSTAINABILITY DEPARTMENT)* AND *REFORESTATION IN THE SOUTHERN PART OF THE STATE OF AMAZONAS PROJECTS.*

This report presents the ex post effectiveness evaluation results of supported state environment agencies projects. This evaluation was carried out by a team formed by independent consultants under the coordination of the German Cooperation for Sustainable Development through *Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH*, alongside with the Brazilian National Bank for Economic and Social Development (BNDES) about the Amazon Fund. All opinions expressed here are the sole responsibility of the authors, and do not necessarily reflect the position of GIZ and BNDES. This report is final, after being adjusted following a presentation at the Consultation Round to raise possible complementary comments.

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BNDES

MINISTÉRIO DA ECONOMIA

MINISTÉRIO DO MEIO AMBIENTE

ACRONYMS

AF	Amazon Fund
APs	Federal Protected Areas *(Áreas Protegidas federais)*
ATER	Technical Assistance and Rural Extension *(Assistência Técnica e Extensão Rural)*
BNDES	National Bank for Economic and Social Development *(Banco Nacional de Desenvolvimento Econômico e Social)*
CAR	Rural Environmental Registry *(Cadastro Ambiental Rural)*
Coema	State Council of Environment *(Conselho Estadual de Meio Ambiente)*
EMBRAPA	*Brazilian Agricultural Research Corporation* (Empresa Brasileira de Pesquisa Agropecuária)
IBGE	Brazilian Institute of Geography and Statistics *(Instituto Brasileiro de Geografia e Estatística)*
IDAM	Institute of Sustainable Agricultural and Forestry Development of the State of Amazonas *(Instituto de Desenvolvimento Agropecuário e Florestal Sustentável do Estado do Amazonas)*
INPE	National Institute for Space Research *(Instituto Nacional de Pesquisas Espaciais)*
IPAAM	Amazonas Environmental Protection Institute *(Instituto de Proteção Ambiental do Amazonas)*
MMA	Ministry of Environment *(Ministério do Meio Ambiente)*
NUREs	Regional centres of the State Environmental Organizations *(Núcleos Regionais OEMAs)*
OECD	Organization for Economic Cooperation and Development
OEMAs	State Environmental Organizations *(Organizações Estaduais de Meio Ambiente)*
PPCDAm	Action Plan for Deforestation Prevention and Control in the Legal Amazon *(Plano de Ação para Prevenção e Controle do Desmatamento na Amazônia Legal)*
PRODES	Brazilian Amazon Rainforest Monitoring Project by Satellite *(Projeto de Monitoramento da Floresta Amazônica Brasileira por Satélite)*
PRA	Environmental Regularization Program *(Programa de Regularização Ambiental)*
RAT	Trimestral Follow-up Report *(Relatório de Acompanhamento Trimestral)*
REDD+	Reducing Emissions from Deforestation and Forest Degradation and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks
SAF	Agroforestry Systems *(Sistemas Agroflorestais)*
SDS	Secretary of the Environment and Sustainable Development *(Secretaria de Meio Ambiente e Desenvolvimento Sustentável)*
SEIAM	State Environmental Information System *(Sistema Estadual de Informações Ambientais)*
SEMA	State Secretary of the Environment *(Secretaria de Estado de Meio Ambiente)*
SEMAS	State Environment and Sustainability Department *(Secretaria de Estado de Meio Ambiente e Sustentabilidade)*
SICAR	National Rural Environmental Registry System *(Sistema Nacional de Cadastro Ambiental Rural)*
TIs	Indigenous Land *(Terras Indígenas)*
UCs	Protected Areas *(Unidades de Conservação)*

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EXECUTIVE SUMMARY

In order to achieve greater efficiency and broaden the understanding of results achieved by projects supported by the Amazon Fund with monitoring and control activities, the *Pará State Environment and Sustainability Department* (called *SEMAS Pará project* as from here) and *Reforestation in the Southern part of the State of Amazonas* (called *Reforestation project* as from here) projects were here evaluated. These projects were carried out by state environmental agencies in the states of Pará and Amazonas respectively.

The projects were implemented at the state level and in some key municipalities, aiming to improve environmental management for deforestation prevention and control. The incentive to join the Rural Environmental Registry (*Cadastro Ambiental Rural - CAR*), with small rural farmers with properties of up to four fiscal modules entering the registry, aimed at a more effective monitoring and control by the State Secretary of the Environment and Sustainability in the states of Amazonas and Pará.

In the case of the *Reforestation project*, as a complementary initiative, vegetation recovery was carried out by small rural farmers, with environmental liabilities generated by deforestation as identified by the CAR. In addition to that, these landowners were trained in the implementation of Agroforestry Systems (*Sistemas Agroflorestais - SAF*), enabling cultivation practices with reduced ecological impact and generating income in a way that does not harm production.

The total value of the two projects was R$ 33,498,516.19 (6,41 Mio. USD[1]), fully supported by the Amazon Fund. The *Reforestation project*, whose support amounted to R$ 17,575,286.19 (3,36 Mio. USD), started in December 2010 and ended in June 2018 (more than seven years). The *SEMAS Pará project*, whose support amounted to R$ 15,923,230.00 (3,05 Mio. USD), started in October 2010 and ended in March 2017 (more than six years).

The methodology used in the evaluation was based on the projects' Logical Framework and on the criteria and objectives contained in the Conceptual Framework for Impact Evaluations of Projects Supported by the Amazon Fund, prepared in cooperation between GIZ and the Amazon Fund in 2016, and in its addendum, which depicts specific methodologies for this type of evaluation and guides future thematic evaluations[2].

In the preparation phase, secondary sources were consulted, and guiding questions were developed based on the development of theories of change and the individual logical frameworks of the projects. An analysis of the forest recovery situation was also carried out in the municipalities covered by the *Reforestation project*.

[1] The quotation used for 1 USD = 5.2281 R$ was based on the values of May 28, 2021, provided by the Central Bank of Brazil. Available in: https://www.bcb.gov.br/

[2] Available in: http://www.fundoamazonia.gov.br/export/sites/default/en/.galleries/documentos/monitoring-evaluation/Independent-evaluations/Amazon-Fund-impact-evaluations-projects-supported-2016.pdf. Access in: May 27, 2021.

It was not possible to carry out a field mission due to the Covid-19 pandemic. Thus, whenever possible and appropriate, people were identified and interviewed remotely. Among the people interviewed were project and public agencies managers working at the time, partners in project implementation, one of the beneficiaries of the *Reforestation project*, employees of the municipal environment secretaries of the states from Pará and Amazonas and from the regional core of the State Secretary of Pará. The specific project reports were sent to the main project actors for review and to be complemented after the consultation round.

Based on the feedback of the main actors, after the consultation round, an analysis of the arguments and the new subsidies was carried out, allowing for the necessary reflections for the more strategic conclusions sections of this report.

EVALUATION RESULTS

According to the main evaluation criteria used by the Organisation for Economic Cooperation and Development (OECD), the main results achieved, in relation to relevance, impacts, effectiveness, efficiency and sustainability, were:

RELEVANCE

Both projects were relevant to the implementation of the new environmental policy, based on the New Forest Code Laws, enacted in 2012, at the beginning of project development. Both focused on environmental regularization and strengthening of environmental management, with an emphasis on the CAR/Environmental Regularization Program (*Programa de Regularização Ambiental - PRA*), with technical training and standardization of the relevant legislation. There were some thematic differences; in Pará State agency decentralization was also strengthened by reaching key deforestation municipalities and the implementation of environmental management in municipalities that showed interest and capacity to take on environmental management commitments. In Amazonas State, in addition to the CAR registration, training and standardization, vegetation recovery initiatives were carried out in the four selected municipalities in areas with environmental liabilities, which brought great learning and are now recovering, as is demonstrated in the spatial analysis carried out in this evaluation.

IMPACTS

In both projects, the change in the federal legislation on CAR, at the beginning of the projects' development, resulted in the need for adjustments, which presented a great challenge in how to adapt and measure impacts. Even so, it can be said that the main positive impacts were a) facilitating the farmers' access to the initial phase of environmental regularity (Rural Registration), b) improved monitoring and control of illegal activities, c) the improvement of commitments for the recovery of environmental liabilities, d) and a reduction in illegal behaviour (these last three arising from access to the CAR), which resulted in initial responses that contributed to deforestation reduction.

In general, because of the reasons raised in this evaluation, the expected impacts of the projects were low in both Pará and Amazonas states, despite being very relevant. In the Monitoring and Control component, the impacts were moderately sustainable, as the registration in the CAR tends to be maintained and to produce long-term effects and impacts. In the Sustainable Production component (from the *Reforestation project*), the impact has low sustainability so far.

However, without the total consolidation of environmental regulation (CAR validation, effective environmental monitoring and inspection, extensive vegetation recovery, among others), which were not anticipated in these projects, illegal behaviours continued to exist to a greater extent. In Amazonas State, 98.7% of the deforestations recorded in 2019 were not authorized. In Pará State, this percentage was 96.7%. However, the embargoed area[3] in Pará State had rates of 52.3%, well above the 37% in Amazonas State.

EFFECTIVENESS

In evaluation of the main direct objectives achieved by the projects, important results have been achieved, although some of them still need to be more effective in the broader scope, as the process of full environmental regularization is still ongoing in both states and the projects did not provide support for all its stages.

The projects were more effective in the Monitoring and Control component. In the Sustainable Production component, effectiveness was low.

CAR registration met all the expected goals relating to the registrations, and the technical training and use of environmental information systems demonstrate effectiveness.

EFFICIENCY

When measuring the cost-benefit of the results of the evaluated projects, it can be said that the efficiency was high in the Monitoring and Control efforts and low in the efforts related to Sustainable Production. As the topics dealt with are new and still being improved and learnt by all Brazilian environmental agencies, implementation is still in its their pilot phase. Measuring efficiency for this is a big challenge, though, and does not allow definitive conclusions about the effectiveness of this criteria yet.

SUSTAINABILITY

The main sustainability benefits from the projects is that both institutions continued to improve the environmental regularization of rural properties and in the supply of a monitoring and environmental inspection efforts database. Another important aspect of sustainability was facilitating the access to the farmers' properties for environmental regularization, via CAR, which is available continuously in the projects' regions. However, so that regularity can be kept, these advances depend on the analysis and validation

[3] Definition from the Brazilian Ministry of the Environment's administrative arm Chico Mendes Institute for Biodiversity Conservation (Instituto Chico Mendes de Conservação da Biodiversidade - ICMBio): "The embargo is an administrative sanction or precautionary administrative measure that aims to propitiate the regeneration of the environment and make the recovery of the degraded area viable." Available here (in Portuguese): https://www.icmbio.gov.br/portal/infracoesambientais/areas-embargadas Access in 31.05.2021

of the CAR registries (not included in the projects) and the effective implementation of the legislation.

An interesting impact on sustainability by the *SEMAS Pará project* was the strengthening of municipal agencies, which seemed to have worked, and has had lasting effects until now.

Only the *Reforestation project* focused on Sustainable Production. In the conclusions for this topic, it is observed that the results depend on the context, on the medium- and long-term monitoring and on attention to commercialization, conditions not ensured until now.

The role of Pará's state teams in this process was creating sustainability and strengthening the Environment System. The municipalization of environmental management and the deconcentration of service delivery of the state agency in Pará State worked well to reduce the agency's work overload, in addition to speeding up and improving service for the state's farmers.

LESSONS LEARNED AND RECOMMENDATIONS

In the Sustainable Production component, the lessons related to the projects' context were emphasized, with special attention given to the land ownership situation and the importance of technical assistance and rural extension. In relation to the Monitoring and Control Component, the report highlighted the lessons related to the positive results of decentralization and municipalization strategy.

The recommendations to the project coordinators highlight the importance of managing the knowledge and experiences acquired, their diagnosis, monitoring systems, appropriate planning and participation of the beneficiaries.

For Amazon Fund's Management Department, recommendations are an important part of improving the selection, adjustment, monitoring and evaluation of ongoing projects and new projects.

CROSSCUTTING CRITERIA

A. Poverty reduction

The evaluated projects did not focus on poverty reduction. However, in a way they benefited the poorest. In the case of Pará, with the efforts in deconcentration and decentralization, environmental regularization services to social segments that previously were excluded was favoured, as only those who had greater resources and could go to the capital city had previous access to it. In addition to that, the improvement of the state's environmental governance, must have had an indirect impact on poverty reduction by favouring sustainable development. Although with the *Reforestation project* there is no proven evidence of contributions to poverty reduction, there are some indications, such as production from the implementation of agroforestry systems to recover vegetation, which provided economic alternatives through the planting of species of economic and environmental value.

B. Gender Equality

The projects did not have specific gender equality activities. However, in the case of the *SEMAS Pará project*, it is worth mentioning that it was reported during the interviews, that the number of female employees occupying prominent positions in the hierarchy of State Environment and Sustainability Department Pará (SEMAS PA) has increased, comprising most of the key interviews for that evaluation. Although this aspect is an internal attribute and not a direct impact of the project, it is worth noting that the project supported training in management and leadership, with a high participation of women. In the *Reforestation Project*, the topic was only treated in a very isolated way. Despite not having specific efforts on gender equality, the project encouraged the participation of families in the training of rural farmers and, in the nurseries, the reports highlight the presence of women. In the interviews, it was reported that there was special attention given to include the participation of families and women.

1. INTRODUCTION

1.1 POLICIES FOR DEFORESTATION PREVENTION AND CONTROL IN THE LEGAL AMAZON

In Brazil, one of the public policies aimed at reducing deforestation in the Amazon is the Action Plan for Prevention and Control of Deforestation in the Legal Amazon (*Plano de Ação para Prevenção e Controle do Desmatamento na Amazônia Legal* - PPCDAm), created in 2004, aimed to: (i) reduce continuous and consistent deforestation and (ii) create conditions to establish a sustainable development model in the Legal Amazon. Its implementation has a series of efforts articulated around four thematic axes:

- Land Tenure and Territorial Planning;
- Environmental Monitoring and Control;
- Fostering Sustainable Production; and
- Economic and Normative Instruments.

According to the Brazilian Ministry of the Environment (*Ministério de Meio Ambiente* - MMA), one of the main initial challenges was to integrate the fight against deforestation into the policies of the Brazilian State, assuming that the fight against the causes of deforestation could no longer be conducted in isolation by environmental agencies. Since 2004, with the launch of the PPCDAm, deforestation rates have fallen by 76% in the Amazon region.

Among the efforts implemented, one of the most important was the creation of the List of Priority Municipalities (*Lista de Municípios Prioritários*[4] - PLM), which is used as a reference for prioritizing integration measures and improving the efforts for the monitoring and control of deforestation, for land and territorial planning and to encourage environmentally sustainable economic activities. The list has been published annually by the MMA since 2008. The first edition of the list included 36 municipalities1 in the Legal Amazon, which was expanded to 52 in 2021.

To define which municipality enters the list, three aspects are analysed: the deforestation rate in the previous year, the deforestation rate of the last three years as well as the evolution of the deforestation rate[6]. Once part of the list, the municipality is monitored and receives support from the federal government and, in some cases, from the states' government,

[4] Among the efforts established by the federal government, through Decree No. 6,321 of December 21, 2007, prevention, monitoring and control of illegal deforestation are included.
[5] Out of 527 municipalities in the Amazon Biome, in total.
[6] Law No. 161, of April 15, 2020, provides for the requirements for inclusion in the list priority municipalities for efforts to prevent and control deforestation and in the list of municipalities with monitored and controlled deforestation and updates the criteria for inclusion on the list of priority municipalities for efforts to combat deforestation in 2020:
I - total area of forest deforested in 2019 equal to or greater than 80 km²;
II - total area of forest cleared in the last three years equal to or greater than 160 km²; and
III - increase in the rate of deforestation in at least three of the last five years.

mainly through State Environmental Organizations (*Organizações Estaduais de Meio Ambiente* - OEMAs), so efforts aimed at reducing deforestation rates are implemented, while also aiming at transitioning to a sustainable economy. The expectation then is that the municipality will cease to be considered a priority and be classified as a municipality with monitored deforestation under control[7].

Even so, the context of monitoring and controlling deforestation in the Legal Amazon is marked by difficulties in managing such a large region, which generates a demand for more decentralized environmental management through the strengthening of state environmental agencies, including their Regional centres of the State Environmental Organizations (*Núcleos Regionais de Regularidade Ambiental* - NUREs) and municipal bodies in order to act more effectively. Among the strategic guidelines of the current phase of the PPCDAm itself, set out in the operational plan 2016-2020[8], the implementation of decentralized and shared management of public policies through partnerships between the Union, states and municipalities was included, as well as the integration of the management and of incentives for preventing environmental damage and the promoting of sustainable production systems.

In this sense, raising deforestation rates led the states to prepare, as of 2008 and with the support of the MMA, their State Plans to Prevent and Control Deforestation (*Plano Estadual de Prevenção e Controle do Desmatamento e Queimadas do Estado* - PPCDQ)[9] as a way of adding efforts to federal action through the PPCDAm. The federal government has established three main lines of action for the State Deforestation Combat Plans (*Planos Estaduais de Combate ao Desmatamento* - PPCDs): territorial ordering, environmental control and fostering sustainable productive activities. The objective is to guarantee the fulfilment of the goals predicted at the PPCDAm national level, as well as to fulfil the role to protect the environment, which is also provided by the Federal Constitution at the state level. The preparation, implementation and periodic review of the PPCDs is one of the requirements of the Amazon Fund for the Amazon states to have access to the available resources and is also a prerequisite for them to have the right to vote in the deliberations of the Amazon Fund Guidance Committee (*Comitê Orientador do Fundo Amazônia* - COFA)[10].

Also, with the objective of decentralizing and relieving the work of the federal government, the Complementary Law No. 140/2011 was enacted, which defines cooperation between the Union, states and municipalities in efforts to protect the environment and preserve forests, among others. In this Law, the decentralization of responsibilities was defined with greater clarity, conferring greater responsibility to state environmental agencies.

Law No. 12,651 / 2012, in turn, established the need to create a national system to integrate information on forestry activities, recognizing that the complementary performance of the different spheres requires data sharing and compatibility between their systems.

[7] For inclusion in the list of municipalities with monitored and controlled deforestation, the municipality must:
I - own 80% of its territory, except for public domain protected areas and indigenous lands, with rural properties duly monitored through the Rural Environmental Registry (CAR), registered in the National Rural Registry System (SICAR); and
II – have maintained deforestation below 40 km² in the last four years.

[8] Available in: https://www.mma.gov.br/images/arquivo/80120/Anexo%20II%20-%20PLANO%20OPERATIVO%20DO%20PPCDAm%20-%20GPTI%20_%20p%20site.pdf. Access on April 2, 2020.

[9] Available in: http://combateaodesmatamento.mma.gov.br/os-planos-estaduais. Access in 27 de abril de 2020.

[10] COFA was extinguished by Decree nº 9.759, April 11th, 2019. More information: http://www.amazonfund.gov.br/en/amazon-fund/COFA/. Access in: April 27, 2020.

1.2 ASSESSED PROJECTS

In the present evaluation, in order to achieve greater efficiency and broaden the understanding of the results achieved by projects supported by the Amazon Fund with monitoring and control activities, the *SEMAS Pará* and *Reforestation projects* were evaluated, which were developed, respectively, by state environmental agencies in the states of Pará and Amazonas.

Both projects were implemented, at the state level and in some key municipalities, aiming to improve environmental management of deforestation prevention and control. The incentive to join the Rural Environmental Registry (*Cadastro Ambiental Rural* - CAR), with small rural farmers with properties of up to four fiscal modules entering the registry, aimed at a more effective monitoring and control by the Secretary of Environments of the states of Amazonas and Pará. In the case of the *Reforestation project*, as a complementary initiative, vegetation recovery was carried out together with small rural farmers working with their previous environmental liabilities generated by deforestation, as identified by the CAR. In addition, these owners were trained to implement agroforestry systems, enabling farming practices with reduced ecological impact, generating income and not harming the production.

The states of Amazonas and Pará, areas of intervention for the projects, have a significant share of the Brazilian forest heritage and have registered increases in deforestation rates. The municipalities in which the *Reforestation project* operated (Boca do Acre, Lábrea, Apuí and Novo Aripuanã) are located exactly in the region where the highest deforestation rates in the state are concentrated. These are large and sparsely populated municipalities (less than 2 inhab./km², according to the 2010 Census). They border the states of Mato Grosso, Rondônia and Acre, a region known as the deforestation arc in the Amazon, where agricultural expansion towards the north focuses on illegal logging and mining, extensive livestock practices, grain cultivation and, often, land grabbing activities for speculative purposes and predatory and illegal activities.

In the case of *SEMAS Pará project*, attention was not focused on a region in the state of Pará, as deforestation is not as concentrated as in Amazonas State. The push to CAR registration extended throughout the state, while the strengthening of the regional centres of the Secretary of Environment took place in the municipalities of Marabá, Santarém, Altamira and Paragominas, where the main roads that cross Pará State are concentrated. These are also the main routes of entry for deforestation, mainly the highways BR 163 and 150.

The total value of the two projects was R$ 33,498,516.19 (6,41 Mio. USD), fully supported by the Amazon Fund. The *Reforestation project*, whose support was R$ 17,575,286.19 (3,36 Mio. USD), started in December 2010 and ended in June 2018. The *SEMAS Pará project*, whose support reached R$ 15,923,230.00 (3,05 Mio. USD), started in October 2010 and ended in March 2017.

Thus, this evaluation is ex-post, which means that it is performed minimum two years after the activities are ended, when it is possible to verify its impacts and the sustainability of the investments.

2. PURPOSE AND AIMS OF THE EVALUATIONS

Project evaluations objective to measure the achieved results, their effects and the sustainability of the changes generated by their implementation. In evaluations like this, which are thematic because they encompass more than one project that worked within the same component, with similar topic(s)[11] and efforts, the objective is also to produce a broader reflection on the contributions of these kind of projects to the supported topic and to the components of the Amazon Fund, in this case, the Monitoring and Control component, and its contribution to the recovery, conservation and sustainable use of the Legal Amazon.

The projects in this evaluation share not only a topic, but also the nature of its implementing institution, which are environmental agencies of state governments. They do not represent the component Monitoring and Control as a whole, which also includes closed projects carried out by the third sector (as is the case of the *Going Green project*, carried out by The Nature Conservancy - TNC, and Socioenvironmental Management of Municipalities of Pará State, carried out by Institute of Man and Environment of the Amazon (*Instituto do Homem e Meio Ambiente da Amazônia* - Imazon) and by municipal governments (as is the case of the project *Water Springs*, carried out by the municipality of Alta Floresta in the State of Mato Grosso) and projects by the Military Fire Brigades focused on fire fighting and fire prevention (all of which have been evaluated already).

Although they do not represent the entire universe of the component, one of the aims of the thematic evaluations includes creating recommendations and the lessons learnt for the component, in this case, from these two projects.

Thus, the main specific aims of this evaluation are:

Strategic:

- Provide subsidies for the institutional learning of the main actors and the Amazon Fund itself, contributing to the improvement of the quality of the projects and the prioritization of investments, subsidizing decision-making, as well as providing knowledge to the executing the projects.
- Recommend possible opportunities for strengthening the area of monitoring and control, as to continue support from the Amazon Fund in this component.
- Check the alignment of the projects with the PPCDAm and the state plans for the prevention and control of deforestation.

[11] The Amazon Fund defined in its Logical Framework four components in its logic of intervention. The relationship between these four components and the seven thematic areas provided for in Decree No. 6,527 / 2008 defines the themes to be supported. Amazonas projects and Pará largely fit into component 2, within the thematic area of control, environmental monitoring and inspection, which includes support for the CAR.

Safeguards and donors:

- Assist the Amazon Fund in being accountable to its donors about the type of project supported and its effects.
- Verify the compliance, by the projects supported by the Amazon Fund, of the Cancun Safeguards agreed under the United Nations Framework Convention on Climate Change (UNFCCC) for actions to Reducing Emissions from Deforestation and Forest Degradation in Developing Countries, and the Role of Conservation, Sustainable Management of Forests, and Enhancement of Forest Carbon Stocks in Developing Countries (REDD+);
- Find out to what extent the projects are relevant, efficient, effective and sustainable and generate impacts, based on OECD evaluation criteria.

Project specifics:

- Analyse the strengths and weaknesses of project intervention.
- Identify challenges and lessons learned and make recommendations related to management and improving the achievement of objectives in future projects.

In order to guide the evaluation, the following general key questions should be answered in the evaluation:

- Have the projects been able to mobilize the necessary inputs to achieve the expected effects of the project?
- Were the projects efficient in their use of results and services to achieve their goals?
- Were the efforts effective? Were the results expected made?
- Were the expected impacts of the results and services achieved?
- How do these impacts contribute to the objective of environmental regularization and recovery, conservation and sustainable use of the Legal Amazon?

From this preliminary understanding, evaluation questions and methodologies were generated. Additionally, the present evaluation sought to incorporate counterfactual evidence to better distinguish the specific effects of the projects from other factors that, eventually, may have affected the group of public organizations (OEMAs) or production units in the Amazon region, in their many scales.

3. METHODOLOGY

The methodology used in the evaluation was based on the Logical Framework of the projects and on the criteria and objectives contained in the Conceptual Framework for Impact Evaluation of Projects supported by the Amazon Fund, prepared by the Cooperation between GIZ and the Amazon Fund in 2016. Based on experience accumulated with a previous thematic evaluation of five projects of the Science, Innovation and Economic Instruments[12] component, and in parallel to this evaluation, the Cooperation project developed an addendum to the Conceptual Framework that reflects specific methodologies for this type of evaluation and guides future thematic evaluations[13] .

Based on the methodology already described in the Conceptual Framework and in the aforementioned addendum, this final report is presented to evaluate the effectiveness of the projects. Below, the methodology applied to implement the evaluation is divided into phases/stages.

3.1 PREPARATION

In the preparation phase, data was collected in a systematic way from secondary sources (documents, such as project performance reports), including institutional information. Guiding questions were developed, based on the development of individual theories of change for the projects. These sought to identify possible impacts of the projects based on their ratiocination expressed in the logical frameworks.

This evaluation is based on the logical framework of each project, presented at the time of their respective approvals. Meanwhile the theories of change (Figures 1, 2 and 3) served as support for the identification of other results achieved that go beyond the ones projected in the Logical Framework, as well as the transformation dynamics during the projects' implementation.

[12] Available in: http://www.fundoamazonia.gov.br/export/sites/default/en/.galleries/documentos/monitoring-evaluation/Independent--evaluations/Science-Innovation-Effectiveness-Evaluation-Report.pdf.
Access in: May 27, 2021.

[13] Available in:
http://www.fundoamazonia.gov.br/export/sites/default/en/.galleries/documentos/monitoring-evaluation/Independent-evaluations/Amazon-Fund-Addendum-Conceptual-Framework-Thematic-Evaluations.docx
Access in: May 27, 2021.

Figure 1 - Theory of Change of the *SEMAS Pará project*, elaborated in the evaluation preparation

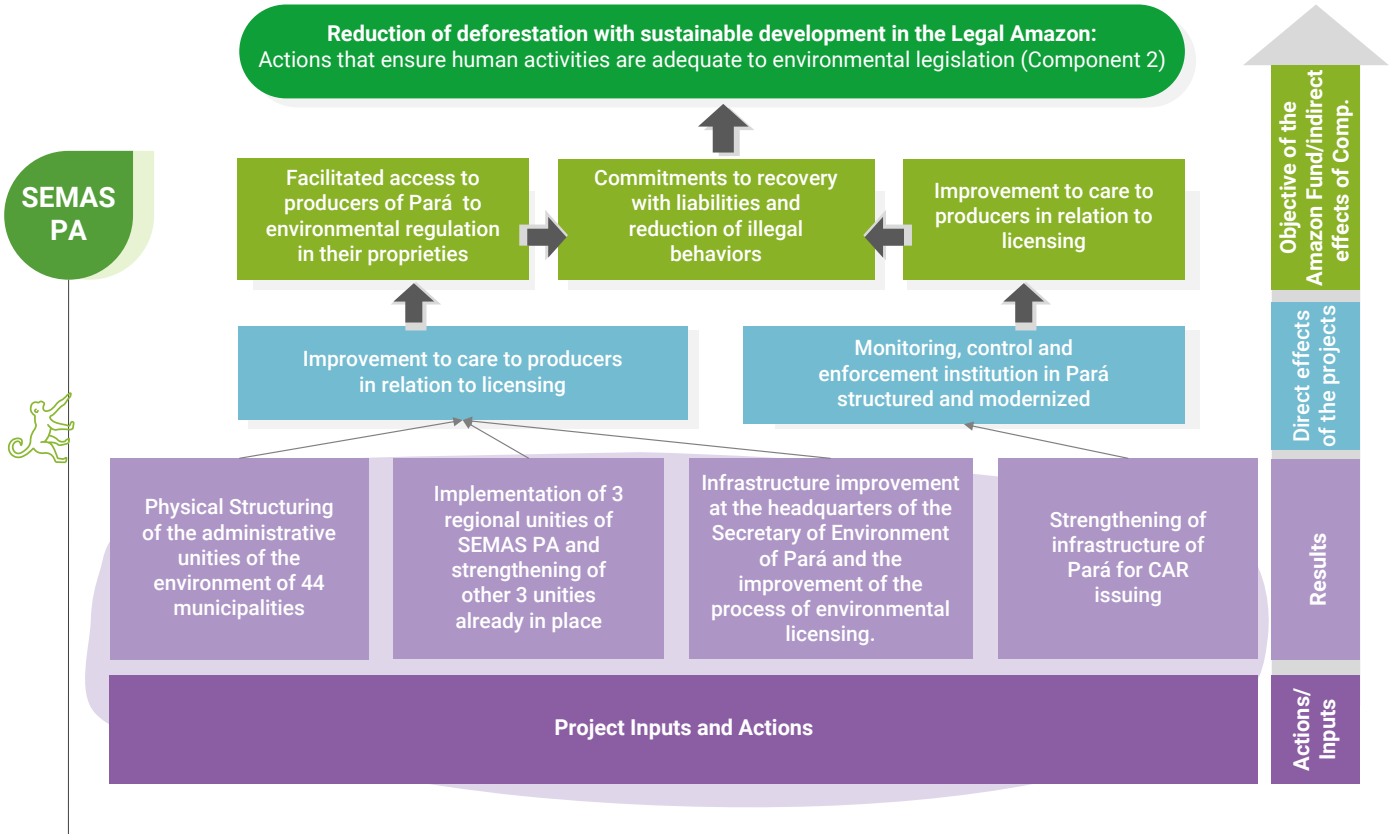


Figure 2 - Theory of Change for the *Reforestation project*, component 1, elaborated in preparation for project evaluation.

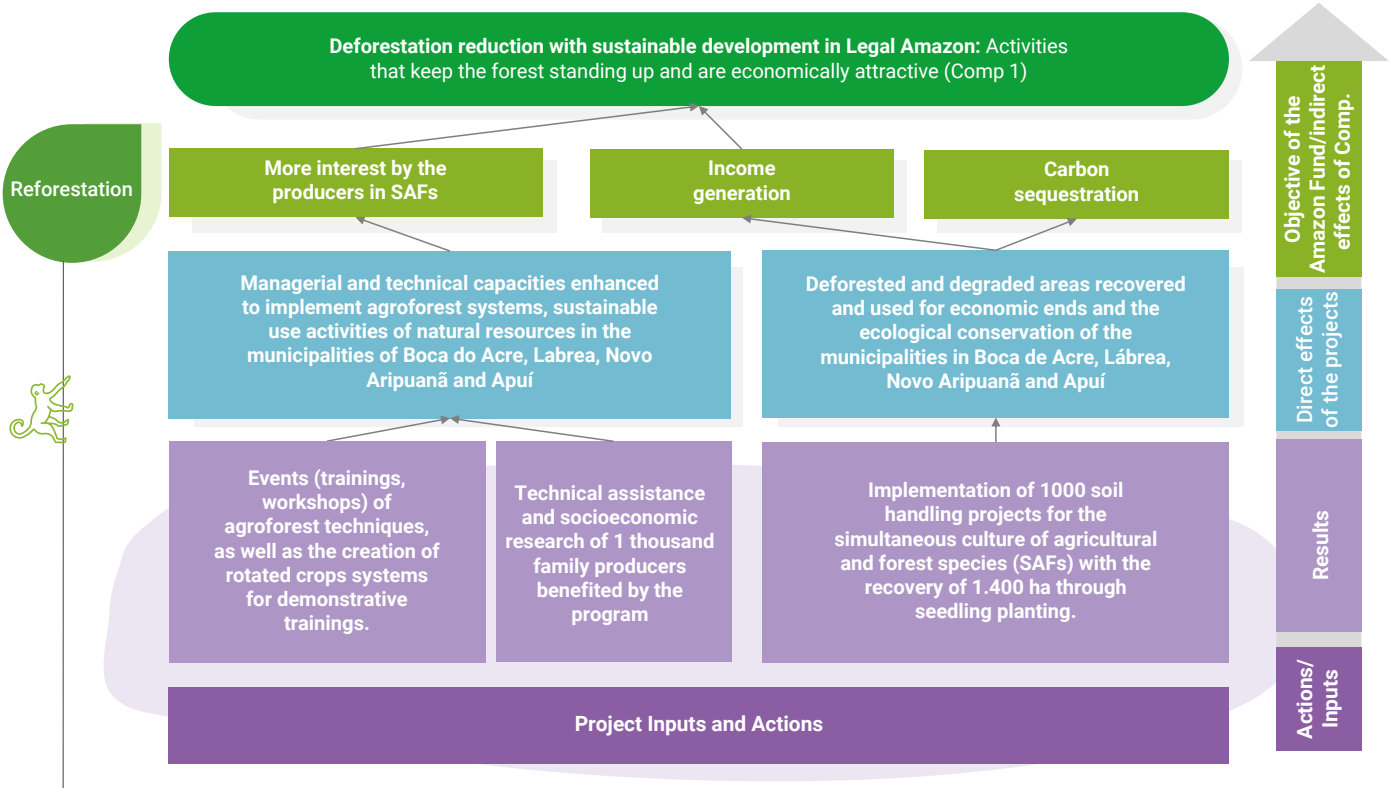
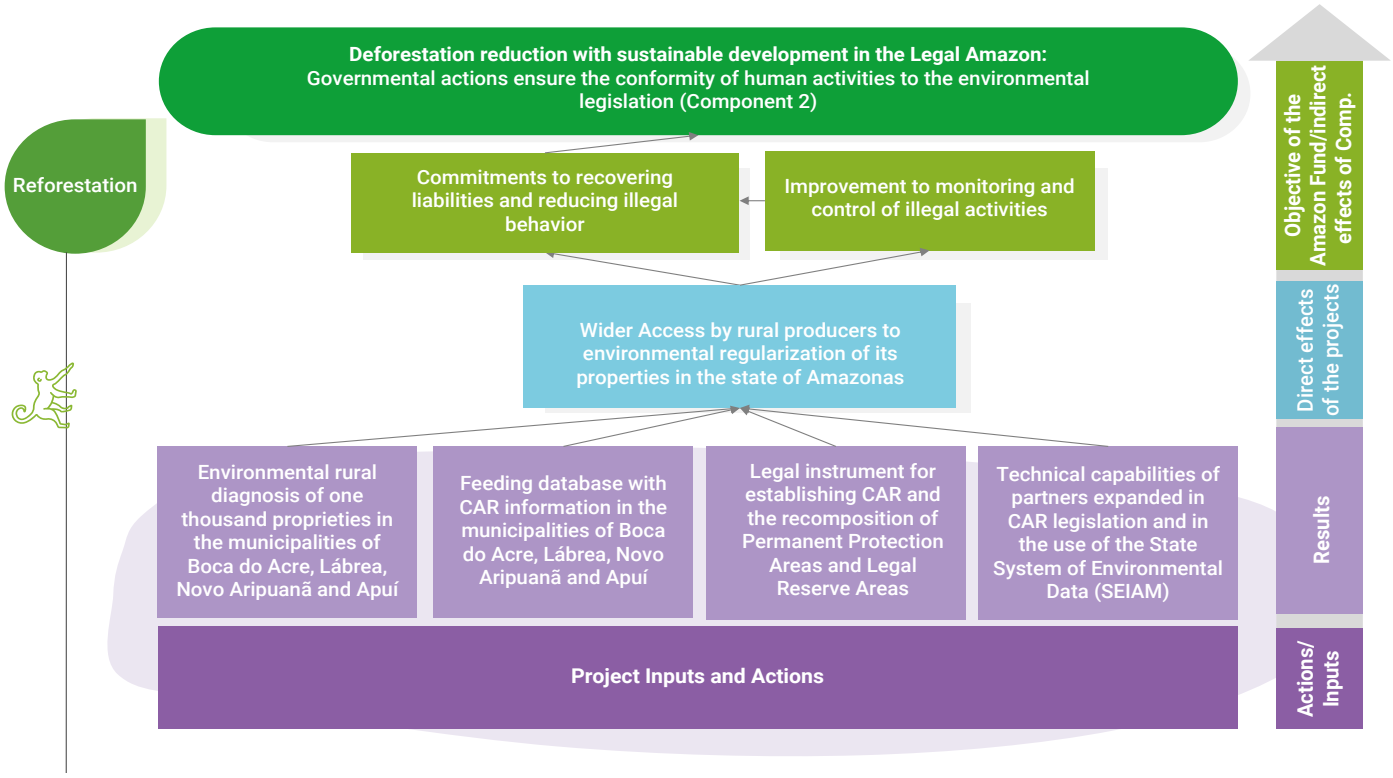


Figure 3 - Theory of Change for the Reforestation project, component 2, elaborated in preparation for the project evaluation.



Theories of change were updated during the evaluation and the result is in the individual annexes for each project. The guiding questions were also updated during the evaluation, once there was further information about the projects.

In addition to that, a consultant specialized in geoprocessing carried out a complementary study for the evaluation, based on the analysis of the forest recovery situation in the municipalities covered by the *Reforestation project*, which served as input for this evaluation. This analysis was carried out based on georeferenced information of the properties registered in the CAR during the project, which were made available by the Amazônia Institute, a partner organization hired to support the implementation of the *Reforestation project* (items 7.4 and 7.5).

3.2 DISTANCED DATA COLLECTION

To deal with the context of Covid-19, during which travel, and meetings were limited, the field mission was cancelled. Whenever possible and appropriate, the local actors were located and interviewed remotely. The group of interviewees (item 7.3) is composed of:

- Managers directly responsible for the project and other members of public bodies that were involved, including those who were at the time, but who are no longer working in the implementing institution;
- Partners during the implementation of the projects (ex: Institute of Environmental Protection of Amazonas - IPAAM, Institute of Sustainable Agricultural and Forestry Development of the State of Amazonas (*Instituto de Desenvolvimento Agropecuário e Florestal Sustentável do Estado do Amazonas* – IDAM), Amazônia Institute and the CAMPO company, among others, in the case of the *Reforestation project*);

- One of the beneficiaries that got the CAR registration done or implemented agroforestry systems as a result of the projects, interviewed remotely (only for the state of Amazonas); and
- Employees of the municipal secretary of environment of the states of Pará and Amazonas and in the regional centres of the State Secretary of Pará.

These interviews were conducted by:

- Videoconferencing apps, when the person interviewed felt comfortable and there was a stable internet connection, with the participation of one or more members of the evaluation team.
- Telephone calls, when the person interviewed did not feel comfortable or there was no stable internet connection, with one interviewer from the team.
- Email or messaging apps, when preferred by the person interviewed or when the previous means of communication were not available, and in addition to them.

The use of online questionnaires, which could have been useful when the same information was requested from many actors, as in the case of the municipalities of Pará State, ended up not being used because it was difficult to locate respondents with the knowledge of the project and its benefits.

The analysis of the available or of the suggested documents by the agents throughout the process of distance interviews was also carried out, as well as photos and videos of the areas that underwent project intervention, carried out by the beneficiaries or by technicians/ those hired to verify these results.

3.3 IMPOSSIBILITY OF FIELD MISSION

The field mission was not possible due to the Covid-19 pandemic. To replace it, with limitations, in addition to remote interviews, local actors sent photos and videos, as previously mentioned.

3.4 CONSOLIDATION OF THE FINAL REPORT

Based on the collection of secondary data, information gathered from the interviews and the analysis carried out, after the suggestions and interventions collected in the consultation round, see below chapter 3.7., of this evaluation, this final project evaluation report was prepared. The results were structured according to the scope of the direct and indirect effects of the projects, in addition to the results of the project management. Lessons learnt are reported and recommendations to actors with specific interests are made.

A The team held internal workshops among the evaluators to obtain consensus on the analysis carried out and the suggestions collected in the consultation round and, based on these inputs, finished the conclusions and final recommendations related to the strategic aims and Safeguards of the evaluation.

3.5 REVIEW BY PROJECT ACTORS

The project-specific reports were sent to their main actors for review and final additions after the consultation round.

3.6 ADJUSTMENTS IN THE FINAL REPORT

Based on the main actors' feedback, after the consultation round, the team carried out an analysis of the arguments and the new subsidies, making the necessary reflections on the more strategic conclusions of this report, which led to adjustments to the final report.

3.7 CONSULTATION ROUND

The preliminary report was analysed among selected key reviewers of the GIZ and its partner institution, the National Bank for Economic and Social Development (*Banco Nacional de Desenvolvimento Econômico e Social* - BNDES) and others. An online workshop was held with the participation of the evaluation reference group and key persons of the evaluated projects, as well as some pairs, represented by other OEMAs in the Amazon region.

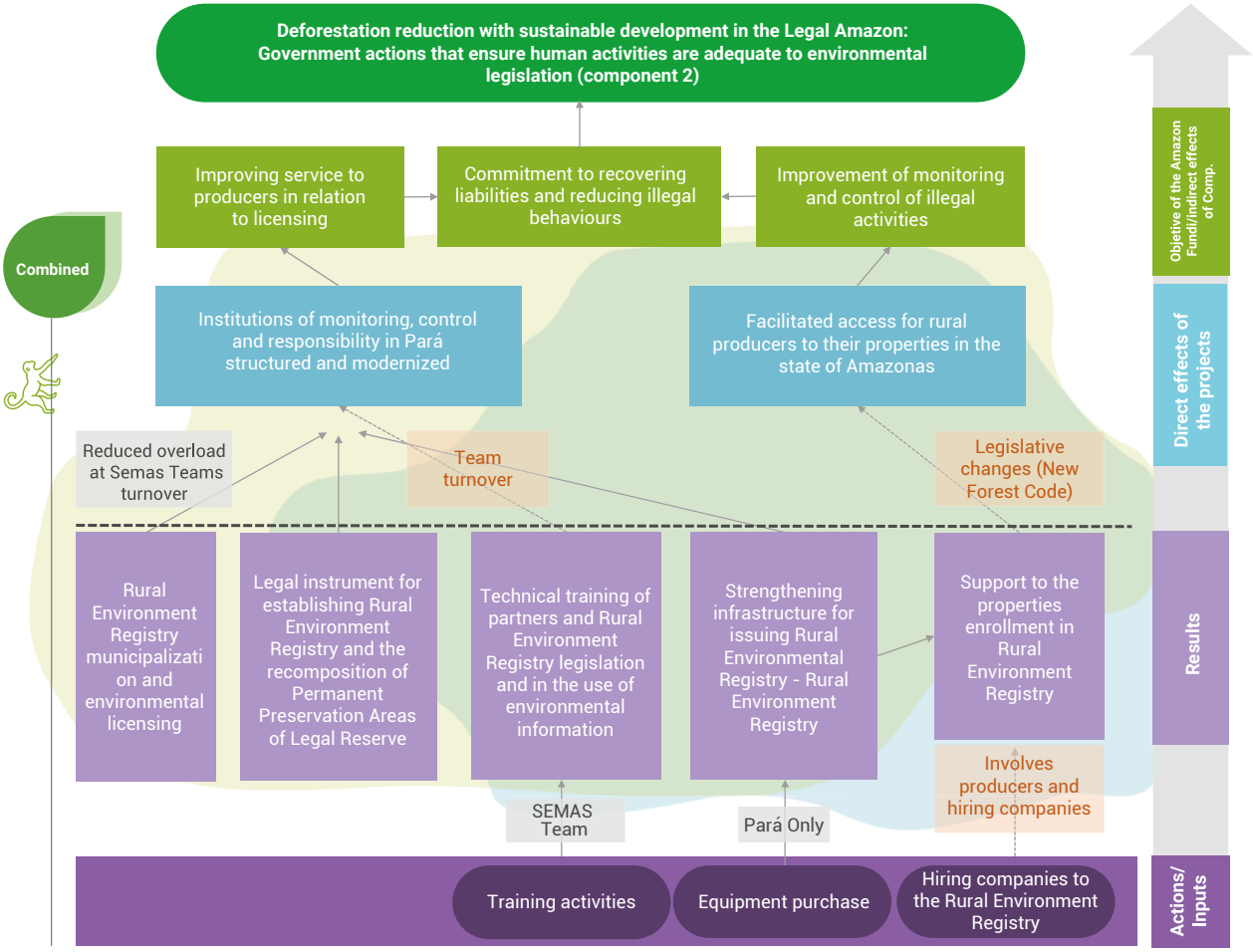
For each project, the specific objectives of the Logical Framework, a topic on management and monitoring and a topic on the context were presented. In each panel, positive aspects, main challenges faced, lessons learned, and recommendations identified by the evaluation team were also presented. At the end of each panel, a section for questions, analysis and contributions to the report was opened. From the discussions in the consultation round, the team of evaluators carried out a new analysis on the arguments and suggestions presented and finished this final report for assessing the effectiveness of the referred projects.

4. RESULTS EVALUATION

4.1 THEORY OF CHANGE

The Theory of Change presented in Figure 4, below, was elaborated based on the theories of change updated after the projects' evaluation. The yellow and blue areas represent the domain of *SEMAS Pará* and *Reforestation projects* respectively. The combination of the two domains appears in light green.

Figure 4 - Combined Theory of Change for the Monitoring and Controlling component (*SEMAS Pará* – yellow; *Reforestation* – blue)



In both cases, the change in federal CAR legislation during the project implementation has resulted in the need for rework. In any case, farmers' access to environmental regulation has been made easier, leading to improved monitoring and control of illegal activities and commitments to recover liabilities and illegal behaviour, which should result in a reduction of deforestation.

However, illegal behaviour persists. In Amazonas State, 98.7% of the deforestation recorded in 2019 was not authorized and, in Pará State, this percentage was 96.7% (Table 1). However, the embargoed area in Pará State was 52.3%, well above the 37% in Amazonas State.

Table 1 - Alerts for authorized and unauthorized deforestation in Amazonas State in 2019.

Type of deforestation	Total alerts	Deforested area (ha)	% of area
Amazonas State			
Authorized	67	3.234	1,3
Non-authorized	13.333	245.461	98,7
Embargoed	4.107	144.383	37,0
Pará State			
Authorized	737	19.653	3,5
Non-authorized	28.038	542.462	96,5
Embargoed	11.821	294.170	52,3

Source: MapBiomas (http://plataforma.alerta.mapbiomas.org/)

According to this Theory of Change (Figure 4), support for the registration of properties in the CAR occurred through hiring companies (as in Amazonas State) or through the structuring of municipal environmental agencies, with the acquisition of equipment, software and images (as in Pará State). Both paths are proving effective, but the strengthening of municipal bodies has shown better results, with more sustainable effects, in addition to resulting in better monitoring and control of illegal activities.

This theory also points out that the technical training of partners in CAR legislation and in the use of environmental information systems is an important element for the structuring and modernization of state and municipal monitoring as well as for control institutions. The role of state teams in this process in Pará State is generating sustainability and strengthening the environment system.

The municipalization of environmental management and the deconcentration of service delivery of the state agency in Pará State has worked well to reduce the work overload in the agency and improve service for farmers in the state. This may have contributed to improving the number of authorized deforestation rates in Pará State (although still relatively low), compared to Amazonas State.

4.2 OECD CRITERIA

Board 1 presents a summary of the results of the five evaluation criteria defined by the Organization for OECD for the components of the *SEMAS Pará* and *Reforestation projects*.

Board 1 - The five evaluation criteria defined by the OECD for the projects' component.

Criteria	State Environment and Sustainability Department Pará (SEMAS Pará)	Reforestation in the Southern part of the State of Amazonas	
	Monitoring and control	***Monitoring and control***	***Sustainable Production***
Impact	Weak effect	Weak effect	Low effect
Relevance	Very relevant	Very relevant	Muito relevante
Sustainability	Moderately sustainable	Moderately sustainable	Low sustainability
Efficiency	Effective	Effective	Moderately effective
Efficacy	Efficient	Moderately efficient	Low efficiency

4.2.1 Impact, relevance and sustainability

In general, the expected impacts of the projects were low in both Pará and Amazonas states, despite being very relevant.

In the Monitoring and Control component, the impacts were moderately sustainable, as the registration in the CAR tends to be maintained and produce long-term effects and impacts. In the Sustainable Production component, the impact so far has low sustainability. There were vegetation recoveries (below expectations) and learning at the state and local levels on this process, but greater recovery results were expected. The individual evaluation of the *Reforestation project* details all the challenges encountered, but the main one was the lack of permanent technical assistance, combined with a very unfavourable local context (land ownership insecurity, conflicts over land ownership, high turnover of farmers on the plots, other activities with greater economic attractiveness, etc.) in two municipalities.

4.2.2 Effectiveness

The projects were effective in the Monitoring and Control component, with the efforts generating the expected results, despite the change in the New Forest Code having forced both cases to start over.

Efficiency was low in the Sustainable Production component, due to the problems referring to sustainability as well as due to the beneficiaries' selection, the lack of participation in Agroforestry Systems (*Sistemas Agroflorestais* - SAF) planning, the difficulties in delivering the seeds at the right time, etc. Another challenge was the difficulty in coordinating and supervising the activities of the various partners.

4.2.3 Efficiency

Efficiency was good in monitoring and control efforts and low in efforts related to sustainable production, in which the model of hiring companies for soil preparation and seedling production did not work well. The seasonality of the Amazon biome was an obstacle to carrying out activities on time.

The procurement procedures were mentioned as an efficiency limiter, as time was not well considered in the implementation of the project. This, combined with seasonal factors that affect transport and planting, resulted in delays in Amazonas State.

5. CONCLUSIONS

5.1 MONITORING AND CONTROL

The projects advanced in facilitating access to the environmental regularization of properties, through CAR. This initial step is essential to establishing rural environmental governance, as it allows landowners to be held accountable, even at a distance, for past environmental liabilities and future illegal acts, in addition to allowing farmers to better organize the activities on their property.

In order to maintain regularity, these advances depend on the analysis and validation of the CAR records (not included in the projects) and on good and regular communication between the environmental agencies and the landowners. It also depends on how legislation is applied, with the embargo of the areas deforested without authorization and punishment for the offenders.

5.2 SUSTAINABLE PRODUCTION

Only one of the two projects (*Reforestation project*) focused on this topic, which means that the conclusions will come only from this experience.

The most important step for a project with a focus on sustainable production using SAF is to consider that these systems, although they may generate income during their implementation (through annual crops), their greatest return will come a few years after the planting. Thus, the beneficiaries need to be in a situation where this future horizon is viable. This includes a context with land security, good social health and education services for families, good community organization, a few income alternatives, etc. There is no point proposing the implementation of SAF in unfavourable contexts or without efforts aimed at changing it (for example, land regularization, implementation of education and health services etc.).

Another important point is to guarantee technical assistance and rural extension not only before and during the implementation of SAF, but also throughout their development. Technical Assistance and Rural Extension Services (*Serviços de Assistência Técnica e Extensão Rural* - ATER), to be helpful for the farmers' success, must be well trained and equipped as well as have enough resources to implement measures.

Finally, it is important to consider the market. The results must have a defined commercial usability and the projects must be associated with processing and commercialization initiatives that guarantee the economic attractiveness of the activities that keep the forest standing.

6. LESSONS LEARNED AND RECOMMENDATIONS

6.1 LESSONS LEARNED

6.1.1 General

- Training linked to concrete efforts, such as "learning by doing", are always very positive and generate important lessons for the proposed projects (both projects implemented this type of training).
- Although shared management with other state agencies presents coordination challenges (including for monitoring, team changes and decision making), enables greater sustainability and dissemination of results.
- The timing for implementation and execution of calls for tenders, as well as the Amazonian seasonality, needs to be considered in the planning, so that their execution is not jeopardized.
- Good project implementation practices, such as selection criteria, mobilization of local actors, diagnosis *ex ante* of the intervention, systematic and continuous monitoring and quality control of information, are key factors for successful implementation.

6.1.2 Sustainable Production Component

- The region receives other projects and actors simultaneously. Isolating the effects of a single program or verifying the impacts of the intervention in the face of what would naturally occur in the region is a challenge.
- The regional context is important to consider for SAF implementation is viable, especially the issues of land security, the perspective of the farmers of the land, social services and land conflicts.
- It is important to guarantee technical assistance and permanent rural extension, or at least during the implementation and start of SAF production, including commercial and financial advice.
- It is important to implement efforts aimed at the commercialization of the value chains generated in the SAF.

6.1.3 Monitoring and Control Component

- An effective communication and mobilization strategy is important to achieve CAR results, overcoming local resistance.

- Municipalization and decentralization contribute decisively to improving environmental governance and the access of farmers to environmental regulation.
- The structuring of municipal environmental agencies is a more effective strategy than hiring companies to carry out the CAR.
- CAR alone does not guarantee the legality of the activities and each state needs to be present in the various stages of CAR validation and the inspection of illegal activities.
- Each state has its own context and dynamics that influences how it will respond to interventions in its territory, which is why it is important to have a continuous strategy to incorporate learning in this topic for deforestation control.

6.2 RECOMMENDATIONS

6.2.1 To the project coordinators

Since the projects are already closed, the recommendations to their coordinators are not aimed at changes to their efforts, but to the policies and efforts in the topics that were the focus of the project carried out and in the future. Thus, on the topics of the projects, it is recommended:

- Develop systems for maintaining and transmitting the institutional memory of the project, through a system of records and reports, of the training activities themselves and of strategies that reduce staff turnover.
- Establish activity monitoring indicators for all actors, so that bottlenecks are identified in a timely manner for strategic decision making and, if necessary, changing the project's direction.
- Carry out a socioeconomic diagnosis of the area (preferably participatory) before the intervention, outlining specific strategies for the territories, if necessary.
- Have a risk mapping and contingency plan.
- Have technical notes and glossaries that guide the technical team in the proper recording of information, guaranteeing the temporal comparability and the accumulated analysis of the data in their reports.
- Reinforce the importance of performance reports and other follow-up reports, not as pro forma mechanisms but as the project's memory and adequate evidence recording.
- Have a plan in case of team changes, so that the learning stays in the institution and not just in people's memories.
- Document reports and good practices.
- Be aware of international agreements and Safeguards in the selection process of beneficiaries.
- Emphasize the logical chain of project activities.
- Consider a larger time window for calls for tenders.

- With regards to the supply of seedlings, take into consideration during the calls for tenders, a previous study of production and delivery logistics and an action plan with contingency factors for the case of any production delay or difficulty in delivery, as well as considering the production or local nurseries as a differential in the score of the selected companies.
- Ensure that there is an adequate perspective of the effort that the project employees will have in managing the project in face of the other demands from their position.
- Strengthen the participation of the beneficiaries during the entire project cycle, from its conception, as well as in the implementation and evaluation.

6.2.2 To the Amazon Fund's Management Department

The recommendations to the BNDES serve to improve the process of selecting, adjusting, monitoring and assessing ongoing projects and new projects. These recommendations are based exclusively on the evaluation of these projects and may have already been adopted by the Amazon Fund in other projects.

- Require, in the guidelines and in the proposal adjustment process, indicators that go beyond equipment purchase lists and other items and that express the achievements in results and objectives.
- Emphasize the need to present a strategy for resources sustainability in recurring efforts.
- Require, in projects submitted by governments, a minimum team of employees capable of retaining the acquired capacities and transmitting project knowledge and memory, including for the cases of municipalities that receive benefits from projects carried out by state governments.
- Continue to support projects to strengthen the management capacity of state and municipal environmental agencies, within a context of decentralization of environmental management, since its return is evident.
- Reinforce the importance of accuracy in performance reports, which must go beyond the project's pro-forma documentation, which is an obligation of protocol delivery. This is important, since these reports are official sources of information that assist institutions in decision making during project development and are the main input for evaluations.
- Request the maintenance of a project information library (preferably digital) that gathers information in an easy, agile and reliable way.
- Consider external monitoring (by non-profit institutions, universities or international organizations that support the project) as a way to ensure the homogeneity of information over time.

7. ANNEXES

7.1 INDIVIDUAL PROJECT EVALUATIONS

7.1.1 *SEMAS Pará Project*

Title:	SEMAS Pará project
Responsible body (Project management):	Pará State
Responsible Body (Financial Management):	Pará State
Period:	1st quarter of 2012 to 1st quarter of 2017
Territorial Coverage:	Pará State
Beneficiaries:	Population of the state of Pará and, more directly, rural farmers, family farmers and state environmental and rural production agencies.
Aim:	Support the strengthening of environmental management in the state of Pará by improving the process of issuing the Rural Environmental Registry, decentralizing and deconcentrating the activities of its State Secretary of the Environment and Sustainability and improving the legal environmental licensing process.
Total value	R$ 15.923.230,00 (3,05 Mio. USD)
Support from the Amazon Fund worth:	R$ 15.923.230,00 (3,05 Mio. USD)
Execution time:	66 months
Contract date:	10.06.2010 - 03.31.2017

Summary

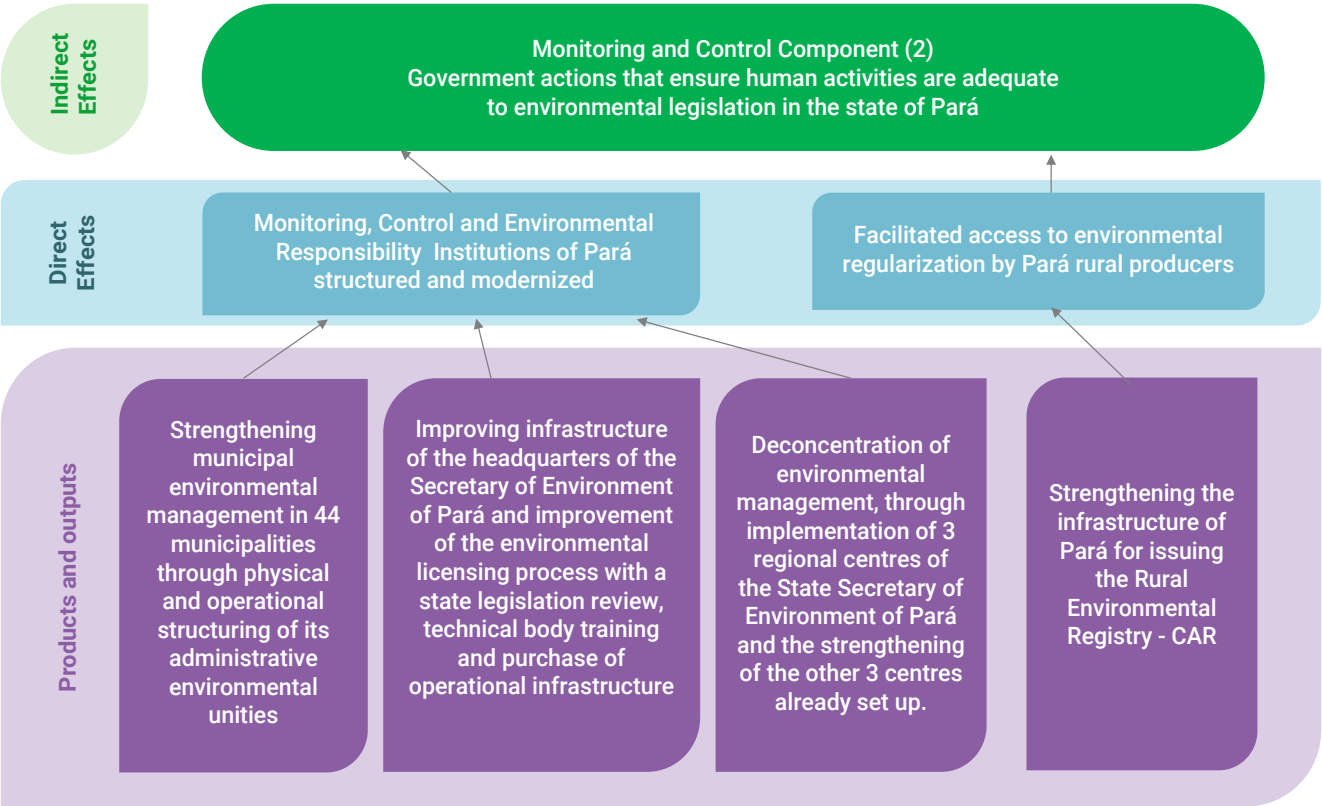
The *SEMAS Pará project*, implemented by the Government of the State of Pará, aimed to strengthen environmental management across the state. The strategy used was to strengthen the technological infrastructure for issuing the CAR, improve the licensing process, decentralize part of the environmental management to key municipalities and deconcentrate the activities of the State Secretary of the Environment and Sustainability and Sustainability of Pará (SEMAS PA) in strategic deforestation areas, through the structuring of municipal environment agencies of and the strengthening of regional centres of the State Environment and Sustainability Department Pará (NUREs).

For the decentralization of SEMAS PA activities, physical and operational structuring efforts were carried out in the municipal environmental administrative units, including the strengthening of technological infrastructure to support CAR registration and to improve the legal environmental licensing process.

The deconcentration of environmental management in the state relied on efforts to strengthen regional centres, in order to bring SEMAS PA closer to the people who lived in the region and the project's economic agents.

Intervention logic

Figure 5 - Objectives Tree of the project's Logical Framework



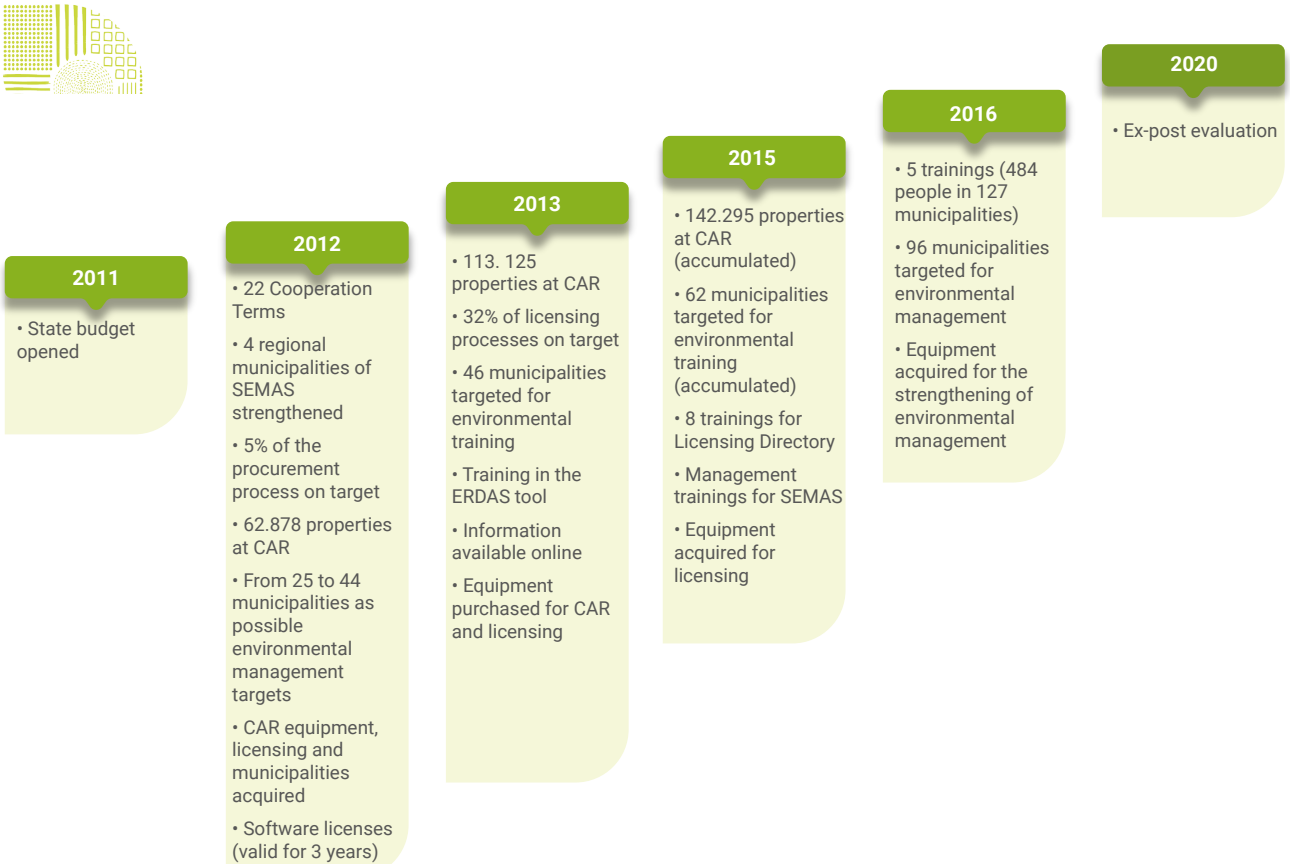
Specific methodology

Based on performance reports, a timeline for the *SEMAS Pará project* was made, which guided the interviewee selection and the interview questions. The interviews were conducted by videoconference, without local visits.

Timeline for the *SEMAS Pará project*

From reports of the projects analysed, the following significant facts were raised about the project (Figure 6).

Figure 6 - Project timeline based on the reports presented



Difficulties and limitations

- Impossibility of on-site visits and interviews due to Covid-19.
- Team changes in the municipalities.
- Interviewers confuse or find it difficult to differentiate the contributions of the SEMAS Pará project and the Green Municipalities Program.
- Performance reports with information gaps.
- Absence of individual data on the support provided to municipalities.

Results Evaluation

Indicators Evaluation

The indicators are evaluated based on the Monitoring Plan (Board 2) proposed by the *SEMAS Pará project* and approved by the Amazon Fund on the beginning of the project. When the indicators are insufficient or do not show progress, other aspects are suggested to show possible advances to the project.

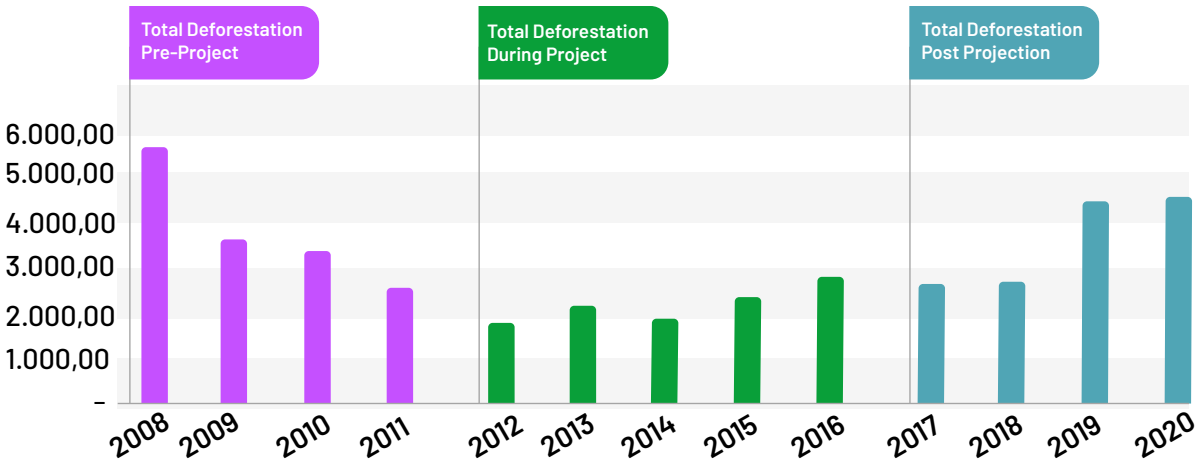
Board 2 - Monitoring Plan for the *SEMAS Pará project*.

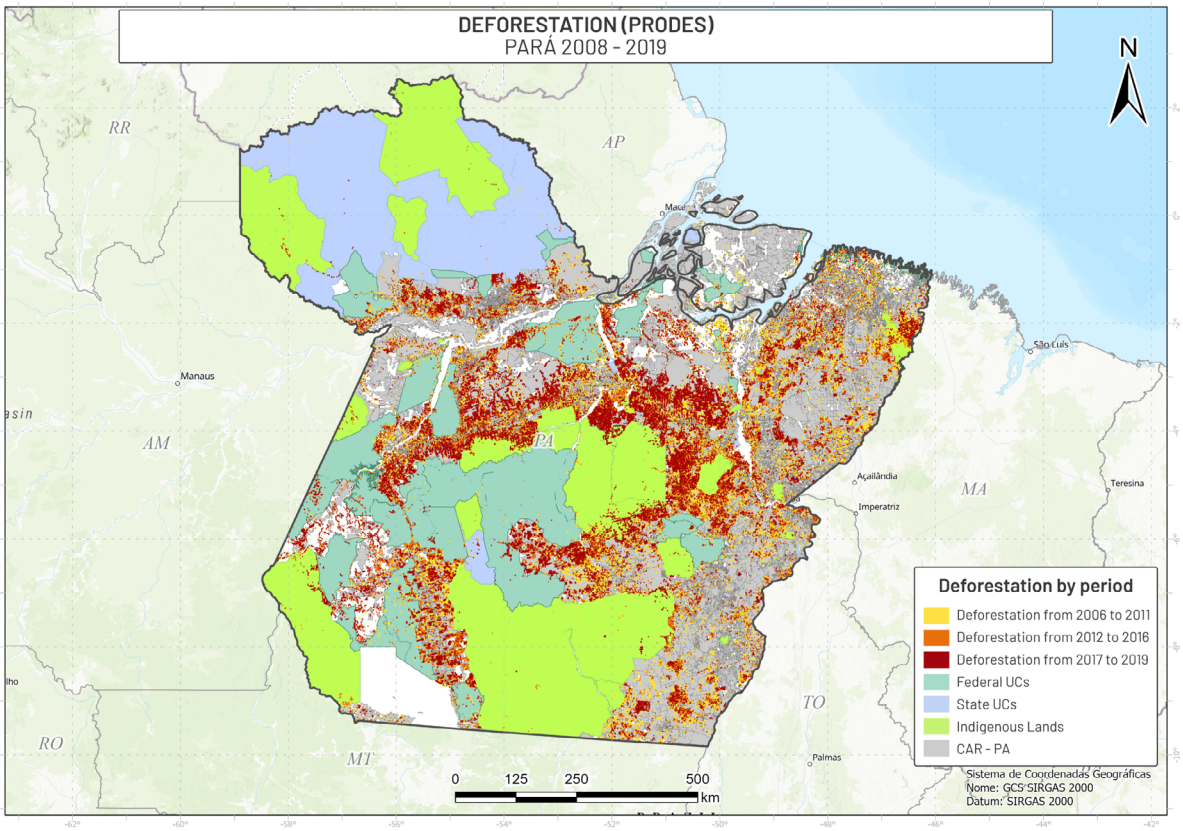
Intervention Logic		Indicators	Aim	Initial Amount	Final Amount
General objective	**Governmental efforts to ensure the human activities follow environmental legislation in the state of Pará**	Annual deforestation rate in the state of Pará		1.741 km²	2.153 km² (+124%)
Specific objective	**1 - Structured and modernized Pará State environmental monitoring, control and accountability institutions**	Number of trained employees using the knowledge acquired in their duties	80		230
		Number of municipalities with a Municipal Environment Council that have held meetings in the last 12 months	38		69
		Percentage of environmental licensing processes analysed within the legal timeframe	90%		60%
		Number of municipalities that developed full environmental management	44		69
	2 - Easier access by rural farmers in Pará State to the environmental regulation of their properties	Number of properties with their CAR membership application issued	No explicit target after 2013 (100.000)		167.864
Results and services	**1.1 - Strengthening of municipal environmental management in 44 municipalities through the physical and operational structuring of their environmental administrative units**	List of equipment purchased	None		See Table 3
	1.2 - Improvement of the infrastructure of the headquarters of SEMAS Pará and improvement of the environmental licensing process with a review of the state legislation, technical staff training and acquisition of operational infrastructure	Number of trained civil servants	160		230
		List of equipment purchased	None		See Table 3
	1.3 - Deconcentration of environmental management, through the implementation of 3 regional units of SEMAS Pará and the strengthening of another 3 previously existing units	Number of regional SEMAS Pará units strengthened	3		4
		List of equipment purchased	None		See Table 3
	2.1 - Strengthening Pará State's infrastructure for CAR issuing	List of equipment, software and images acquired			

General objective: Governmental efforts that ensure human activities follow environmental legislation in the state of Pará, the main indicator being the deforestation rate according to the Brazilian Institute of Geography and Statistics (*Instituto Brasileiro de Geografia e Estatística* - IBGE)[14], based on the Deforestation Monitoring Project in the Brazilian Amazon by the Satellite of the National Institute for Space Research (*Projeto de Monitoramento da Floresta Amazônica Brasileira por Satélite* - PRODES/*Instituto Nacional de Pesquisas Espaciais* - INPE).

The Evaluation of the general objective is complex. Figure 7 shows the progress of this indicator before, during and after the project.

Figure 7 - Deforestation in Pará State.





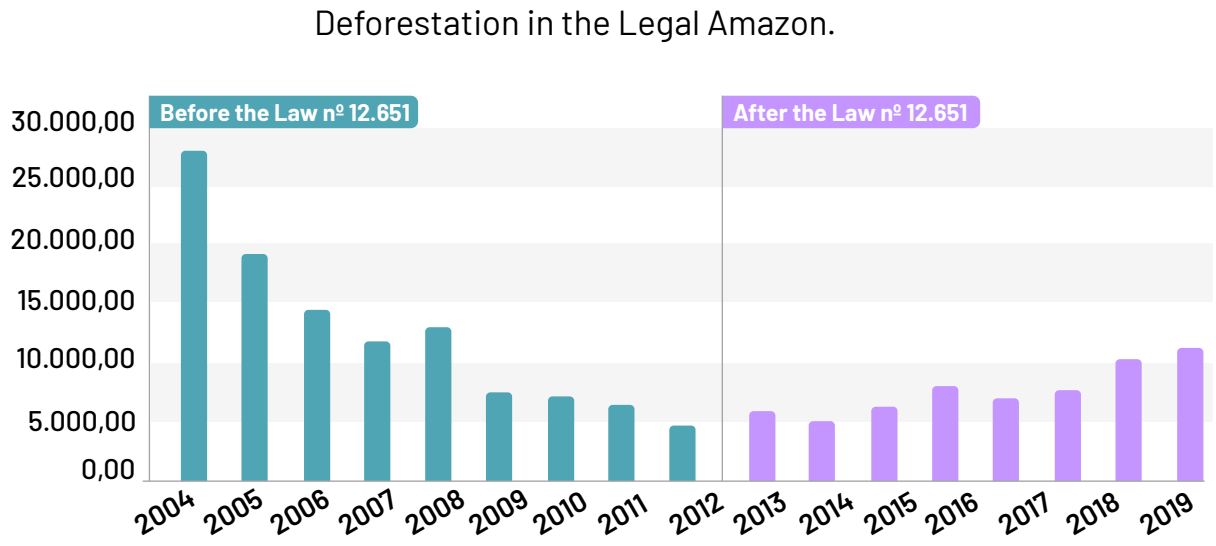
Source: Prodes/INPE.

[14] Rates haven't been updated since 2015.

Deforestation in Pará State had been falling until 2012, the first year of the project, when deforestation was 1,741 km², the lowest rate since 2004. During the project, deforestation rates oscillated, ending the period of this development, in 2016, with a raising trend that reached 2,759.86 km² (PRODES/INPE). This highest level of annual deforestation was maintained until 2018 and, in 2019, the deforestation rate then jumped up, remaining high in 2020.

This dynamic followed the more wider Amazon scenario, in which there was a drop in deforestation until 2012, which gradually rose until a sudden jump in 2019, when the rate represented 243% of the rate in 2012 (Figure 8). This reveals that the determining factor for the increase in the deforestation rate was taking place through the entire Amazon, and not only in Pará State. Passing Law No. 12.651 might figure among the factors that have acted throughout the entire Amazon region as of 2012, establishing the New Forest Code, which made the rules for protecting native vegetation more flexible.

Figure 8 - Deforestation in the Legal Amazon.



Source: Prodes/INPE.

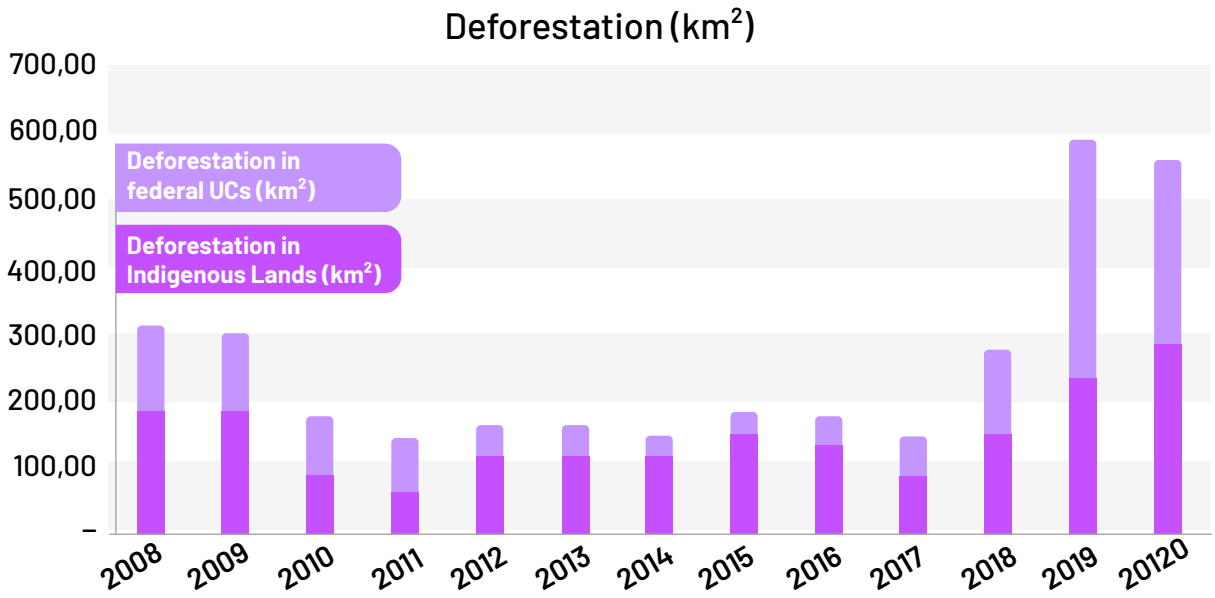
However, the increase in the rate of deforestation in the Amazon occurred differently in the Amazon and Cerrado biomes after Law No. 12.651 passed. In the Cerrado, there was an immediate increase in the annual rate in the years 2013, 2014 and 2015, followed by a sharp drop in the following years. These variations may be influenced by the expectations generated by the Law, which was then balanced by increased monitoring of the Cerrado areas, related to CAR implementation, and by the increase in market pressures, in recent years, for sustainable results from non-deforested areas.

In the Amazon biome, there was a gradual increase until 2018, with a jump in 2019 and continued to increase in 2020. Pará State represents a good part of deforestation in the Amazon and the relative increase in the period from 2012 to 2020 was of 267%, higher than the increase in the Legal Amazon as a whole (242%). Thus, although the dynamics are similar, the intensity of the increase in the rate of deforestation was greater in Pará State.

These increases are difficult to explain based on the usual arguments, such as Law No. 12.651 (New Forest Code), since deforestation remains relatively stable until 2018 (with a peak in 2016). The peaks may be the result of environmental flexibility expectations created by the change at the federal government in 2016, the year in which the presidential impeachment took place, and in 2019, with the inauguration of a new president.

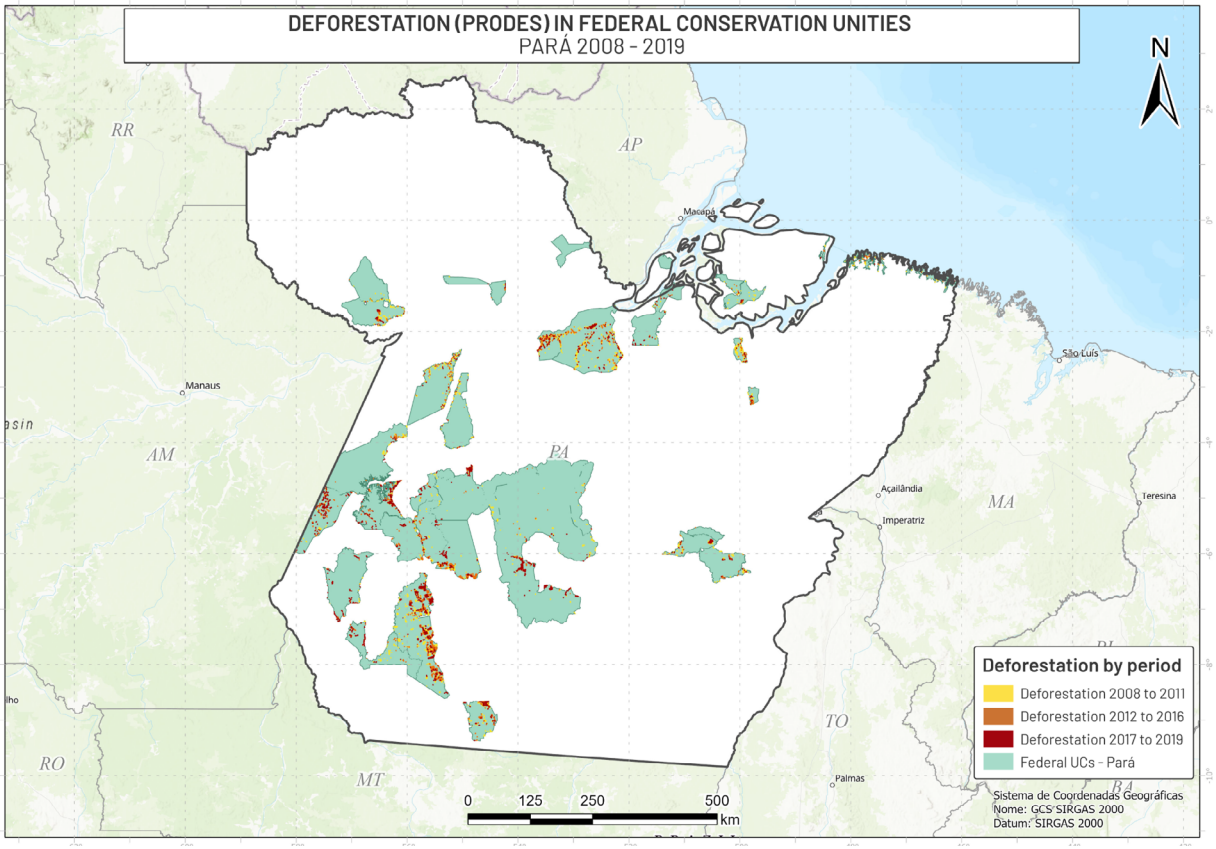
The evaluation team also sought to identify whether this dynamic was the same in all land categories in the state. Deforestation in federal public domain protected areas (*Unidades de Conservação* - UCs) and indigenous lands (*Terras Indígenas* - TIs) in 2020 was 353% larger in relation to that recorded in 2012, a relative increase much greater than the increase in the state as a whole (Figure 9). In these areas, there was no major increase in deforestation between 2012 and 2018, when the upward trend that preceded the jump in 2019 began. This probably reflects a deterioration of control in federal protected areas (*Áreas Protegidas federais* - APs), especially indigenous lands, in which in 2019, annual deforestation tripled in relation to previous years (Figures 9, 10 and 11).

Figure 9 - Deforestation on indigenous lands and federal public protected areas in Pará State.



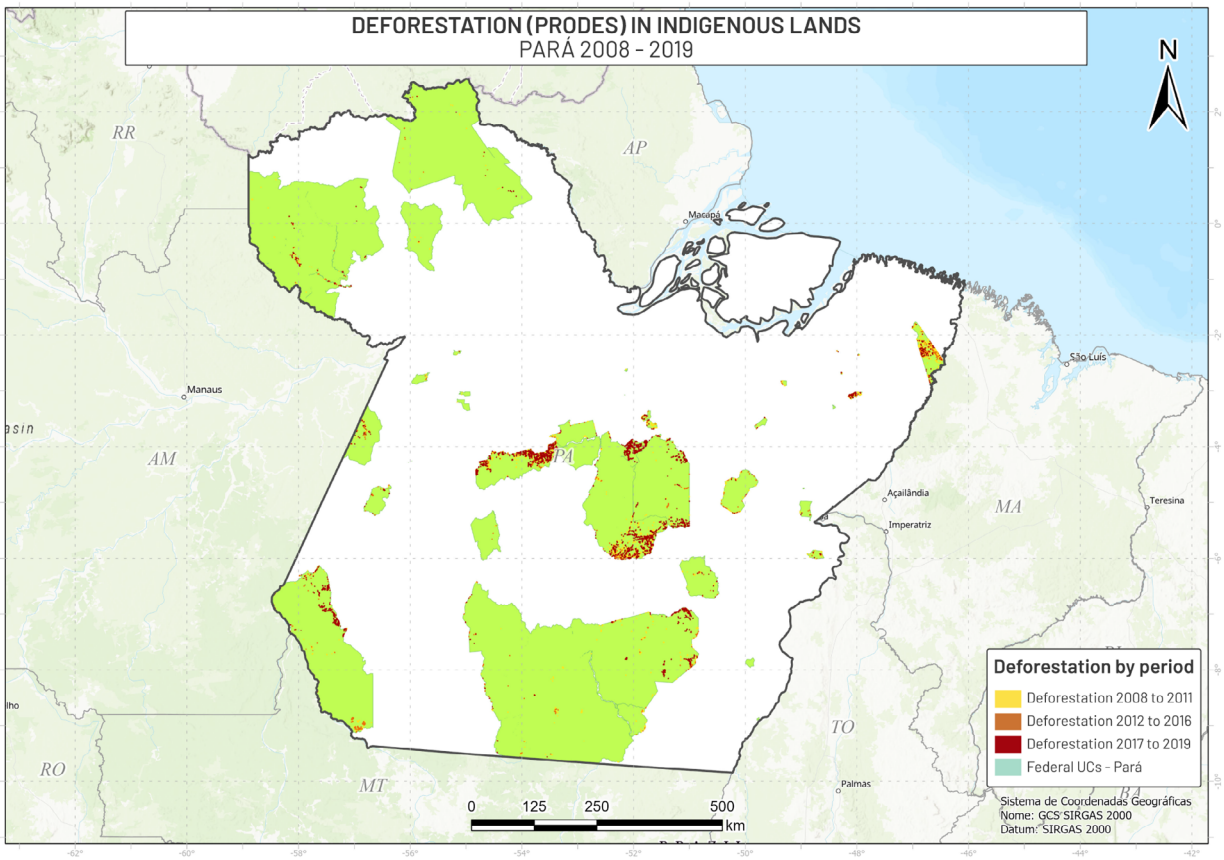
Source: Report on deforestation in the areas of the *SEMAS Pará and Reforestation projects* (item 7.5)

Figure 10 - Deforestation in federal public domain protected areas in Pará State.



Source: Report on deforestation in the areas of the *SEMAS Pará and Reforestation projects* (item 7.5)

Figure 11 - Deforestation on indigenous lands in Pará State.

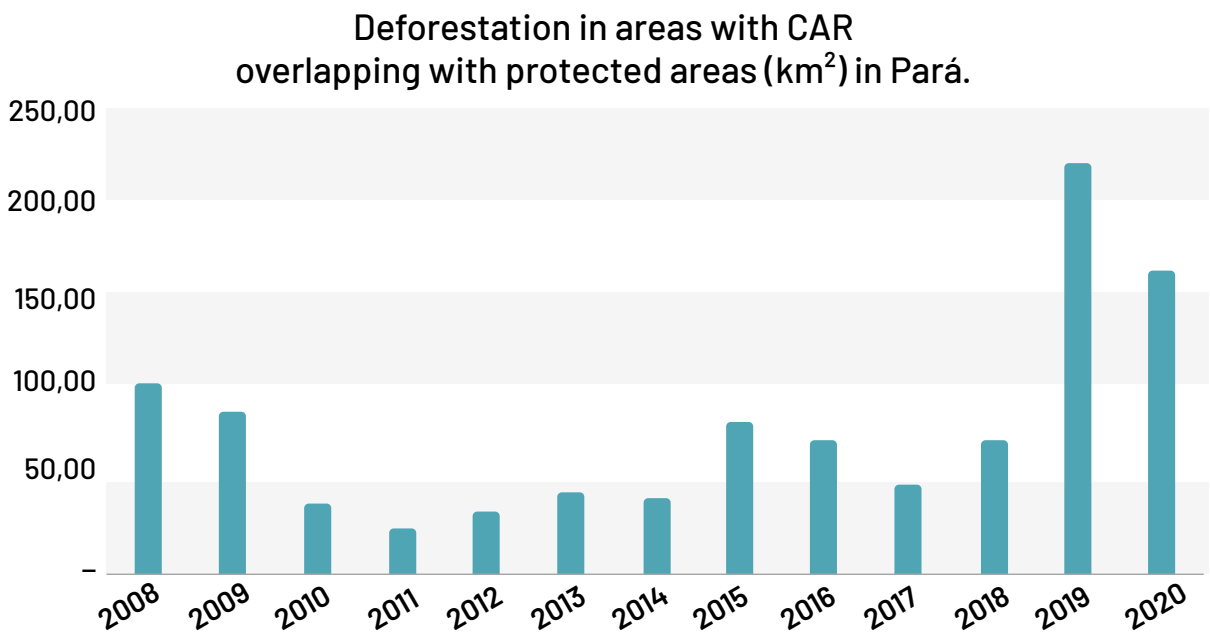


Source: Report on deforestation in the areas of the *SEMAS Pará and Reforestation projects* (item 7.5)

Deforestation in 2020 was 252% of that recorded in 2012 in areas filed on CAR, a smaller increase than that of the state of Pará as a whole. In areas not filed on CAR, outside protected areas, this percentage was 300%, representing a greater increase than that of the state. This difference suggests that the areas with CAR have better monitoring, that is to say, the registration has contributed to this smaller increase in deforestation in relation to other lands.

However, the areas registered in CAR overlapping protected areas had, in 2020, deforestation of 524% in relation to 2012, more than twice the increase in the whole of Pará State and much greater than that registered in the areas outside CAR in the state (Figure 12). It is worth noting that these areas, since they are protected, since they are federal public domain UCs or TIs, have their forest cover preserved, and CAR reach in these areas is related to the attempted land takeover for the purpose of deforestation. Since CAR registration is self-declaratory, many that have made these statements try to secure some proof of land use and occupation. In the current phase of validation analysis, these records in the CAR will, for the most part, be suspended and invalidated.

Figure 12 - Deforestation in areas with CAR's overlapping with protected areas (km²) in Pará State.



Source: Report on deforestation in the areas of the SEMAS Pará and Reforestation project (item 7.5)

Thus, the data presented suggest that CAR outside Federal public domain UCs and TIs increases monitoring and reduces deforestation. However, within APs, the CAR may reflect, together with the deforestation of the area, an attempt to take the land over. At first, it may seem advisable that the CAR system refuses to register properties within APs. However, if, on the one hand, this record would serve land grabbers, on the other, it could serve the government to focus command and control efforts on offenders, who are now identified.

This control seems to be the most difficult. MapBiomas survey reveals that only 2.32% of deforestation alerts between October 2018 and November 2020 occurred in authorized areas in Pará State, which shows ineffectiveness both in controlling unauthorized deforestation and in licensing deforestation that could be legal. The largest number of unauthorized deforestation occurred in small areas, from one to five hectares, but areas larger than 100 hectares make up the majority of the area cleared without authorization. Control of a few larger areas could then result in a large reduction in deforestation.

Less than half of the unauthorized deforestation (41%) resulted in an embargo, causing some possible difficulties to get financing or make commercialization viable. In the case of areas larger than 100 hectares, 59% of unauthorized deforestation resulted in an embargo, which suggests that command and control efforts have, in fact, focused on this segment.

Thus, although deforestation has increased in Pará State after the start of the project, this increase appears to be associated with powerful external factors, which have affected the entire Amazon biome. The difference of this increase in the different land categories analysed suggests that the project's efforts contributed to the increase in deforestation being smaller than average. However, the figures indicate that Pará State is far from guaranteeing good monitoring over rural areas.

Specific Objective 1 (impact level): Structured and modernized institutions for monitoring, control and environmental accountability in Pará State.

According to the Monitoring Plan of *SEMAS Pará project*, except for the objective of the "percentage of environmental licensing processes analysed within the legal deadline" indicator, the project achieved its goals: "number of trained employees using the knowledge acquired in the exercise of their functions", "number of municipalities with Municipal Environment Council that have held meetings in the last 12 months" and "number of municipalities that developed full environmental management "(Table 3):

Trained civil servants:

The interviews conducted show that the training of SEMAS PA civil servants, supported by the project, resulted in effective training for the whole team. More than numbers, there are several cases of civil servants who have advanced in their careers and, having started their work at the bottom of the SEMAS PA hierarchy at the beginning of the project, today hold positions of coordination and leadership. The time elapsed between the training and this evaluation makes it difficult to recover testimonies, but its importance was reinforced by the key interviewees in this evaluation.

The following courses took place until the end of the project, focusing on the SEMAS PA team:

- Managerial development;
- Botanical identification;
- Techniques for the evaluation, treatment and disposal of solid industrial waste;

- Treatment of industrial effluents;
- Biology conservation and wildlife handling;
- Recovery of areas degraded by mining activities;
- Evaluation of environmental impacts of mining activities;
- Procedures for assessing contaminated areas;
- Evaluation of environmental impact studies and environmental impact reports.

The list of course themes is very wide in the environmental area and some do not contribute to achieve the project's aims, for example, the ones regarding industrial solid waste, industrial effluents and evaluation of contaminated areas. Although relevant in the context of environmental management, these courses are not related to the Amazon Fund or the project's impact indicators, which generates an important point: the lack of focus from all courses within the project's topic tends to reduce effective implementation. In terms of systematic monitoring, the indicator was computed as fully realized, but the lack of focus on the topic in some cases reduces the effectiveness, which is the ability of the efforts to generate the expected results, and consequently the effectiveness and the expected impact of the proposed changes on the project.

Board 3 - Indicators for Specific Objective 1 (structured and modernized institutions for environmental monitoring, control and responsibility).

Indicator	Definition	Aim	Until 11/30/2016
Number of trained civil servants using the knowledge acquired in their duties	A measurement of trained civil servants using the knowledge acquired in their duties	80	139
Number of municipalities with a Municipal Environment Council that have held meetings in the last 12 months	Verified number of Municipal Environmental Councils with activities in the last 12 months	38	107
Percentage of environmental licensing processes analyzed within the legal timeframe	Calculated percentage of the number of environmental licensing processes analyzed within the legal deadline, on the total sample of licensing processes filed at the secretary at a given time	90%	60%
Number of municipalities that developed Full Environmental Management	Verification of the number of municipalities with terms for decentralization and Qualifications for Municipal Environmental Management celebrated with the state of Pará	44	107

Municipalization of environmental management

In Pará State, the municipalization of environmental management was carried out with the support of the *SEMAS Pará project* and, subsequently, of the *Green Municipalities Program*, both of which supported by the Amazon Fund. It is worth mentioning that the municipalization of environmental management is, in addition to a legal obligation, a state policy that is quite internalized in SEMAS PA.

At the beginning of the project, there was a greater monitoring of the municipalities and some supervision of the certification process, by SEMAS PA, of those who would be considered suitable for environmental management. As of 2015, municipalities started to require qualifications for full environmental management once proved that they meet the minimum requirements. This process has been advancing, even after the end of the project, and SEMAS PA is delivering a computerized licensing system for the municipalities to use. By municipalizing environmental management, the environmental secretary eased its own structure from the burden of the environmental licensing and inspection processes but had to develop training and guidance skills for municipal teams.

The *SEMAS Pará project* supported the environmental management of municipalities with equipment purchase, especially those that would help in carrying out the CAR. In addition to this, some municipalities have also received support for this purpose, from other projects supported by the Amazon Fund and non-governmental organizations (TNC and Imazon).

In order to receive the equipment through the project support, it was mandatory that the municipality be qualified for environmental management. The qualification came from meeting a series of standards (regulation, environmental policy, establishment and functioning of the Municipal Environment Council, staff members etc.). In 2015, the focus changed, demanding a less detailed requirement, with the municipality simply having to request its qualification.

An important point to note is that Pará State has incentives to improve municipal environmental management. The main one is the Green ICMS - *ICMS Verde* (State Law), which rewards good performances (Rural Environmental Registry, federal public domain protected areas, and controlled deforestation). The project, in turn, was also an incentive, with an increase in the number of municipalities interested in the project as it would support CAR.

Therefore, there is a chain of incentives that favor the municipalization of environmental management and so the municipalities are incorporating the need for municipal environmental management. There is also an award for the effort in environmental management and, every year, municipal managers seek the SEMAS PA to better understand how to get incentives.

On-time environmental licensing

The indicator "percentage of environmental licensing processes analyzed within the legal period" is crucial to the structuring and modernization of environmental monitoring, control and accountability institutions. The target for this indicator was 90%, and only 60% was achieved. Although the goal has not been reached, 60% of the processes analyzed within the legal deadline is a reasonable number within the many complexities and bureaucracies that are required in a licensing process. However, there is no indicator of the quality of this analysis.

Specific Objective 2 (level of impact): Easier access by rural farmers in Pará State to the environmental regularization of their properties.

Without an explicit goal after 2013 (when there were 100,000 registrations), 167,864 registrations were made in the state of Pará at the end of the project, which indicates this objective was met. Currently, Pará State has 229,928 registered properties, covering an area of 71.4 million hectares[15] (77% of the state's registrable[16] area). However, there are still many overlapping areas and registrations in areas that are not appropriate for registry, and it is only during the analysis and approval phase of the CAR, which is just beginning, that problems such as overlapping areas with indigenous lands (1.1 million hectares)[17] and embargoed areas (12.3 million hectares), among others, are resolved.

SEMAS PA was a pioneer in implementing the CAR, which has existed in the state since before it was instituted by Law No. 12.651/2012. However, with the implementation of the National Rural Environmental Registry System (*Sistema Nacional de Cadastro Ambiental Rural* - SICAR)[18] the state system was incorporated into the national system, which caused record losses. Thus, although the project has achieved its goals, this result has not been fully recorded. On the other hand, there was significant learning during CAR implementation.

Product 1.1: Strengthening of municipal environmental management in 107[19] municipalities through the physical and operational structuring of their environmental administrative units, with the indicator, without a target, being "list of equipment purchased", which does not indicate the strengthening of environmental management.

This project planning error, not adjusted during its approval, can be justified by the fact that the Amazon Fund was at the beginning of its operation, but makes it difficult to evaluate the project using this indicator.

The equipment purchase was communicated to the Amazon Fund and its distribution to the municipalities was presented through donations, with some interviews carried out confirming this transfer. These reports indicate that there was a substantial equipment purchase (especially motorcycles and computer equipment) to the municipalities for the CAR (Table 2). However, what was obtained are sparse impressions via interviewed informants, which are difficult to locate after so many years from implementation, and are easy to confuse with another similar project (*Program Green Municipalities*) implemented in the same state with the same types of benefits.

Table 2 - Equipment acquired by the project.

Equipment	Amount
Desktop	150
Nobreaks	150
NXR BROS motorcycles and helmet	146
Boats	22
Engines	22
Tows	22
Printers	100

[15] Available in: http://www.car.gov.br/publico/imoveis/index e http://car.semas.pa.gov.br/
[16] 55.300.089,83 ha. Source: CAR 10 anos. Available in: https://semas.pa.gov.br/wp-content/uploads/2018/11/9.pdf.
[17] SICAR does not show overlaps with conservation unities, although they are obvious in the map
[18] Check it in: www.car.gov.br
[19] The initial target was 44 municipalities. But, as a product, 107 municipalities were reached.

An example would be the Municipal Secretary of Environment of Altamira, which received funds from SEMAS PA and is very well structured, but it is difficult to separate how much of this structure came from the project or other sources. The evaluation found it very difficult to locate municipal managers with memories of the project to interview.

According to the managers' reports about SEMAS PA, the NUREs and the municipalities that were interviewed, the main impact from project that contributed to this product and added to others of the specific objectives, was the municipalization that resulted in improved access to farmers to regularize their properties through CAR registration and environmental licensing by municipalities (Specific Objective 2).

Product 1.2: Infrastructure improvement of the headquarters of the Pará State Secretary of Environment and improvement of the environmental licensing process with a review of the state legislation, training of the technical staff and purchase of operational infrastructure, with the indicators "list of equipment" and "number of trained civil servants", which do not offer a relative measure of infrastructure improvement and do not measure the improvement of the environmental licensing process with a review of the state legislation, although the "number of trained civil servants" indicator shows the training acquired by the whole team.

The project data reveals that all the equipment predicted in it was purchased, and the interviews with managers and technicians from the current and previous teams reveal that there has been a significant improvement in the physical structure and equipment of the SEMAS PA.

There are no indicators or targets in the project's Monitoring Plan for "improving the environmental licensing process" but, at the specific objective level, the indicator "percentage of environmental licensing processes analysed within the legal timeframe" offers an insight into the possible improvements in the licensing process, which was not mentioned during the interviews. The main improvement noticed during the interviews, a part of the direct impacts, was the process of decentralizing the licensing from headquarters to the NUREs and municipalities. This removed the burden from the SEMAS PA[20] headquarters, which started to meet the legal deadlines more effectively, reaching a total 60% of the cases within the established deadlines.

Nor are there any indicators (or reports) of the state legislation review. A query to the Legislative Portal for SEMAS PA does not show changes in the state laws related to licensing in the period between 2012 and 2017. Board 4 lists the decrees related to environmental licensing during the period of the project. At this level of laws and decrees, there are no signs of significant changes of state legislation related to licensing.

[20] At: www.semas.pa.gov.br/legislacao/publico/home.

Board 4 - Decrees and laws related to environmental licensing for the project's period.

Year	Decree	Contents
2013	838	Establishes rules for granting licenses, authorizations, services or other types of public benefit or incentive to enterprises and activities located in areas illegally deforested in the State of Pará, as well as other measures.
	739	rovides for a special land regularization process in the municipalities that meet the goals of the *Green Municipalities Program* and takes other measures.
	775	Regulates State Law No. 7.638/2012, which deals with the Ecological ICMS (revoked by Decree No. 1.696/2017).
2014	1.052	Provides for the obligation of the Rural Environmental Registry to issue the Animal Transport Guide in the State of Pará and to grant other state licenses and services.
2015	1.052	Creates the Environmental Regularization Program for Rural Properties in the State of Pará (*Programa de Regularização Ambiental* - PRA) and provides other measures (as amended by Decrees No. 1.813/2017 and 1.952/2017).

The same is true at the level of normative resolutions:

- State Council of Environment (*Conselho Estadual de Meio Ambiente* – Coema) Resolution No. 107, of March 8, 2013, defines criteria for framing works or enterprises/activities with low polluting/degrading potential or low environmental impact subject to the Environmental Licensing Exemption (*Dispensa de Licenciamento Ambiental* - DLA) and other measures.
- Coema Resolution No. 120, of October 28, 2015, provides for local environmental impact activities, which are the responsibility of the municipalities, and provides for other measures.
- Resolution Coema nº 126, of October 25, 2016, establishes the procedures and criteria for the Simplified Environmental Licensing, called *SIMPLES AMBIENTAL*, of enterprises or activities with low polluting/degrading potential, within the scope of the State of Pará – SEMAS PA, and makes other arrangements.

Regarding the training of the technical staff, the indicator "number of trained employees" exceeded its target of 160 and reached 230. There is no quality indicator in the design of the project (although the courses have quality Evaluations), but the interviews conducted point to an effective training process for the SEMAS PA technical staff. A sign of this contribution is, as has already been pointed out, the evolution of the technicians in the environmental Secretary within its organizational structure.

There are other aspects related to the structuring and modernization of SEMAS PA that may be important to improve the service provided to farmers in relation to licensing, the main one being online information and computerized systems for licensing processes. This aspect is not present in the project's Logical Framework, but it is currently being served by SEMAS PA.

Product 1.3: Deconcentration of environmental management, through the implementation of 3 regional units of the Pará State Secretary of the Environment and the strengthening of another 3 units already installed [21] with the agreed indicators in the Monitoring Plan, "number of regional units of Strengthened SEMA PA" (there is no indicator for the units created) and "equipment list "(see previous discussion on this type of indicator).

SEMAS PA strengthened four NUREs and did not create any for the duration of the project. In the interviews, it was cleared that the conditions for the creation of new regional centres were only achieved after the completion of the project, when two centres were then created based on the project's experience: Itaituba and Redenção. Thus, SEMAS PA reached the total number of six predicted NUREs, although only four were strengthened by the project. In those that were strengthened, the investment allowed its effective operation.

All equipment anticipated in the project was purchased. According to the interviews, the project also helped to adapt the facilities for NUREs operations and the acquisition of vehicles.

Product 2.1: Strengthening of Pará State's infrastructure for the issuance of CAR, with the agreed indicator "list of equipment, software and images acquired" (see previously presented discussion on this type of indicator).

In the first year, an unlimited number of geoprocessing software licenses were purchased. This information, provided in the reports, allows to signal that the CAR licensing issuing infrastructure has reached the desired degree of strengthening and that, apparently, there was no structural deficiency for the issuing of CAR licensing at the end of the project.

However, in addition to the infrastructure, there must be a good integration between the SEMAS PA headquarters and the municipalities. The municipality of Altamira, for example, is unable to reach the levels required of recorded CAR issuances to leave the list of critical municipalities.

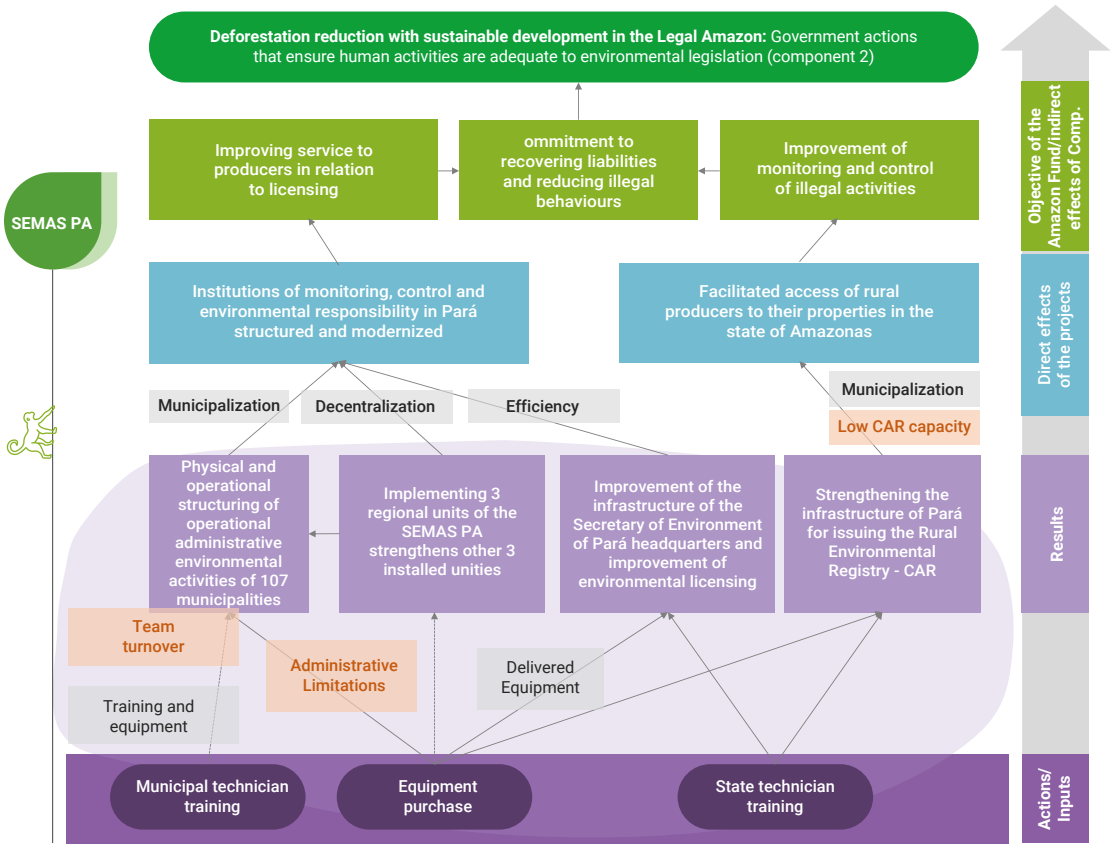
The area of Pará State registered in the CAR at the end of 2016 (56.9 million hectares) slightly exceeded 100% of the registrable area (56.8 million hectares). This indicates a problem of overlapping records, either between properties, with protected areas and public lands. From 2016 to 2019, the problem seems to have been accentuated, with a registered area increase of 71 million hectares, with about 14 million hectares more in relation to the numbers of 2016 and registrable area. Thus, currently, Pará State's greatest challenge in relation to the CAR will be the analysis and validation of the CAR records.

Theory of Change

Figure 13 presents the Theory of Change of the SEMAS Pará project, revised after the interviews.

[21] The Monitoring Plan describes a larger number of regional units: result 1.3: Deconcentration of environmental management, through the implementation of 3 regional units of the Pará State Secretary of the Environment and the strengthening of another 3 units already installed

Figure 13 - Theory of Change for the project revised after interviews.



OECD criteria

Board 5 summarizes the evaluation of the *SEMAS Pará project* according to the OECD criteria.

Board 5 - Summary of the project evaluation according to the OECD criteria.

Criteria	Brief definition (based on DAC /OECD)	Relationship with the Theory of Change	Evaluation
Impact	Evaluates the positive and negative changes resulting from the project, directly or indirectly, intentionally or involuntary.	Direct and indirect effects of project results	Strong effect
Relevance	Assesses the coherence of the project's aims according to the beneficiaries' demands and the political priorities of the target groups, the recipient and the donors.	Relationship between the "direct and indirect effects" of the projects with the "indirect effect of the component" and with the general objectives of the Amazon Fund.	Very relevant
Sustainability	Assesses whether the benefits of the project continue to occur after its completion, with an emphasis on social, economic and environmental aspects.	Continuity of direct and indirect effects of project results.	Moderately sustainable
Effectiveness	Assesses the extent to which the direct objectives of the project have been achieved or are expected to be achieved and what factors have been important.	Contribution to efforts for the generation of project results.	Good Effectiveness
Efficiency	Measures the cost-benefit of the results, if the financial resources were invested in a more economical way and if the results were achieved in a satisfactory way.	Contribution to procedures, management arrangements, works, equipment and other inputs to the project's efforts.	Good Efficiency

Impact, sustainability and relevance

Pará State's environmental monitoring, control and accountability institutions were structured and modernized with the support of the project at three levels: State Environment and Sustainability Department Pará (SEMAS PARÁ) headquarters, regional centres and municipalities. The strategy of decentralization (for municipalities) and deconcentration (for State Environmental Organizations) in key areas was effective in shifting part of the headquarters' service to regional centres and city hall, which were also equipped. Although the farmers were not interviewed, the perception of the technicians of these bodies is that the service has improved, with faster responses, mainly in relation to licensing, which may have given the impression of greater control and governance to landowners.

This impact, associated with the re-evaluation of forest conservation rules, carried out through Law No. 12.651 / 2012, may, in fact, have reduced deforestation on private lands, outside federal protected areas, as pointed out in the discussion made about the general objective indicators.

The fact that deforestation has been maintained, and even increased, in federal protected areas has to do with both the motivation of the actors and the command and control efforts in these areas. In protected areas, deforestation efforts are carried out by criminals and squatters who seek to consolidate the possession of public goods and the illegal extraction of natural resources. If the federal government is not able to guard the Union's assets against this criminal action, there is no effect from inhibiting deforestation in these areas, as there was in other areas of the state, where state governance was strengthened, the limits were reassessed and there is no motivation.

The state of Pará is the second largest in the country, with very long distances, sometimes within the same municipality. Altamira is the most extreme example, with a total area of 159,533 km², 105 times larger than the municipality of São Paulo and larger than the states of Ceará, Amapá, Pernambuco and Santa Catarina, for example, or that the sum of the areas of the states of the Rio Janeiro, Espírito Santo, Alagoas and Sergipe, with internal displacements of up to 800 km between the municipality's centre and rural locations. Thus, sometimes, rural regularity is no longer achieved due to logistical difficulties, both on the part of farmers and government institutions. In this context, both the deconcentration and the decentralization promoted by the project are very relevant.

This strengthening of Pará State's environmental monitoring, control and accountability institutions, which were structured and modernized, is relatively sustainable. The items supported by the project have a duration period: computers, equipment and, mainly, images need to be renewed periodically. Training meets both the limit on the need to update knowledge and the turnover of civil servants, especially in the municipalities. Few remain in the same role, which can be demonstrated by the difficulty of the evaluation team in locating people with significant project knowledge. This occurred in all the strengthened instances: city halls, State Environment and Sustainability Department and, to a lesser extent, State Environment and Sustainability Department Pará (SEMAS PARÁ). For there to be greater training sustainability, it is necessary to have a specific staff of public servants (public employees or otherwise) of the agencies. On the other hand, training is a recurring need by nature, and an investment will always be necessary, even with more stable teams. In addition, a certain renewal of the team is healthy, but not at a level where it implies discontinuity.

Thus, the state of Pará needs permanent sources of funds to cover these expenses. The project, however, created the conditions for the demand for these resources to exist once society gets used to the provision of environmental licensing and regularization services.

Effectiveness

The effectiveness of *SEMAS Pará project* is the extent to which efforts create results. These efforts consisted mainly of the acquisition and delivery of software, satellite images and equipment, the adaptation of facilities and training activities.

In general, the analysis of the product indicators presented, despite its limitations, indicated that the efforts resulted in the expected results.

Efficiency

The evaluation team had few elements to assess the efficiency of the project. No problems were reported with the BNDES procedures, regarding the purchasing rules or the management arrangement.

Investments in infrastructure in the CAR add up, including equipment for the municipalities and investments in the infrastructure of SEMAS PA, R$ 12,052,506.88 (2,31 Mio. USD). Also, 166,051 registrations were made in the CAR, resulting in a cost of R$ 72.58 (13,88 USD) per registration, considered relatively low. And, over time, this cost would drop, considering that the same structure could advance registrations even more. If no investment had been made after the project, that cost would today be R$ 54.13 (10,35 USD) per property (with more than 222 properties) or R$ 0.17 (0,03 USD) per hectare. Obviously, this would not be the total cost of the CAR, which involves personnel, fuel etc. In any case, to pay for this cost, using the assumptions of the carbon value of the Amazon Fund, the state of Pará should reduce annual deforestation by 903 hectares, that is, 0.42% of annual deforestation at the end of the project.

In relation to the cost of the items purchased, a detailed assessment is outside the scope of this evaluation, but the values appear to be within the market values, especially in the case of those of more substantial value, such as vehicles and computer equipment.

REDD+ Cancun Safeguards

Board 6 presents the analysis of the compliance with the Cancun Safeguards [23] for REDD+ in the *SEMAS Pará project.*

Board 6 - Cancun Safeguards (REDD+) applied to the project.

Safeguard/Issue	Compliance	Observation
1. Efforts complementary or consistent with the aims of national forest programs and other relevant international conventions and agreements.	**Yes**	
Did the project prove to be in line with the PPCDAm and the state plans for the prevention and control of deforestation?		The strengthening of institutions and the CAR is aligned with the PPCDAm.
With what other federal public policies or international agreements did the project demonstrate alignment? In what aspects?		The project supports the implementation of the Forest Code and helps Brazil to fulfil its commitments before the UNFCCC.

[23] These Safeguards were not mandatory to projects in the moment they were submitted, so the project did not develop specific strategies to meet them.

Safeguard/Issue	Compliance	Observation
Has the project contributed, or could it contribute directly or indirectly to reducing emissions from deforestation or forest degradation? In what way?		The project strengthens control over deforestation, but deforestation increased during its implementation, a trend observed throughout the Amazon biome.
2. Transparent and effective national forest governance structures, with a view to national sovereignty and national legislation.	**Yes**	
To what extent has the project promoted the articulation between different actors (public, private, third sector or local communities)?		The project promoted the decentralization of environmental management and interacted with other related projects, implemented by NGOs.
To what extent has the project contributed to strengthening public instruments and forestry and territorial management processes?		The project strengthened the infrastructure necessary for the implementation of these instruments and trained the technical staff.
3. Respect for the knowledge and rights of indigenous peoples and members of local communities, considering relevant international obligations, circumstances and national laws and noting that the UN General Assembly has adopted the United Nations Declaration on the Rights of Indigenous Peoples.	**Not Available**	
To what extent has the project influenced the constitutional rights associated with the formal possession and disposal of land in its area of expertise?		The project could have influenced land tenure and formal destination if the CAR carried out overlapping indigenous lands, federal public domain protected areas and traditional territories could be used as evidence of land ownership. The Law does not provide for this and there were no instances where this could have happened, although there was no effort to interview representatives of indigenous peoples and traditional communities.
To what extent has the project influenced the sustainable use of natural resources in its area of expertise?		It strengthened the governance instruments.
If the project's direct beneficiaries were indigenous peoples, traditional communities or family farmers: were their socio-cultural systems and traditional knowledge considered and respected throughout the project?		Not Available
Are there any effects that interfere with the traditional way of life of these groups? What kind of effects: on the social, economic organization or the use of available spaces and resources? How do they interfere: positively, negatively or both?		Not Available
4. Full and effective participation of stakeholders, in particular indigenous peoples and local communities, in the efforts referred to in paragraphs 70 and 72 of Decision 1/CP 16.	**Not Available**	
How did the project guarantee prior consent and the local or traditional way of choosing representatives of its beneficiaries (especially indigenous peoples and traditional communities)?		Not Available
What participatory planning and management tools did the project apply during planning and decision-making?		Not Available

Safeguard/Issue	Compliance	Observation
In the case of projects with economic purposes: were any benefits from the project accessed in a fair, transparent and equitable manner by the beneficiaries, avoiding a concentration of resources?		Through information available on the SEMAS PA website.
To what extent did the project provide the general public and its beneficiaries with free access and easy understanding of information related to the project's efforts?		Through information available on the SEMAS PA website.
Was the project able to build a good system for monitoring results and impacts? Were the results achieved and their effects systematically monitored and disseminated?		The monitoring system was deficient in the definition and reporting of the indicators.
5. Efforts consistent with the conservation of natural forests and biological diversity, ensuring that the efforts referred to in paragraph 70 Decision 1/CP 1611 are not used for the conversion of natural forests, but rather to encourage the protection and conservation of natural forests and their ecosystem services and to improve other social and environmental benefits.	**Yes**	
How did the project contribute to the expansion or consolidation of protected areas?		Not Available
How did the project contribute to the recovery of deforested or degraded areas?		It helped to identify farmers' environmental deficits and to structure recovery obligations.
In the case of restoration and reforestation activities in areas, did the methodologies used prioritize native species?		Not Available
To what extent has the project contributed to establishing recovery models with an emphasis on economic use?		Not Available
6. Efforts to address the risks of reversals in REDD+ results.	**Yes**	
What factors constitute risks to the permanence of REDD+ results? How did the project approach them?		Prevented by the Forest Code
7. Efforts to reduce the displacement of carbon emissions to other areas.	**Yes**	
Has there been a shift in emissions avoided by the project's efforts to other areas?		Although the project, associated with other measures, has been very effective in reducing deforestation on private land in Pará State, deforestation in the state has continued to increase, in federal protected areas (public domain UCs and indigenous lands), where command and control efforts are exclusive to the Union.

Cross-cutting criteria

Poverty reduction

The project did not focus on poverty reduction[24]. However, deconcentration and decentralization tend to favour the poorest, who gained access to environmental regularization services. In addition to that, the improvement of the state's environmental governance, by logic, must have had an indirect impact on poverty reduction by favouring the sustainable development of the state, but there are no indicators on which to base this statement.

Board 7 - Crosscutting criteria "Poverty Reduction" applied to the project

Crosscutting Criteria/Issue	Compliance	Observation
Poverty Reduction	Yes	
To what extent has the project contributed effectively to economic alternatives that value the standing forests and sustainable use of natural resources?		The improvement of the state's environmental governance must have had an indirect impact on poverty reduction by favouring the sustainable development of the state.
To what extent has the project positively influenced poverty reduction, social inclusion and improved living conditions for beneficiaries (mainly: traditional communities, settlers and family farmers) who live in their area of activity?		Deconcentration and decentralization tend to favour the poorest, who gained access to environmental regularization services.
Did the project manage to promote and increase the production in value chains of timber and non-timber forest results, originating in sustainable management?		Not Available
In the case of a project that contains the component of scientific and technological development, did it contribute to the construction of a development model suited to the region?		Not Available

Gender Equality

The project also did not focus on gender equality[25]. However, it is worth noting that it has been observed that women occupy a prominent position in the hierarchy of SEMAS PA, composing most of the key people interviewed for this evaluation, but this aspect is an internal attribute and not an impact from the project. Thus, it is considered that gender equality is not a criteria applied to the project.

Board 8 - Transversal Criteria "Gender Equality" applied to the project

Cross-cutting criteria / Issue	Compliance	Observation
Gender equality	Not Available	
Did the project manage to integrate gender issues into its strategies and interventions, or did it address the issue in isolation? How?		Not Available
Was there gender separation in data collection for project planning and monitoring?		Not Available
How did the project contribute to gender equity?		Not Available

[24] The crosscutting criteria were not mandatory during the project's submission, so it might not have developed specific ways to meet them.
[25] The crosscutting criteria were not mandatory during the project's submission, so it might not have developed specific ways to meet them.

Conclusions

The *SEMAS Pará project* was able to deliver the proposed results and achieve the specific and general objectives. In other words, the project generated results and these results apparently had the expected impact (indirect effect). In other words, the project, in alongside with other initiatives, contributed to the deconcentration and decentralization of environmental management in Pará State, which resulted in improved access by rural landowners to environmental licensing and regularization services provided by environmental agencies. In conjunction with the renegotiation of environmental rules in Law No. 12.651/2012, this contributed to the improvement of environmental governance, encouraging deforestation reduction outside federal protected areas.

Recommendations

To the project coordinators

Since the SEMAS Pará project has ended already, the recommendations to the project coordinators are not aimed at adjustments to their efforts, but to the policies and efforts in the topics of this project and to future projects. Thus, with regard to the topics of the project, it is recommended to:

- Encourage public tenders in the state and municipalities to hire effective civil servants, thus reducing turnover and the constant need for training in the same subjects.
- Develop systems for maintaining and transmitting the institutional memory of the project, either through a system of records and reports, or through the training activities themselves.

To the Amazon Fund's Management Department

The recommendations to the BNDES are meant to improve the selection, adjustment, monitoring and evaluation processes of ongoing and new projects. These recommendations are based exclusively on the evaluation of the *SEMAS Pará project* and may have already been adopted by the Amazon Fund in other projects.

- Requirements, in the guidelines and in the proposal adjustment process, that the indicators go beyond equipment purchase and other items lists to show that the project has achieved its aims and expected results.
- Emphasize the need to present a strategy for the sustainability of resources in recurring efforts.
- To require, in projects submitted by governments, a basic team of effective civil servants, capable of retaining the acquired capacities and transmitting knowledge and the memory of the project.
- Continue to support projects to strengthen the management capacity of state and municipal environmental agencies, within a context of decentralization of environmental management, since they have very good returns.

7.1.2 Reforestation in the Southern part of the State of Amazonas Project

Title:	*Reforestation in the Southern part of the State of Amazonas*
Responsible body (Project management):	State of Amazonas
Responsible body (Financial management):	Amazonas State and BNDES
Period:	08.17.2010 – 06.30.2018
Territorial coverage:	Lábrea, Apuí, Boca do Acre and Novo Aripuanã municipalities
Beneficiaries:	1.000 selected farmers and their families, public bodies involved (SEMA, IPAAM and IDAM)
Aim:	To support the environmental management in the state of in areas under extreme deforestation pressure, in the Amazonas State's municipalities Boca do Acre, Lábrea, Apuí and Novo Aripuanã, through: (i) strengthening environmental management, focusing on doing CAR; and (ii) recovering deforested areas through reforestation with species that have an economic and ecological function, through agroforestry, silvicultural and agrosilvopastoral systems.
Total value:	R$ 20.000.000,00 (3.83 Mio. USD) (estimative) - R$ 17.575.286,19 (3.36 Mio. USD) (actual)
Support from the Amazon Fund worth:	R$ 20.000.000,00 (3.83 Mio. USD) (estimative) - R$ 17.575.286,19 (3.36 Mio. USD) (actual)
Execution time:	79 months (estimative) - 96 months (actual)
Contract date:	12.17.2010
Project end:	06.30.2018

Summary

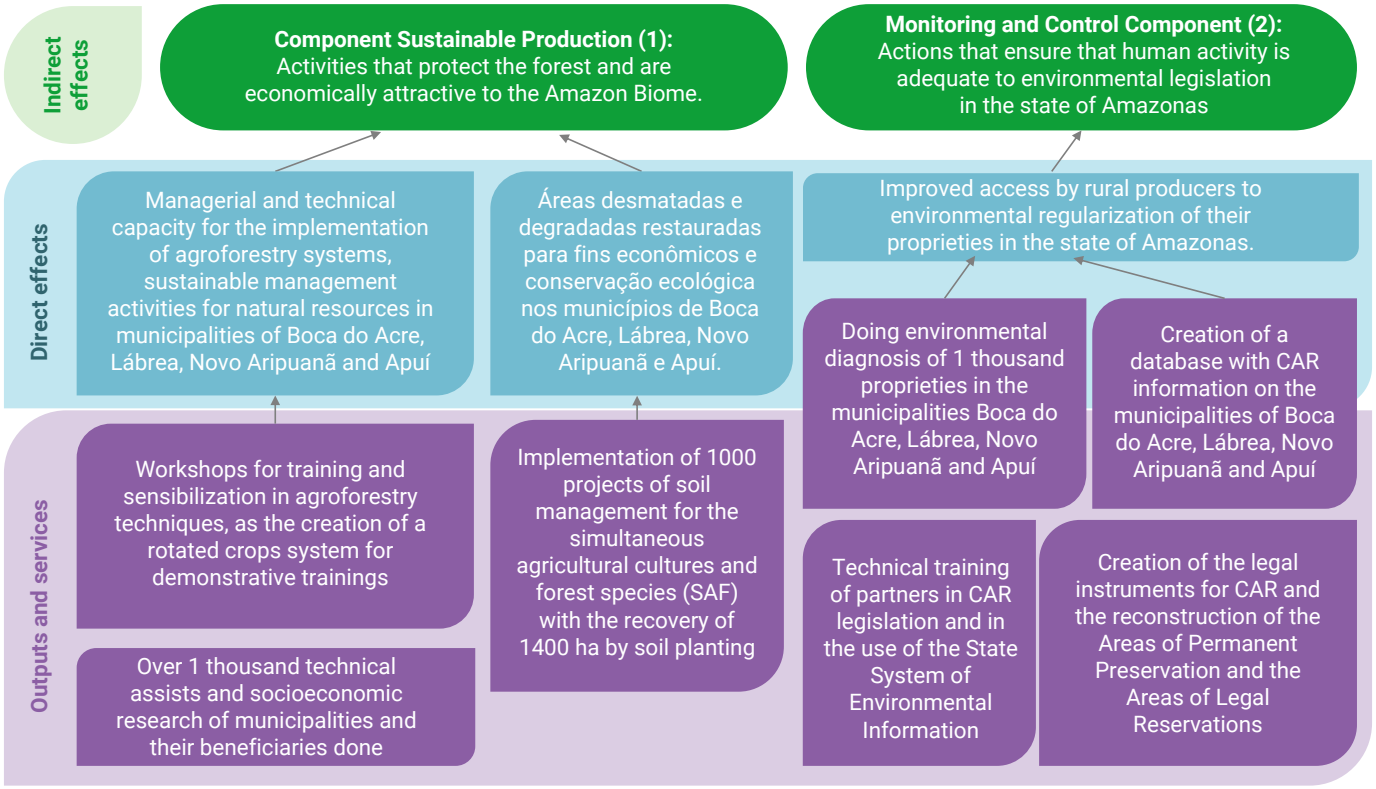
The project included activities along two axes: (i) strengthening of environmental management, with a focus on the realization of CAR and (ii) recovery of deforested areas through reforestation with species with an economic and ecological function, through agroforestry, silvicultural and agrosilvopastoral systems. To this end, the state environmental agency selected 1,000 rural farmers in the four municipalities.

Awareness-raising workshops, training and technical assistance through practices of sustainable use and management of natural resources, using demonstration units in which farmers could observe the methods of implantation and the results of agroforestry systems were held with local communities. To support reforestation efforts, the project performed: (i) the mechanization services for cleaning and preparing the area for planting; (ii) the inputs supply to support planting; and (iii) the seeds supply to farmers to implement SAF.

The project was implemented by the State Secretary of the Environment and Sustainable Development (*Secretaria Estadual de Meio Ambiente e Desenvolvimento Sustentável* - SDS), which, after administrative reform in the state in 2015, changed its name to the State Secretary of the Environment (*Secretaria de Estado de Meio Ambiente* - SEMA). It also had a direct partnership with the Institute of IDAM and the IPAAM.

Intervention logic

Figure 14 - Logical Framework of the Reforestation project.



Specific methodology

An ex post document analysis was carried out for the realization of the *Reforestation project*, following the parameters of the Conceptual Framework for Impact Evaluations of Projects Supported by the Amazon Fund and its complementary documents.

Based on the performance reports, an analytical script was produced, which guided the selection of interviewees and the interview questions. The interviews were conducted by videoconference without local visits.

Analysis of secondary sources (publicly accessible databases)

Analyses of the results of the Agricultural Census of 2006 (the last census ex ante to the project) and of 2017 (the last census ex post to the project) were carried out.

Interview script

The interviews had four stages:

- Efforts in the project/role of the institution;
- Direct effects of the *Reforestation project*;
- Project sustainability;
- Cross-cutting criteria (poverty and gender).

Difficulties and limitations

- Impossibility of on-site visits and interviews due to Covid-19.
- Inexistence of a database of farmers with individualized information on properties and their recovery/planting, that is, monitoring "every single producer'.
- Gaps in available data sources: performance reports, evaluation reports and reforestation reports.
- Change of the consultant responsible for the project evaluation within the evaluation team after the interviews were carried out.

Results Evaluation - Component 1 (Sustainable Production)

Context

At the time of the implementation of the *Reforestation project*, the Agricultural Census (IBGE, 2006) was the database with the most up-to-date picture of rural establishments, productions and farmers at the municipal level. The project started in the region, which was undergoing a marked transformation, five years later, but this is the only data available to understand the context. In 2011, in the four target municipalities of the project, more than 85% of the agricultural establishments were family based (Table 3) (Agricultural Census, IBGE, 2006).

Table 3 - Distribution of locations by producer condition.

Producer condition	Amazonas State	Project municipalities			
		Apuí	Boca do Acre	Lábrea	Novo Aripuanã
Family based	**61.830**	**1.774**	**1.282**	**1.877**	**653**
Owner	36.959	1.528	801	861	491
Settled without definitive ownership	3.438	188	43	194	10
Lease	915	18	1	10	4
Partner	2.100	10	6	34	58
Occupier	8.207	18	371	553	74
Producer without land ownership	10.211	12	60	225	16
Total land participation	**92,6%**	**86,0%**	**89,0%**	**87,5%**	**94,4%**
Owner	90,8%	88,8%	88,9%	83,0%	93,2%
Settled without definitive ownership	87,9%	84,3%	89,6%	89,4%	90,9%
Lease	96,4%	85,7%	100,0%	83,3%	80,0%
Partner	98,5%	83,3%	100,0%	89,5%	100,0%
Occupier	95,0%	26,9%	87,9%	96,7%	98,7%
Producer without land ownership	97,7%	66,7%	96,8%	84,0%	100,0%

Source: Agricultural Census 2006 (IBGE, 2006).

Family proprieties of settlers without definitive title, occupants and farmers without area represented a smaller proportion in Apuí and Novo Aripuanã and a higher one in Boca do Acre and Lábrea, indicating a low level of land regularisation of the properties in these municipalities, with obvious consequences in relation to land security, conflicts over land, stability and turnover of farmers in the areas and environmental regularity. Farmers in a situation of land insecurity also tend to be less successful in long-term projects, such as SAF. In fact, the interviews carried out by this evaluation corroborate this situation, with a lower success rate in the implementation of SAF in the municipalities of Lábrea and Boca do Acre.

Family farming represented the largest number of properties in the four municipalities; however, it did not represent most of its area. In Apuí, a municipality with a territorial area of more than 54 thousand km², family properties were predominant among tenants (82.6%), but among owners this type of ownership represented 46.4% of the occupied area, despite being 88, 8% of the properties. In Boca do Acre, a municipality with a territorial area of more than 22 thousand km², family properties were 100% of the area where farmers were partners, and 47.9% of the area among owners, a similar pattern observed in Novo Aripuanã. In Lábrea, even though the family properties were 83% of the total, they only represented 4.9% of the area of all the properties in which the producer was the owner, showing great land concentration. It was observed that family farmers were predominant in the area and in several properties when they were settled without definitive title.

Table 4 - Area of establishments by producer condition (IBGE, 2006)

Producer condition	Amazonas State	Project municipalities			
		Apuí	Boca do Acre	Lábrea	Novo Aripuanã
Family based	**1.475.558**	**156.539**	**75.811**	**42.693**	**29.761**
Owner	1.188.459	135.749	59.236	20.169	28.177
Settled without definitive ownership	95.850	17.074	2.941	16.779	413
Lease	44.976	1.043	X	529	37
Partner	12.729	406	218	112	64
Occupier	133.545	2.267	13.415	5.105	1.069
Producer without land ownership	-	-	-	-	-
Total land participation	**40,2%**	**35,0%**	**52,2%**	**9,8%**	**49,7%**
Owner	37,8%	46,4%	47,9%	4,9%	48,6%
Settled without definitive ownership	56,2%	47,5%	86,9%	82,4%	94,3%
Lease	86,8%	82,6%	-	76,3%	13,5%
Partner	73,3%	63,7%	100,0%	18,3%	100,0%
Occupier	46,8%	1,9%	75,2%	64,9%	99,3%
Producer without land ownership	-	-	-	-	-

Source: Agricultural Census 2006 (IBGE,2006).
Note: Data for territorial units with less than three respondents are unidentified and marked with the letter X.

In general, and based on ex ante data for the project, these were the general characteristics of the farmers who, later on, would be potential beneficiaries of the project's intervention. The project would act both in terms of environmental regularization and in vegetation recovery and conservation, promoting productive activities that would keep the standing forest and bring financial returns to families.

In 2006, the four municipalities targeted by the project represented a small portion of properties when compared to the rest of the state of Amazonas. Their properties were, for the most part, family members, with family labour, living in the property, poorly educated, with low qualifications and with men as head of the household. Most of the farmers were owners, but there was still a lot (almost reaching equality with the owners) of other types of ownership, which is part of the reality in the Amazon. The properties had forest cover in most of the territory and pastures as the second largest cover in the area. The SAF were practically non-existent and few degraded areas were reported by the farmers.

Indicators Evaluation

The Evaluation of the indicators was made based on the Monitoring Plan (Board 9) proposed by the *Reforestation project* and approved by the Amazon Fund. When the indicators were insufficient or did not show progress, other aspects were suggested to indicate possible advances in the project.

Board 9 - Indicators and targets according to the Monitoring Plan for the Sustainable Production component.

	Intervention logic	Indicators	Aim	Initial Amount	Final amount
General objective 1	**Activities that keep the forest standing and are economically attractive in the municipalities of Boca do Acre, Lábrea, Novo Aripuanã and Apuí.**	Annual deforestation rate in the state of Amazonas (estimated by using satellite images of the clear-cut deforestation area in the municipalities of Boca do Acre do Acre, Lábrea, Novo Aripuanã and Apuí).			
Specific objective	**1.1 - Expanded managerial and technical capacity for the implementation of agroforestry systems, activities for the sustainable management of natural resources in the municipalities of Boca do Acre, Lábrea, Novo Aripuanã and Apuí.**	Number of people trained effectively using the knowledge acquired.			Not presented
	1.2 - Deforested and degraded areas recovered and used for economic and ecological conservation purposes in the municipalities of Boca do Acre, Lábrea, Novo Aripuanã and Apuí.	Reforested area.	1,400 ha with seedlings	0	1073,8
		Area recovered and used for economic purposes.		0	1073,8
Results and services	**Result 1.1.1 - Holding events (trainings, workshops) to raise awareness and training in agroforestry techniques, as well as the installation of rotated pasture management system units for demonstration courses.**	Number of awareness and training events held	142 events (109 trainings and 33 workshops) held		208
		Number of people trained.	3550 people trained		903
		Number of demonstrative rotative pasture management units deployed.	4 units installed		3
		Number of SAF demonstration units deployed.	4 units installed		5
		Number of events held in the demonstration units of SAF and rotational grazing management.	4 units installed		4
		Number of events in the demonstration units of SAF and management of rotated pasture administered.	54 events with an average of 25 participants		96
	Product 1.1.2 - Provision of technical assistance and socioeconomic survey to 1,000 family farmers benefited by the project	Number of families served.	1,000 assists		6204
		Families participating.	1,000 families participating		1.000
	Product 1.2.1 - Implementation of 1,000 soil management projects for the simultaneous cultivation of agricultural crops and forest species with recovery of 1,400 ha by planting seedlings	Number of seedlings distributed.	1.450.000		1.450.000
		Number of soil management projects for simultaneous cultivation of agricultural crops and forest species implemented.	1,000 projects implemented		767

General objective 1: Activities that keep the forest standing and are economically attractive in the municipalities of Boca do Acre, Lábrea, Novo Aripuanã and Apuí, with the indicator "annual deforestation rate in the state of Amazonas (estimate using satellite images of the area of clear-cut deforestation in the municipalities of Boca do Acre do Acre, Lábrea, Novo Aripuanã and Apuí)".

Obviously, the deforestation indicator does not reflect the economic attractiveness of the activities that keep the forest standing, as deforestation may be occurring due to other causes. An indicator that could reflect this general objective would be "area or production of activities that keep the forest standing".

But do the activities that the Reforestation project promoted keep the forest standing? This evaluation hired a study[26] to compare deforestation inside and outside the plots that received support from the project, which would reflect Specific Objective 2 (presented below), and answers whether the activities keep the forest safe. In Apuí, properties that received support from the project deforested 7.2% less than neighbouring properties. In Boca do Acre, deforestation was 1.7% higher in supported properties. In Lábrea, it was 0.61% lower. In Novo Aripuanã, the rate of deforestation within the supported properties was 11.51% lower than the rate of deforestation in the surrounding areas (Table 5).

Table 5 - Accumulated deforestation from 2010 to 2019 (%) in the properties participating in the project and its surroundings.

Municipalities	% of accumulated deforestation from 2010 to 2019		
	Within the properties participating in the project	In areas up to 1 km	Difference
Apuí	10,2%	17,4%	-7,2%
Boca do Acre	18,2%	16,5%	1,7%
Lábrea	18,8%	19,4%	-0,6%
Novo Aripuanã	10,8%	22,3%	-11,5%

Source: Report on deforestation in the areas of the projects SEMAS Pará and Reforestation (item 7.5)

These data show that the project's activities corroborated moderately to reduce deforestation, especially when the conditions of governance were met. The second question for evaluating this general objective is: are these activities economically attractive?

Regarding the 17 species chosen for the implementation of SAF, six of them have results of monitoring the IDAM´s Quarterly Monitoring Reports from 2009 (before the project) until 2019 (post-project). The *guaraná* planted area grew during the project period but fell again in 2018. The same movement was observed for cocoa, bananas and, more drastically, coffee. This negative variation in 2019 may reflect a methodological problem. *Cupuaçu* was the only one of the six crops that remained stable after the completion of the project. *Andiroba* has no results of planted area. *Açaí* appears in interviews as a crop that brings potential results (such as complementary income, food security and potentially sale), but there is no data available in the Monitoring Reports on the crop.

[26] Comparative rates of deforestation in the lots that followed CAR in the project scope and around it. May 2020. Based on Table 2 - Total territorial range in the proprieties (lots) and distance.

The project's technical team also emphasized that certain species take a longer time to become productive. Thus, the production data (Table 6) should consider a delay in relation to the project dates and, that due to normal annual variations, do not represent its economic attractiveness.

Table 6 - Evolution of production by species in the municipalities participating in the project.

Species	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Guaraná (t)	18,0	16,8	17,3	16,3	16,3	30,3	79,1	43,2	58,6	41,9	19,6
Cocoa (t)	297,5	419,5	411,0	232,5	219,2	371,0	234,0	320,0	362,5	296,6	282,6
Cupuaçu (thousand fruits)	131,0	102,0	102,0	100,0	100,0	67,1	64,0	72,0	72,0	114,0	149,2
Coffee (t)	3.077,0	2.382,0	1.126,0	1.132,0	1.192,8	2.350,8	2.017,8	2.351,3	348,0	309,8	125,5
Banana (thousand bunches)	595,4	418,4	414,4	412,0	413,6	707,1	988,4	706,7	867,2	754,4	538,1
Andiroba (t/oil)	23,9	25,2	25,6	5,9	0,7	1,6	2,2	7,1	11,7	8,4	26,0
Total	**4.142,8**	**3.363,9**	**2.096,3**	**1.898,6**	**1.942,5**	**3.527,9**	**3.385,4**	**3.500,4**	**1.720**	**1.525,1**	**1.141**

Source: Quarterly Monitoring Reports/IDAM, 2009 to 2019.
Note: Reference period: January to December of the year referenced.

There is a strong growth in the number of farmers of all species (with the exception of *andiroba*) from 2014, from 47% to 87%, which may reflect an influence of the project or of the economic attractiveness of these species in these municipalities. As previously mentioned, there is a strange variation in the number of coffee growers (a reduction of almost 90%) between 2016 and 2017 and of banana growers and *guaraná* farmers between 2018 and 2019 (Table 7). Except in these cases, other crops tend to maintain the number of farmers.

Table 7 - Evolution of the number of farmers per species in the municipalities participating in the project.

Species	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Guaraná	128	142	155	174	181	318	326	327	327	329	179
Cocoa	295	287	273	247	248	336	325	341	365	321	306
Cupuaçu	127	97	97	93	93	156	145	145	157	149	190
Coffee	1.100	840	730	711	705	1.267	1.274	1.272	158	156	244
Banana	831	822	822	720	842	1.460	1.398	1.301	1.432	1.310	933
Andiroba	115	229	146	83	56	48	50	49	64	45	46
Total	**2.596**	**2.417**	**2.223**	**2.028**	**2.125**	**3.585**	**3.518**	**3.435**	**2.503**	**2.310**	**1.898**

Source: Quarterly Monitoring Reports/IDAM, 2009 to 2019.

Note: Reference period: January to December of the referenced year.

The planted area data (Table 8) reflects this variation in the number of farmers.

Table 8 - Evolution of planted area (ha) by species: total of municipalities participating in the project.

Species	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Guaraná	132	161	159	174	195	345	386	387	396	387	100
Cocoa	371	309	306	358	358	506	461	485	505	412	401
Cupuaçu	61	55	55	50	50	70	82	86	86	80	89
Coffee	2.712	1.543	1.186	1.170	1.164	2.268	2.271	2.270	283	280	141
Banana	688	636	660	635	742	1.259	1.338	1.162	1.279	1.192	859
Andiroba	---	---	---	---	---	---	---	---	---	---	---
Total	**3.964**	**2.704,1**	**2.366,1**	**2.386,5**	**2.509,3**	**4.448,1**	**4.538,1**	**4.388,8**	**2.549,2**	**2.351,2**	**1.589,6**

Source: Quarterly Monitoring Reports/IDAM, 2009 to 2019.

Note: Reference period: January to December of the referenced year.

The 2017 Agricultural Census indicates that the increase in the extent of land use for other activities not related to SAF grew, in the period, at a higher speed than those related to the implementation of SAF. In addition, despite the project having carried out 767 SAF, the data self-reported by farmers in the Census was only 147 in the municipalities (69 less than in the Census carried out before the project in 2006). Thus, although the self-reported information may contain errors (which could explain the large discrepancy between the Census reports and data), the data from the 2017 Agricultural Census, at first glance, does not seem consistent with the data from Quarterly Monitoring Reports/IDAM, which indicates an increase in the number of farmers who cultivate species normally associated with SAF.

However, many SAF (according to the Census, areas cultivated with forest species also used for crops and grazing by animals) evolve into permanent crops, without annual crops or livestock. In fact, in the Amazon, it is common for SAF to be called the consortia of shrub and tree species, including of permanent crops such as *guaraná*, cocoa, *cupuaçu*, coffee, bananas and other crops, often grown in shade alongside with timber species, without the presence of annual crops or livestock. However, if the permanent crops expanded in Boca do Acre and Novo Aripuanã, they also expanded the natural forests or forests destined for permanent preservation or legal reserves (Table 9).

Table 9 - Activities developed and area in which the activity is developed: family properties, 2006 and 2017.

		Municipalities of the 2006 project					Municipalities of the 2017 project			
Activities	Amazonas State 2006	Apuí	Boca do Acre	Lábrea	Novo Aripuanã	Amazonas State 2017	Apuí	Boca do Acre	Lábrea	Novo Aripuanã
Total family properties	61.830	1.774	1.282	1.877	653	67.602	746	2.653	1.839	886
Crops - permanent	26.631	329	573	875	316	43.319	236	1.418	1.024	543
Crops - temporary	35.428	406	978	1.484	421	55.729	192	1.868	1.553	727
Pastures - natural	5.791	241	272	54	35	8.263	18	145	217	75
Pastures - planted in good condition	8.734	1.302	441	249	96	9.188	656	1.421	263	27
Woods or forest - natural woods or forest destined for permanent preserva-tion or legal reserves	9.643	703	391	199	145	24.571	487	1.135	1.226	411
Woods or forest - natural woods or forests	17.412	1.139	664	607	243	20.557	209	1.262	454	206
Woods or forests - planted forests	216	28	2	1	10	133	-	-	4	1
SAF - area cultivated with forest species also used for crops and grazing by animals	2.242	171	29	6	10	3.272	14	25	105	3
Family activities area	1.475.558	156.539	75.811	42.693	29.761	1.766.255	94.712	183.732	70.937	38.406
Crops - permanent	139.682	1.401	3.393	2.228	1.531	73.946	893	3.359	867	1.776
Crops - temporary	218.510	1.596	4.076	4.079	1.174	93.764	664	4.972	1.706	1.388
Pastures - natural	86.981	9.444	2.993	991	909	164.144	X	2.689	14.283	5.817
Pastures - planted in good condition	175.088	34.837	10.734	12.509	2.583	257.112	46.691	57.778	18.189	2.295
Woods or forest - natural woods or forest destined for permanent preserva-tion or legal reserve	261.171	34.620	16.092	6.726	11.382	602.643	31.651	59.075	25.469	17.288
Woods or forest - natural woods or forest	479.337	62.707	33.814	14.435	10.281	411.886	8.260	47.946	3.823	7.733
Woods or forests - planted forests	2.928	636	X	X	341	564	-	-	X	X
SAF - area cultivated with forest species also used for crops and animal grazing	28.231	2.442	265	20	250	46.358	X	X	X	X

Source: Agricultural Census 2006 and 2017.

Note: The total number of activities is higher than the total number of properties because the same property can carry out more than one activity.

To prove the impact of a project, it is necessary that some conditions are met: (i) there is a hypothesis linking an intervention to the change of a variable (impact); (ii) the intervention precedes the change in the variable; (iii) the change in the variable occurs only where the intervention occurs. Thus, there is reasonable evidence of a positive impact of the project since: (i) there were support for the implementation of Agroforestry Systems (the project intervention); (ii) the project preceded the increase in the number of farmers and the area of agroforestry cultivation and the decrease in the deforestation of these lots (the variables that the project sought to change); (iii) the plots that were supported with seedlings for the creation of these harvests had lower deforestation than the plots in their surroundings in most municipalities (the change is associated with the intervention); (iv) there has been an increase in the area of permanent crops and natural forests intended for permanent preservation or legal reserves in the municipality; (v) these observations are consistent with the Theory of Change (or intervention logic) of the project.

Specific Objective 1.1 (impact level): Expanded managerial and technical capacity for the implementation of agroforestry systems, sustainable management activities of natural resources in the municipalities of Boca do Acre, Lábrea, Novo Aripuanã and Apuí, with the indicator, according to the Monitoring Plan, being "number of people effectively trained using the knowledge acquired".

More than 110 training events were held, with more than 1,007 people trained1. IDAM teams were also trained[27] in the process of training farmers. Although the indicator does not fully reflect the increase in managerial and technical capacity for Agroforestry Systems implementation and sustainable management of natural resources in the municipalities targeted by the project, it largely reflects this part of the process. Except in the south of Lábrea, where there was a great discontinuity of teams and rotation of farmers in the benefited lots, capacity was maintained and may have spread throughout the region. The analysis is further discussed in the following results.

Product 1.1.1: Offering trainings in agroforestry practices, as well as the implementation of crop rotation system unities for demonstrative teaching sessions, with six indicators.

The objectives were achieved in four of the indicators. Two of them have not been achieved: "number of trained and sensitized people" (903, instead of 3550) and "number of events in the SAF demonstration units and rotated pasture management administered" (54, instead of 96).

208 awareness-raising and training events were held, but their reach in terms of the number of people was significantly less than expected. The 93 training courses held had 440 farmers present - 89 in Lábrea headquarters, 217 in Boca do Acre and 134 in Novo Aripuanã - with the agreed goal of 80 courses. In addition to that, 70 training sessions were held with 494 farmers, exceeding the agreed goal of 30 training sessions. The topics addressed in both strategies were agroeconomics, environmental education, rural environmental registration, agroforestry system, crop/livestock/forest integration and rotational grazing, in accordance with the expected delivery. The trainings and workshops were monitored by local IDAM[28] coordinators.

According to the technicians and local actors interviewed, carrying out training above the expected was part of the process making local participation easier, as more training closer to the farmers would facilitate participation (but resulted in fewer farmers in each

[28] The data provided are based on their performance reports.

workshop), but that number of possible participants may have been overestimated. On the other hand, farmers who did not participate in the project were also part of some training courses, which was considered positive by the interviewees, as, in their perceptions, the workshops served to arouse the farmers' interest in the project topic, motivating and clearing doubts. The fact that both, those served by the project and their neighbours, had access to the training expanded the impact analyses, since knowledge about SAF may have reduced deforestation and increased the area for SAF cultivation both within the benefited lots and in their surroundings.

In each of the strategies, less than 50% of those selected by the project participated. Regarding the training, Lábrea (extreme), a region with major agrarian conflicts and low government presence, was not included (which may have contributed to the low persistence of Agroforestry Systems in that region). One of the reasons for this low adherence may have been the selection, pointed out by the interviewees as inefficient. The groups of farmers were selected by IDAM, the company and IPAAM, seeking to meet the project deadlines, and the training activities worked as motivation. But, as the project would only last four years, this selection was rushed.

The field days, which were not originally in the project and were negotiated with the contractor, were late adaptation attempts during process' implementation.

Product 1.1.2: **Technical assistance and socioeconomic survey to 1,000 family farmers benefited by the project,** with the following indicators: "number of technical assistances provided" and "number of families served".

These two indicators achieved their aims, with the "number of technical assistances provided" being six times greater than estimated. The BNDES Monitoring Plan established as targets for this result 1,000 assistances carried out by technicians. In total, 6,204 assists were carried out, with an accumulated progress of 1,859 in 2012 and 4,228 in 2013.

A problem found in the provision of this technical assistance was that, in some municipalities, there was a lack of synchrony between the availability of the teams and the availability of seedlings, in addition to the short time for the technical assistance (less than two years), with discontinuation of Technical Assistance and Rural Extension (ATER) after planting the seedlings. As will be seen below, the seedlings were ready in 2014. Thus, it is likely that these Technical Assistance and Rural Extension had little effect on the planting of the seedlings and subsequent care in the field, a hypothesis that was corroborated by the interviews, which also pointed out rotation problems with the technical staff in the field. Technical Assistance and Rural Extension was lacking during the implementation of the project and after its completion, especially where the Institute of Agricultural and Sustainable Forest Development of the State of Amazonas did not have enough staff.

Specific Objective 1.2 (impact level): Deforested and degraded areas recovered and used for economic and ecological conservation purposes in the municipalities of Boca do Acre, Lábrea, Novo Aripuanã and Apuí, their indicators being, according to the Monitoring Plan, "reforested areas" and "area recovered and used for economic purposes".

For these two indicators, the Results Evaluation Report points to the same area of 1073.8 hectares. The SAF area is reported as "reforested area" and "area recovered and used for economic purposes", which seems unlikely. A study on the reforested area in the lots served by the project was carried out comparing the years 2010 and 2019. This study first identified the vegetation cover of the project's beneficiary lots (Table 10).

Table 10 - Boundaries of the lots and areas mapped in 2010 and 2019 by municipality of where the Reforestation project operates.

Municipality	Border (ha)	2010		2019		Differential (%)	
		Native vegetation (ha)	Area of use (ha)	Native vegetation (ha)	Área of use (ha)	Vegetation	Area of use (ha)
Apuí		14.852,94	10.717,75	15.837,17	9.733,54	7	-9
Boca do Acre	24.970,60	13.299,66	11.671,02	10.626,32	14.344,39	-20	23
Lábrea	15.917,19	12.043,11	3.882,01	9.867,65	6.057,38	-18	56
Novo Aripuanã	8.958,72	6.623,34	2.335,38	6.732,07	2.226,65	2	-5
Total	**75.417,19**	**46.819,05**	**28.606,16**	**43.063,21**	**32.361,96**	**-8**	**13**

Source: Report on the analysis of vegetation recovery in the areas of the Reforestation project (item 7.5)

It is worth noting that the forest cover increased in the lots of Apuí and Novo Aripuanã and fell in the ones in Boca do Acre and Lábrea. On the other hand, Table 11 shows that there was forest regeneration even in the municipalities where the coverage of native vegetation even in plots where native vegetation cover was reduced.

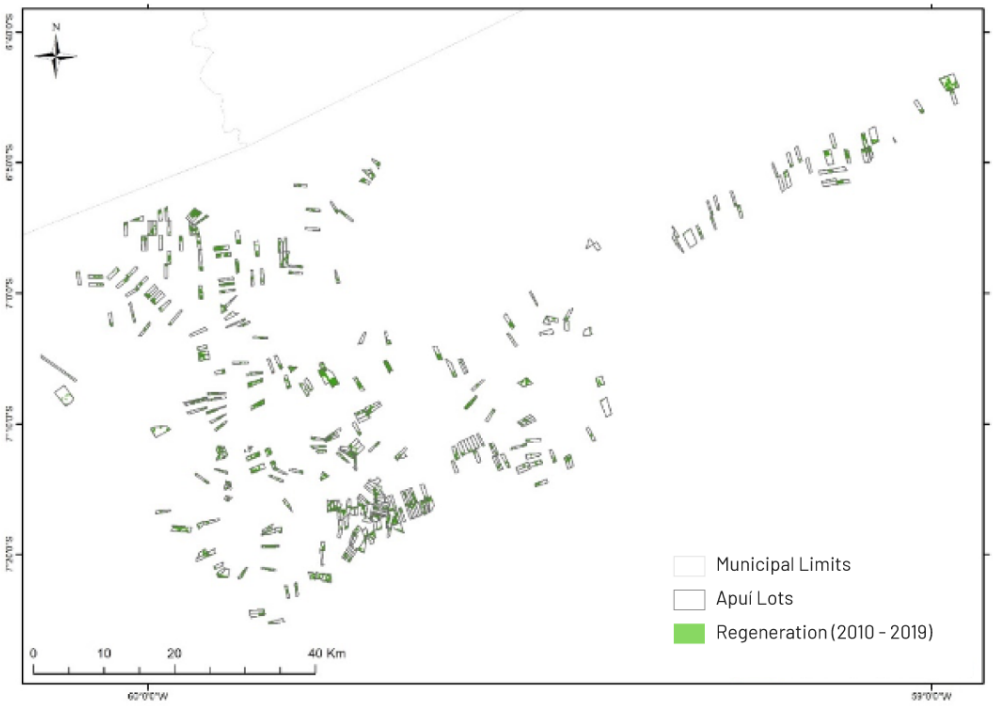
Table 11 - Areas under regeneration and rate of regeneration by municipality in the period from 2010 to 2019.

Municipality	Border (ha)	Regeneration (ha) (2010-2019)	Regeneration Rate (%) (2010-2019)
		3.581,25	14,0
Boca do Acre	24.970,60	1.863,15	7,5
Lábrea	15.917,19	816,09	5,1
Novo Aripuanã	8.958,72	1.075,34	12,0
Total	**75.417,19**	**7.335,83**	**9,7**

Source: Report on the analysis of vegetation recovery in the areas of the Reforestation project (item 7.5)

As was pointed out in the discussion of the general objective of this component, the economic attractiveness of activities that keep the forest standing does not always guarantee the reduction of deforestation or the recovery of areas, as other factors can also influence this issue. The analysis of the map in Figure 15, based on the data contained in the report presenting these results, demonstrated that the observed recovery of these areas was not a consequence exclusively from the SAF crops. For example, the total forest recovery area was 7,335 hectares (Table 11), but the objective of the project was just 1,400 hectares, with only 1,073 hectares being reported.

Figure 15 - Demonstrative map of regeneration areas in the municipality of Apuí.



Source: Report on the analysis of vegetation recovery in the areas of the Reforestation project (item 7.5)

In other words, most of the recovery of the areas (86%) took place in the absence of the project, although they may also have been influenced by the project and other initiatives. More detailed surveys in the field would be necessary to arrive at the correct numbers of the direct contribution of the *Reforestation project*, but, factually, there was recovery of native vegetation, which may also have been caused by other projects or programs, or even by areas being abandoned and natural regeneration.

At the same time, there were only net gains (recovered - deforested) in forest cover in Apuí and Novo Aripuanã. Overall, the properties had their internal area recovered or in the process of being recovered according to the 2020 Forest Cover Recovery Report, but the data includes all areas under natural recovery and not just agroforestry crops.

In any case, the evidence shows that forest recovery, associated with rural extension efforts and in a specific context, can, in fact, be a way to mitigate the deforestation that has been occurring in the region and, if supported in a concrete way, with policies effective public policies, it can be a path to sustainable development via the standing forest.

Product 1.2.1: Implementation of 1,000 soil management projects for the simultaneous cultivation of agricultural crops and forest species with recovery of 1,400 hectares by planting seedlings, the indicators being: "number of seedlings distributed" and "number of soil management projects for simultaneous cultivation of agricultural crops and forest species implanted".

The Monitoring Plan indicates that the target of distributing 1,450,000 seedlings has been achieved. The number of projects implemented was 767, below the target of 1,000. The difficulty of transportation, the quality of the seedlings, the delays in the bidding processes and the delay in preparing the properties were the main factors cited by the interviewees, and present in the project reports, to explain the failure in achieving the target. According to the interviews, this was due to the rigidity of the procedures of the Amazon Fund and

the state government, which did not allow farmers themselves to be hired for the local production of the seedlings, requiring the hiring of an external company.

In 2011, three Agroforestry Systems study models were replicated in six arrangements. For dimensioning the hiring of a company capable of producing seedlings, the estimated mortality of seedlings that would be produced was 10%. In 2012, the company COTRAP *Construtora e Transportadora Pioneiro* LTDA signed with the SDS, in September 2012, after a bidding process, a contract to carry out the removal, cleaning, swathing and harrowing of 1,450 hectares. In December 2012, the company *Campo da Amazônia de Biotecnologia* signed a contract in which the production of 1,450,000 seedlings of 17 species: *guaraná*, *açaí*, cocoa, *cupuaçu*, coffee, banana, Brazil nut, *andiroba*, pink cedar, *paricá*, *ipê, cumaru, jatobá, piquiá, jenipapo, cedrinho* and *angelim*. In the period from December to February 2012, two nurseries were built, one at the headquarters of the municipality of Apuí (built area of 4,635 m²) and one at the headquarters of the municipality of Lábrea (useful area of 1,260 m²).

In 2013, 334 properties were removed, cleaned, swathed and screened: 110 in Apuí, 26 in Novo Aripuanã, 40 in Boca do Acre and 158 in Lábrea. There were delays in this preparation process due to rains and difficulties in sending equipment. In the same year, 707,046 seedlings (49%) were ready for planting and nine people were hired to compose the technical team to monitor the project.

The project's technical team reported that the low quality of the seedlings and the delay in delivery interfered with the usefulness of the plants. In November 2013, a multi-institutional commission was formed by means of an Ordinance, aiming to evaluate the quality of the seedlings produced based on variables such as health, root conformation, clods quality, height uniformity, resilience and number of leaves. According to the reports presented, "the commission recommended correction and treatment for some species in certain lots, which were immediately attended to and approved the other seedlings for planting as suitable."

By March 2014, 665 properties had been prepared and the production of seedlings reached 55.3%. In December 2014, 100% of the seedlings were ready, in a quantity expected to cover 1,400 hectares. In May 2017, the activity was concluded, considering the acquisition, mechanization, transport and fertilization. However, according to the reports of the *Reforestation project*, the recovered area reached 1,074 hectares, below the desired coverage area.

The number of Agroforestry Systems in the municipalities supported by the project totalled 767 (below the target of 1000 predicted). The indicators "recovered area" and "number of seedlings distributed", when analysed together, already showed signs that the total coverage would not be reached:

- March 2013: 61.7% of seedlings distributed and 10.7% of reforested area;
- December 2014: 93.5% of seedlings distributed;
- March 2015: 65.6% of reforested area;
- November 2016 (end of the project): 100% of seedlings distributed and 76.7% of reforested area.

According to the interviews, the lack of direct listening to the farmers in the design of the intervention, the problems in receiving the seedlings, the difficulty of implementing the SAF, the pressure from crops and livestock as one of the local productive activities, the lack of logistical assistance for the production flow and the lack of financial guidance may have influenced the success of SAF in the region. Part of the farmers continued their SAF, while others gave up, among other factors, because technical assistance was not provided by the project after planting.

There are reports in the interviews that *açaí* assists in the food security of families and that local micro-industries process the fruit, but with the closure of the project there is no continuous monitoring anymore. In general, the interviewees' perception demonstrated that the farmers understood the importance of vegetation recovery with the use of SAF, but lost interest when the price of their product was devalued on the market, there were difficulties with the flow or the production cycle ended.

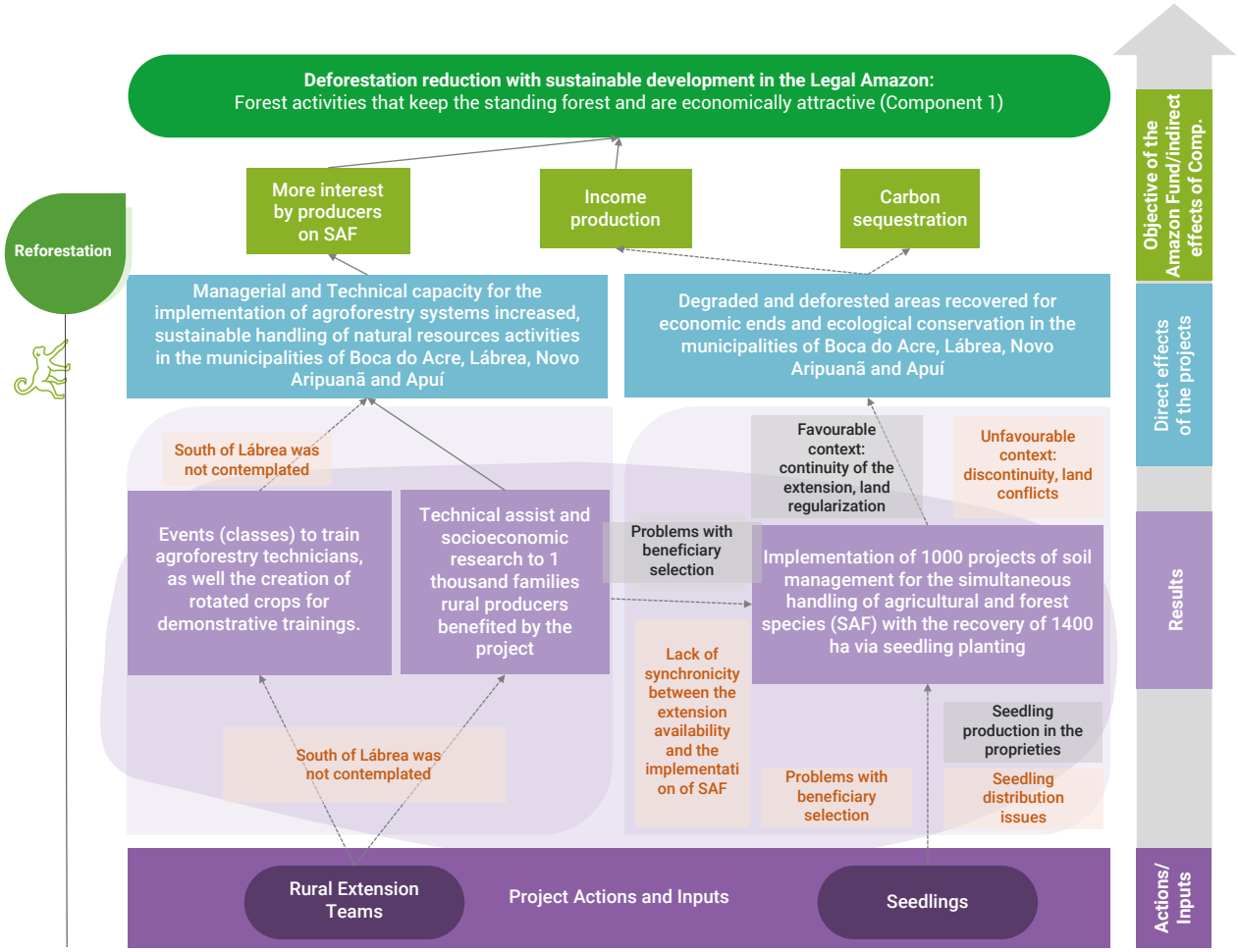
The effective and consistent income gain for families is not clear, which can make it difficult to sustain the benefits of reforestation in the areas where it has been successful. There are interviews that point out that there was no risk or market evaluation of inputs and difficulties in implementing projects in the south of the state of Amazonas.

Considering that family farmers are usually conservative, risk-averse and cautious innovators and that there is a turnover of farmers in the lots (which reduces their involvement in permanent medium-term crops, such as Agroforestry Systems), their willingness to continue with the project can be considered quite reasonable in Novo Aripuanã and Apuí. Combined with strategies to overcome the challenges mentioned, Agroforestry Systems can be very promising for the region.

Theory of Change

Figure 16 presents the Theory of Change for the Sustainable Production component, revised after this Evaluation

Figure 16 - Theory of change for the Sustainable Production component, adjusted after this Evaluation.



OECD criteria

Board 10 summarizes the Evaluation of the Sustainable Production component according to the OECD criteria. The efficiency criteria was assessed together for the two components, as can be seen below.

Board 10 - Summary of the Sustainable Production component Evaluation according to the OECD criteria.

Criteria	Brief definition (based on DAC/ OECD)	Relationship with the Theory of Change	Evaluation of the Sustainable Production Component
Impact	Evaluates the positive and negative changes resulting from the project, directly or indirectly, intentional or involuntary.	Direct and indirect effects of project results.	Moderate effect
Relevance	Assesses the coherence of the project's objectives according to the demands of the beneficiaries and the political priorities of the target groups, the recipient and the donors.	Relationship between the "direct and indirect effects" of the projects with the "indirect effect of the component" and with the general objective of the Amazon Fund.	Very relevant
Sustainability	Assesses whether the benefits of the project continue to occur after its completion, with an emphasis on social, economic and environmental aspects.	Continuity of direct and indirect effects in project results.	Low Sustainability
Effectiveness	Assesses the extent to which the direct aims of the project have been achieved or are expected to be achieved and what factors have been important.	Contribution of efforts for the generation of project results	Moderately effective

Impact, sustainability and relevance

The evaluation of the indicators of the *Reforestation project* reveals that there was an impact on the municipalities covered, with the expanded managerial and technical capacity and the recovery and use of deforested areas for economic and ecological conservation purposes, which resulted in greater interest from farmers in SAF, increasing their adoption and reinforcing the economic attractiveness of these activities. This impact was not uniform in the different municipalities due to differences in context and implementation problems.

In relation to the context, the impacts were smaller and less sustainable in the municipalities with less land tenure security, more rural conflicts and larger turnover of the farmers in the benefited lots, and with the loss of the agency's rural extension teams. These factors also decreased the sustainability of the impacts. For example, in the south of Labrea, only six SAF remain today. In other municipalities, such as Apuí and Novo Aripuanã, there was greater persistence and even expansion.

The evaluation points out that support for SAF works to reduce deforestation and generate income for family farmers, but only under certain conditions:

- The area must have a low level of land conflicts and few economic alternatives more attractive than Agroforestry Systems.

- Technical Assistance and Rural Extension Services must be present and stable for a sufficient period, at least for the start of Agroforestry Systems production, especially if the beneficiaries have no previous experience with its implementation.
- There must be a market and flow conditions for the results.
- The beneficiaries' selection must be careful, considering inclination, their perspective of remaining on land, interest etc.
- The Agroforestry Systems planning must be done with the participation of the beneficiaries, taking into account the market and other local conditions.
- Environmental regularity must be guaranteed by the Rural Environmental Registry/ Environmental Regularization Program

The impacts are very relevant. These municipalities have high rates of deforestation and an increase in activities incompatible with forest conservation. The viability of an alternative land use model is very important. However, this type of project does not seem appropriate for areas where environmental governance, ATER services and tenure stability are too precarious.

Effectiveness

The effectiveness of the project reflects the difficulties carrying out the process. The training efforts resulted in "trainings for agroforestry practices, as well as the implementation of crop rotation system unities for demonstrative teaching sessions". However, their reach was severely under what was expected. It was not clear whether this is due to the lack of interest by the farmers, their lack of prior involvement or problems in the design and execution of the project, and these factors may present themselves in a combined way, or even in the overestimation of the expectations of the farmers' participation in these courses.

Apparently, the difficulties to elaborate the project were the most important: it had a very short duration, with no time for the partnership between farmers to grow and to select the farmers. Having been extended for more years, the intervention period in which the main activities of registration, production of seedlings, preparation of areas and distribution and planting was too narrow, which, in addition to similar issues with trainings and technical assistance at the beginning of the project, led to the project selecting the wrong beneficiaries, to the delivery of seedlings in inadequate periods and a to a general lack of technical assistance in critical periods.

Efforts to support "the implementation of 1,000 soil management projects for the simultaneous cultivation of agricultural crops and forest species, recovering 1,400 ha by planting seedlings" did not meet its goal, due to planning difficulties, lack of interest from the farmers in which crops would be implemented, problems in the delivery of the seedlings and lack of synchrony between the implementation of the Agroforestry Systems and rural extension.

Evaluation of Results - Component 2 (Monitoring and Control)

Evaluation of Indicators

Board 11 - Monitoring Plan for the Monitoring and Control component.

Intervention logic		Indicators	Target	Initial amount (2011)	Final amount (2017)
General objective 2	**Efforts by the state of Amazonas ensure human activities are adequate to environmental legislation.**	Annual deforestation rate in the state of Amazonas.		50.200	100.100
Specific objectives	**2.1 - Expanded access by rural farmers to the environmental regularization of their properties in the state of Amazonas.**	Number of properties that have had their CAR membership application filed.	1.000		1.000
		Area (hectares) of properties that had their application for CAR membership registered.			57.137,88
		Number of CAR certificates issued.	1.000		1.000
Products	**2.1.1 - Conducting a rural environmental diagnosis of 1,000 properties in the municipalities of Boca do Acre, Lábrea, Novo Aripuanã and Apuí.**	Number of properties with environmental diagnosis carried out.	1.000		1.000
	2.1.2 - Feeding the database with CAR information in the municipalities of Boca do Acre, Lábrea, Novo Aripuanã and Apuí.	Number of properties registered in the CAR database.	1.000		1.000
	2.1.3 - Elaboration of legal instruments for the establishment of the CAR and the restoration of Permanent Preservation Areas and Legal Reserve Areas.	State legal instruments on regulated CAR	List the legal instruments		Law No. 3.635/2011 - regulates the State Program Rural Environmental Registry. Revision of Law No. 3.635/2011 - creates the State Environmental Regularization Program and regulates the Rural Environmental Registry. Publication of Law No. 4.266/2015 of Environmental Services. Law No. 4.406 on December 28, 2016, which establishes the State Environmental Regularization Policy, provides for CAR, the SICAR, the PRA, in the State of Amazonas
	Result 2.1.4 - Technical training of partners in Rural Environmental Registry legislation and in the use of the State Environmental Information System	Number of training courses in Rural Environmental Registry legislation and in the use of State Environmental Information System (carried out)	Listar os instrumentos legais	0	0
		Number of people (technicians from IDAM, SEMMAS[29] and other partners) trained	Listar os instrumentos legais	0	0

[29] Municipal Secretary of the Environment and Sustainability.

General Objective 2: Efforts by the State of Amazonas to ensure the adequacy of human activities to environmental legislation, with the indicator being the "annual deforestation rate of the State of Amazonas" (in this component, the proposed indicator was for the state as a whole).

There is no target or initial value, so the deforestation rate (PRODES/INPE) of the last year prior to the *Reforestation project* (2011), with 50,200 hectares, is taken as the initial value, and as a final value, 100,100 hectares. Thus, the rate of deforestation would have doubled in the state.

The use of this indicator to prove this objective is questionable, since there is legal deforestation and, in Amazonas State, there is enough space for this type of deforestation to happen. However, a survey carried out by MapBiomas indicates that a very small portion of deforestation in Amazonas State was authorized (1.3% of the area) (Table 12). Thus, it makes sense to measure illegal behaviour by the rate of deforestation.

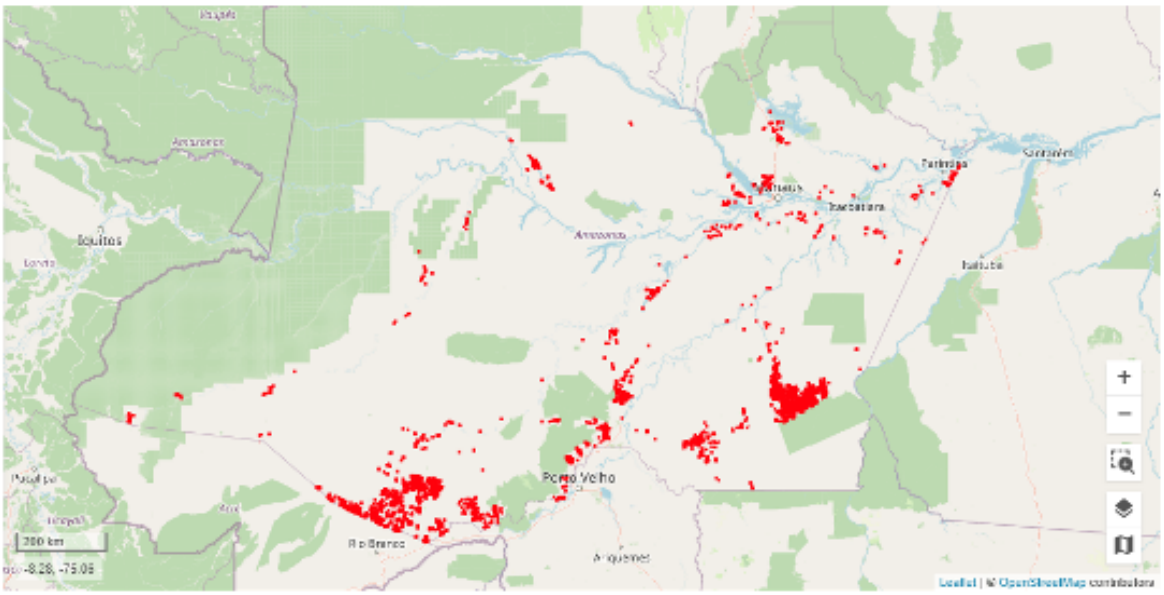
Table 12 - Alerts for authorized and unauthorized deforestation in Amazonas State in 2019.

Type of deforestation	Total alerts	Deforested area (ha)	Average speed (ha)	% alerts	% area
Authorized	67	3.234	6	0,50	1,30
Not authorized	13.333	245.461	366	99,50	98,70
Embargoed	4.107	144.383	215	23,55	37,04

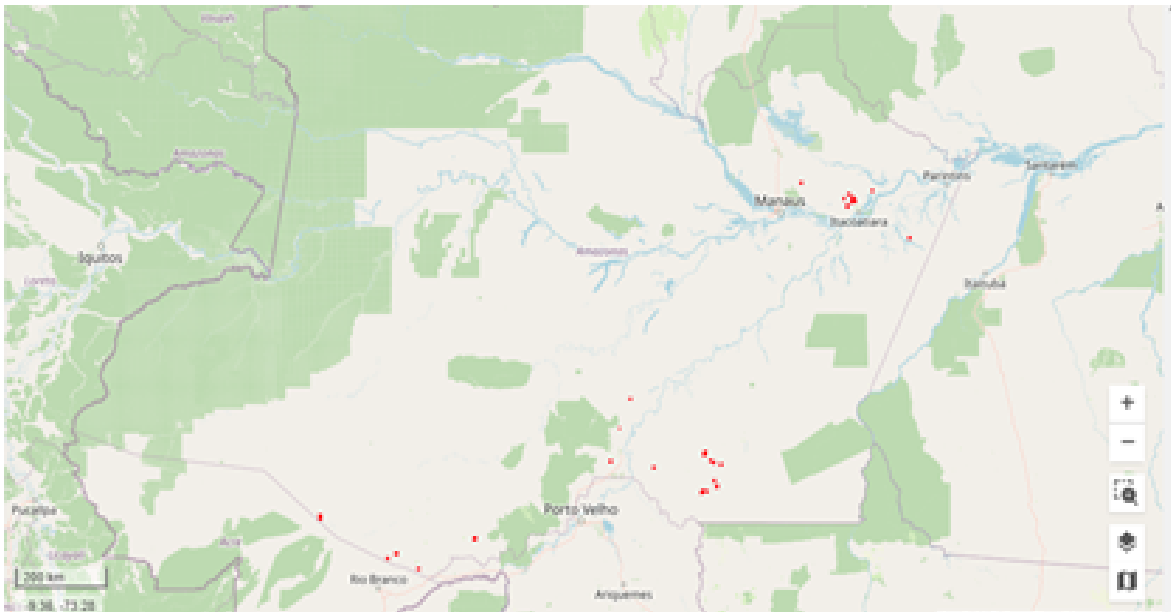
Source: http://plataforma.alerta.mapbiomas.org/

Most deforestation alerts are in the south of the state and along the Amazon River. Figure 17 shows this location and how rare authorized deforestation is within the state.

Figure 17 - Deforestation alerts in Amazonas State in 2019



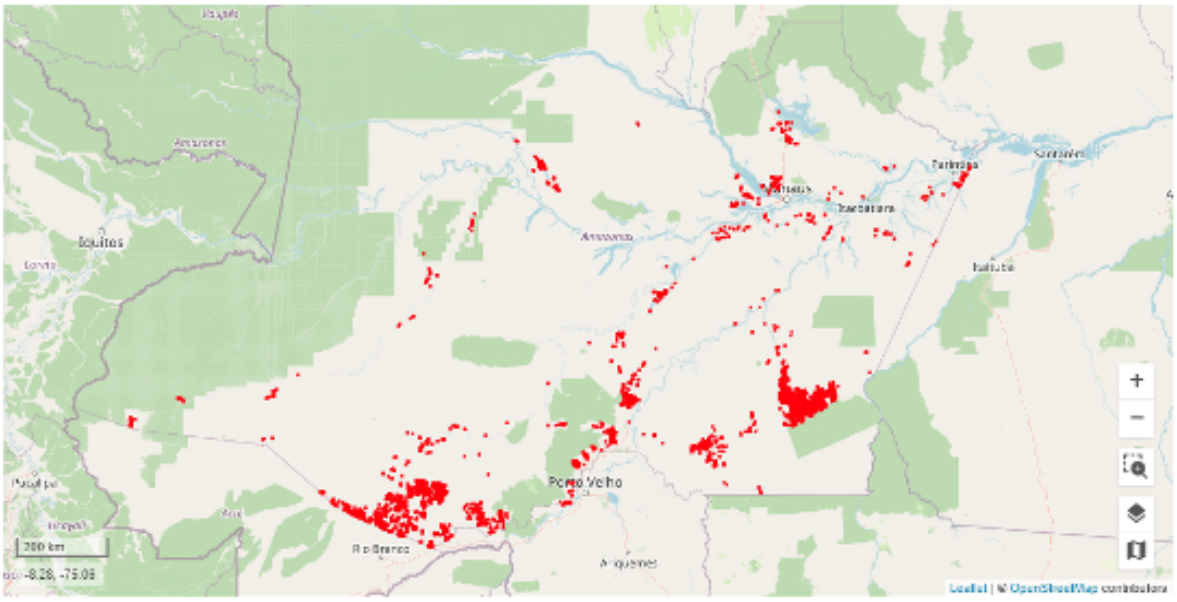
(A) Unauthorized



(B) Authorized

In 2019, embargoed areas accounted for 37% of the deforested area, most of which are in municipalities in the south of the state, which represents a reasonable rate (Figure 18).

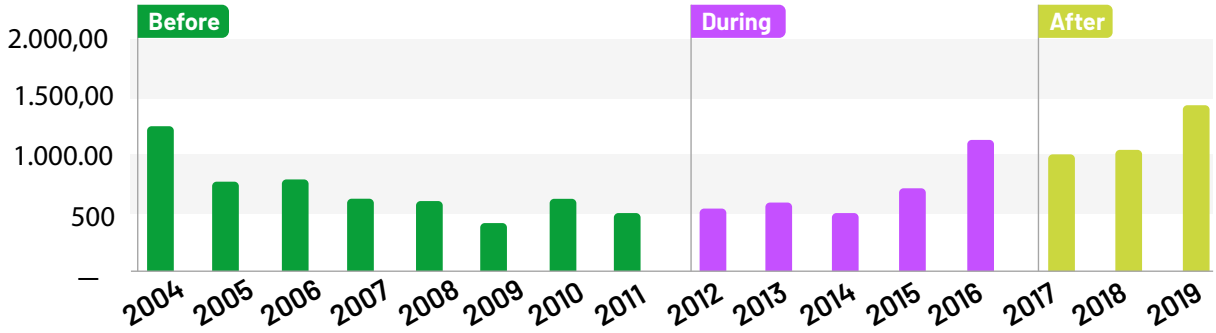
Figure 18 - Deforestation areas embargoed in Amazonas State in 2019.



Source: MapBiomas.

Thus, to ensure the adequacy of human activities to environmental legislation, the state of Amazonas is acting in a punitive manner. This punitive action, supported by the Rural Environmental Registry, has been paying off. When considering deforestation in the entire state, the impression has been of increasing deforestation since 2014 (Figure 19).

Figure 19 - Deforestation rate in Amazonas State.

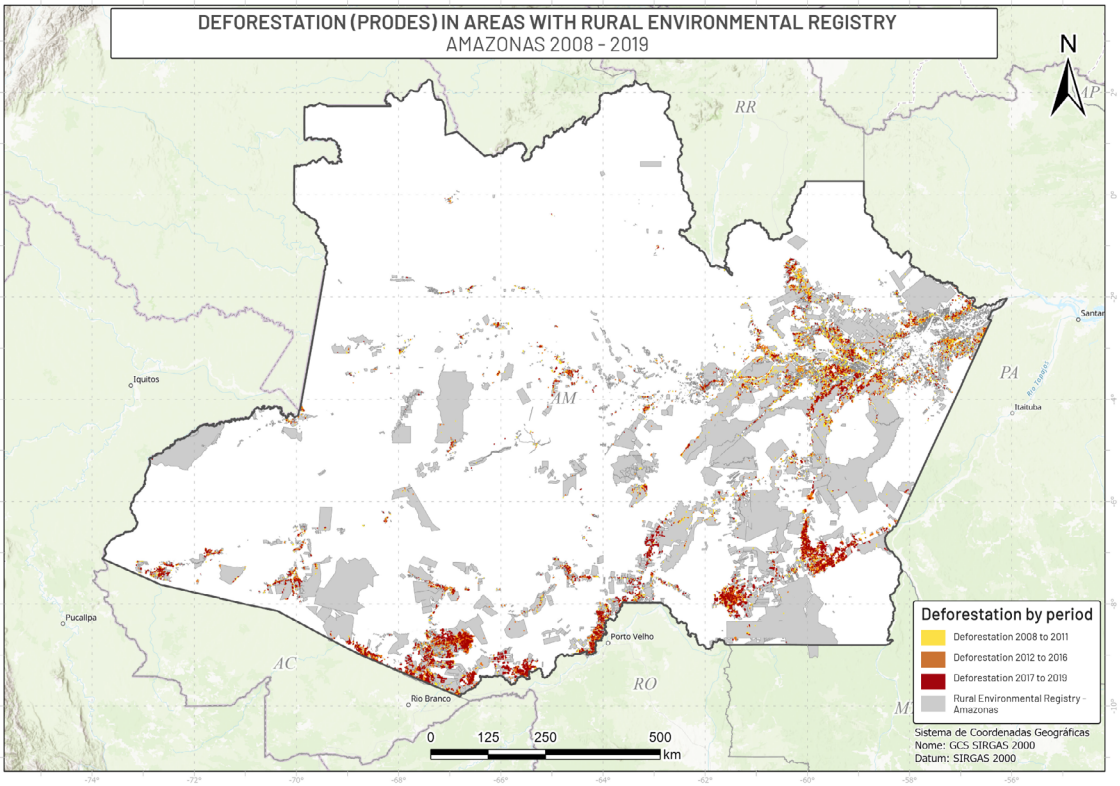


Source: Report on deforestation in the areas of the SEMAS Pará and Reforestation projects (item 7.5)

Deforestation in 2020 in Amazonas State was 274% higher in relation to deforestation in 2012, above the variation of the Legal Amazon. Deforestation in federal public domains areas such as UCs and TIs increased by much less, 64%. In the areas with Rural Environmental Registry, the increase was also smaller, 191%, possibly reflecting a certain governance, and where the Rural Environmental Registry overlaid with protected areas, it was 103%. Deforestation increased more in areas without Rural Environmental Registry, 396%.

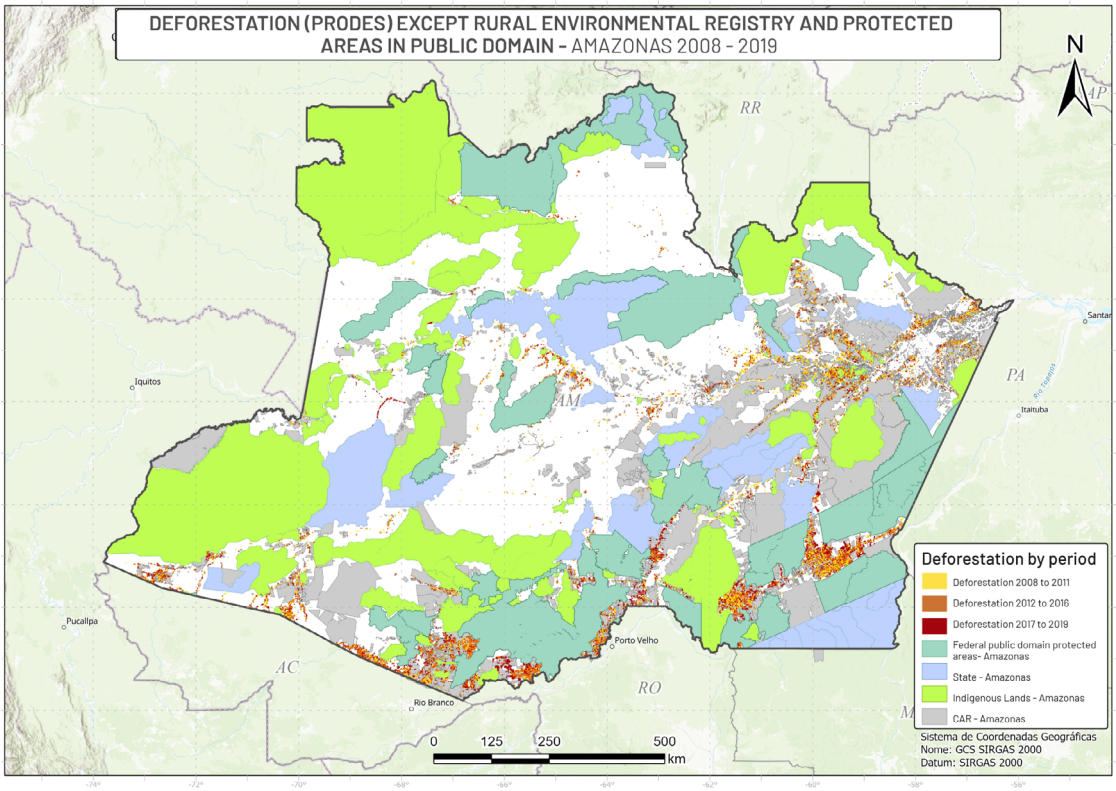
The deforestation dynamic in Amazonas State is very different from that of Pará State. In Amazonas State, deforestation is in the south of the state and is more recent, intensifying as of 2016 (Figure 20). In 2019, as in the rest of the Amazon, there was a peak of deforestation, more accentuated in areas without Rural Environmental Registry. Based on the indicator, the impact of the project on deforestation in the state of Amazonas cannot be confirmed or disregarded, which seems to be responding to more powerful factors, such as the lifting of the embargo on the federal highway BR 319[30] However, areas with Rural Environmental Registry (Figure 20) show less deforestation rates growth than areas without Rural Environmental Registry (Figure 21), which suggests that the project's logic in supporting Rural Environmental Registry makes sense regarding to reducing deforestation. To confirm this, however, it is necessary to assess the local effect of the project, which the indicator does not do.

Figure 20 - Deforestation in the Amazon (areas with Rural Environmental Registry)



Source: Report on deforestation in the areas of SEMAS Pará and Reforestation projects (item 7.5)

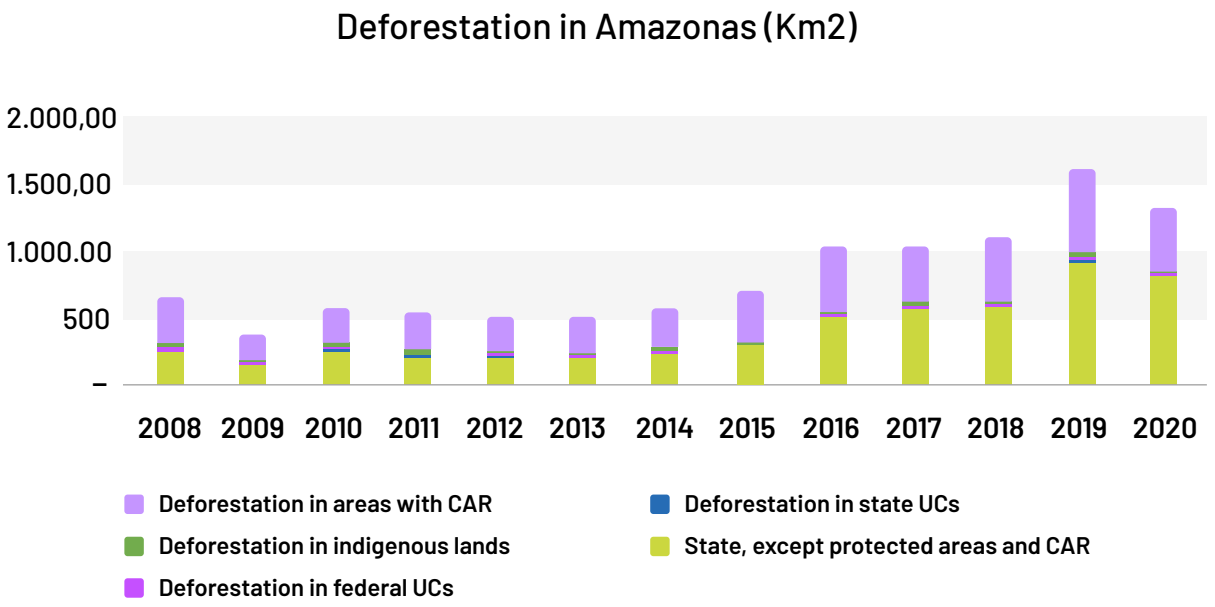
Figure 21 - Deforestation in Amazonas State, except Rural Environmental Registry and protected areas in public domain.



Source: PRODES/INPE

[30] Check at: https://agenciabrasil.ebc.com.br/geral/noticia/2017-06/justica-federal-libera-obras-em-trecho-da-br-319-que-liga-manaus--porto-velho.

Figure 22 - Deforestation in Amazonas State.



Source: Report on deforestation in the areas of SEMAS Pará and Reforestation projects (item 7.5) projects.

Specific Objective 2.1 (impact level): Expanded access by rural farmers to the environmental regularization of their properties in the state of Amazonas, with the indicators being, according to the Monitoring Plan, "number of properties that have had their requests filed on the Rural Environmental Registry protocol", "area of properties that had their requests filed on the Rural Environmental Registry protocol" and "number of Rural Environmental Registry certificates issued".

The amounts reported in the Monitoring Plan were 1,000 properties; 57,137.88 hectares and 1,000 certificates. The indicators were reported at a municipal level, of properties directly supported by the project, thus presenting result indicators characteristics.

Through the Rural Environmental Registry, the environmental assets and liabilities of rural properties are identified, allowing both the management of these assets and action planning and execution for the recovery of deforested areas that, due to legal determination, need to be reforested. An important function of this register is that, in the case of rural possessions, squatters in these properties are identified (individuals who occupy a rural property without having a title to their property), establishing the possibility of their accountability in case of possible environmental law violations in these properties. This is the logical link between this Specific Objective and the General Objective of the Monitoring and Control component, whose indicator is the deforestation rate.

Although it is not listed in the intervention logic or in the Monitoring Plan, there is an effect from the modernization and structuring of environmental monitoring, control and accountability institutions, such as what was predicted in the *SEMAS Pará project*. This effect appears in this Amazonas State project both in the institutional and legislation changes (see below) and in the knowledge acquired by the technical team on the SICAR. The modernization can be considered indirect, given that the project also had to purchase support equipment to carry out its activities.

Product 2.1.1: Conducting a rural environmental diagnosis of 1 thousand properties in the municipalities of Boca do Acre, Lábrea, Novo Aripuanã and Apuí, -with its indicator being "number of properties with an environmental diagnosis carried out".

According to the Monitoring Plan, this result was fully delivered upon. Specialized technical services were hired for socio-economic diagnosis and the georeferencing of properties, but the procurement failed. The process was rescheduled and culminated in hiring a new service in December 2013. Despite its success, some points of attention need to be considered:

- The socioeconomic diagnosis was carried out late, therefore, its information could not be used to select or prioritize farmers to carry out the Rural Environmental Registry or to implement the Agroforestry Systems, which also hindered the identification of the families' characteristics, which would show data on Safeguards or income for producer's financial return estimates in this income-generating vegetation recovery process.

- Implementing a strategy to maintain the forest standing by means of institutional improvements, reforestation, education and agroforestry systems that is perennial and sustained over the years needs to consider the socioeconomic situation of the region. This implies understanding family composition, education, personal characteristics, access to basic services, production profile of the region, items already produced on the property, reasons for deforestation, solutions for deforestation (in the population's point of view), needs and different forms of technical advice, as well as difficulties, risks, potential and territory management, among other elements that would only be possible with a full diagnosis. These elements could guide not only differentiated strategies for the municipalities, but also the possibility of adding elements to safeguard international agreements and establish criteria for the selection of farmers.

- The information contained in the Rural Environmental Registry is not sufficient for a diagnosis (so much that there was a process of hiring a company for this purpose in 2013). Despite having questions about income and production, the Rural Environmental Registry's objective is not to attend to make a diagnosis[31].

- There are reports that Rural Environmental Registry implementation was discouraged by local actors in some regions: "do not fill in Rural Environmental Registry, it is for the Brazilian Federal Environmental Agency (*Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis* - IBAMA) inspection".

According to the Results Evaluation Report, the socioeconomic information collected was:

- Of the 1,000 farmers benefited by the project, 57.9% have income from the activities developed directly on their property, with the remaining 42.1% needing to perform services to third parties in order to complement their monthly income, not having satisfactory pay from the activities developed in their rural property. Another important aspect is that 100% of the farmers employ family labour for their production.

[31] Created by Law No. 12,651 / 2012, within the scope of the National Environment Information System (Sistema Nacional de Informação sobre Meio Ambiente – SINIMA), and regulated by Normative Instruction MMA No. 2, of May 5, 2014, CAR is an electronic public register of national scope, mandatory for all rural properties, with the purpose of integrating the environmental information of rural properties in the Permanent Preservation Areas (PPA), restricted use, Legal Reserves, forest remnants and other forms of native vegetation, as well as consolidated areas, composing a database for control, monitoring, environmental and economic planning and combating deforestation. Enrollment in CAR is the first step towards obtaining the official environmental regulation of the property, and includes: data on the owner, rural owner or direct responsible for the rural property; data on documents proving ownership or possession; and georeferenced information on the property's perimeter, areas of social interest and areas of public utility, with information on the location of the remnants of native vegetation, PPA, restricted use areas, consolidated areas and Legal Reserves.

- Livestock stands out as the main activity of the beneficiaries, occupying 97% of the area of use of rural properties, leaving only 3% of the area of use for the cultivation of short cycle crops, such as rice, beans, corn, cassava etc.

- According to data from rural farmers, what leads them to opt for livestock production in the region is mainly the difficulty of access for the flow of agricultural production and the acquisition of inputs, as well as the lack of a market for agricultural commercialization, since big competitors offer prices below what is necessary to finance their own production process. Thus, livestock production becomes a source of savings for farmers, as they have greater guarantees of commercial viability with low maintenance costs.

- Another factor that contributes to the resistance of the farmers in that region to substitute livestock for agriculture or for low-carbon and forest-related agrosilvopastoral activities is the lack of access to appropriate technologies and the high cost that is required to work the land in the preparation of the area (cleaning/removal), application of inputs and production maintenance.

To carry out this registration[32], the project went through some stages. In 2011, the strata of potential beneficiaries were defined: 350 in Apuí, 250 in Boca do Acre, 150 in Novo Aripuanã and 250 in Lábrea (being 100 set in the headquarters and 150 in its outskirts). Until July 2012, 43 technicians were trained to do the registration and, at the end of this period, 452 farmers were registered. Between August 2012 and February 2013, the information from the project indicates that the registration had already reached, even exceeding, the expected number of farmers. However, the project's technical team emphasized that, between February and August 2013, the entire registration needed to be revised due to the approval of Law No.12.651/2012 (New Forest Code).

Product 2.1.2: Feeding the database with CAR information in the municipalities of Boca do Acre, Lábrea, Novo Aripuanã and Apuí, with the indicator "number of properties registered in the Rural Environmental Registry database".

The project aimed to carry out 1,000 CARs, which represents:

- 7.7% of the Novo Aripuanã Rural Environmental Registry (among the 1,955 existing ones);
- 7.4% of the Boca do Acre Rural Environmental Registry (among the 3,360 existing ones);
- 20.9% of the Apuí Rural Environmental Registry (among the 1,675 existing ones);
- 8.1% of Lábrea Rural Environmental Registry(among the 3,091 existing ones).[33]

In 2013, the 1,000 properties in the program had their CAR compliance process consolidated by formalizing, with the IPAAM, the Term of Commitment and Adherence (TCA) and sending the property design sketch, in compliance with the guidelines of Law No. 3,635/2011. However, between September 2013 and March 2014, the registered farmers became part of SICAR, created in 2012 by Decree No. 7,830/2012. According to the technical team, what most affected the performance of the activity was the approval of the new Forest Code, in May 2012, which generated the need to practically redo the entire registration.

Produto 2.1.3: Elaboration of legal instruments for the Rural Environmental Registry and the restoration of Permanent Preservation Areas and Legal Reserve Areas, with the indicator "state legal instruments on regulated Rural Environmental Registry".

[32] This information is based on the performance reports.
[33] SICAR, 2020. Last update, Feb 2020.

One of the project's contributions was support for drafting the proposed legislation that contributed to the enactment of Law No. 4,406, of December 28, 2017, establishing the State Environmental Regularization Policy, which provides for the CAR, the SICAR Amazonas and PRA, in the state of Amazonas.

The prioritized legal instruments, discussed and approved in the scope of the realization of the *Reforestation project*, can be considered a legacy of the intervention. The following highlights, in chronological form, summarize the main milestones in the evolution of regulations and the associated project results.

In 2011, the Environmental Regularization Program for Rural Properties in the State of Amazonas was created (Law No. 3,635 of July 6, 2011), with the objective of promoting environmental regularization in rural properties in the state of Amazonas that were part of the project implementation carried out in 2012, through the CAR. Within the period of the project's development, other partnerships and other regulations were created and, although they are not exclusively associated with the project, they are related to the indirect effects of the Monitoring and Control Component, meeting the efforts of this project, including:

- The Administrative Reform of the State of Amazonas (Law No. 4,163/2015): the SDS changes its name to the SEMA and the Amazonas Lands Institute (*Instituto de Terra do Amazonas* - ITEAM) is integrated to the State Secretary for Land Policy (*Secretaria de Estado de Política Fundiária* - SPF);
- Law No. 4,406, of December 28, 2016 establishes the State Policy for Environmental Regularization and provides for Rural Environmental Registry, National Rural Environmental Registry System Amazonas and Environmental Regularization Program, in the state of Amazonas;
- Law No. 4,419, of December 29, 2016: institutes the Economic and Environmental Policy of the State of Amazonas for Sustainable Development (Amazonas Economic-Environmental Matrix);
- Law No. 4.415, of December 29, 2016 provides for the management of forests located in areas of the State's domain for sustainable production;
- Law No. 4,266, of December 1, 2015 provides for the State Environmental Services Policy and the Environmental Services Management System and creates the State Fund for Climate Change, Environmental Conservation and Environmental Services;
- Decree n° 37.421, of December 1, 2016: creates the Sustainable Municipalities Program of Amazonas (*Municípios Sustentáveis* - MS Amazonas), with the main objective of "boosting the local economy on a sustainable basis, promoting environmental recovery and the conservation of natural resources, considering the need to share and decentralize the environmental agenda, which presupposes integrated efforts between the State Government and the municipalities, and allows for a more effective participation of civil society and the productive sector". The elaboration of this program was guided via the guidelines and strategic axes of the State Plan for the Prevention and Control of Deforestation in Amazonas State;
- Update of the State Plan for the Prevention, Control and Combat of Illegal Burnings in Amazonas (*Plano Estadual de Prevenção e Controle às Queimas e Incêndios Florestais do Amazonas* - PEPCQ-AM);

- Definition of the activities of the state of Amazonas to compose the efforts of the Sustainable Landscapes of the Reforestation project, which would be coordinated by the Ministry of the Environment, and is part of the Amazon Sustainable Landscapes Program of the Global Environmental Facility;
- Interinstitutional cooperation with the SEMA, IPAAM and the Amazonas State Military Fire Brigade (*Corpo de Bombeiros Militar do Estado do Amazonas* - CBMAM), for the implantation, implementation and operation of the Civil Protection and Environment Units in the municipalities of the rural countryside, aiming to provide services with a view to preventing, preparing, mitigating and responding to forest fire emergencies throughout the state of Amazonas;
- Cooperation Agreement between SEMA and the Brazilian Institute of Municipal Administration (*Instituto Brasileiro de Administração Municipal* - IBAM) with the objective of supporting sustainable development in sustainable municipalities in the state of Amazonas, within the scope of the Environmental Management Qualification Program - Municipalities of the Legal Amazon.

Product 2.1.4: Technical training of partners in Rural Environmental Registry legislation and in the use of the State Environmental Information System (Sistema Estadual de Informações Ambientais - SEIAM), with indicators being: "number of training sessions in Rural Environmental Registry legislation and in the use of State Environmental Information System (carried out)" and "number of trained people (technicians from Institute of Agricultural and Sustainable Forest Development of the State of Amazonas, Municipal Secretary of the Environment and Sustainability (*Secretarias Municipais de Meio Ambiente e Sustentabilidade* – SEMMAS) and other partners)".

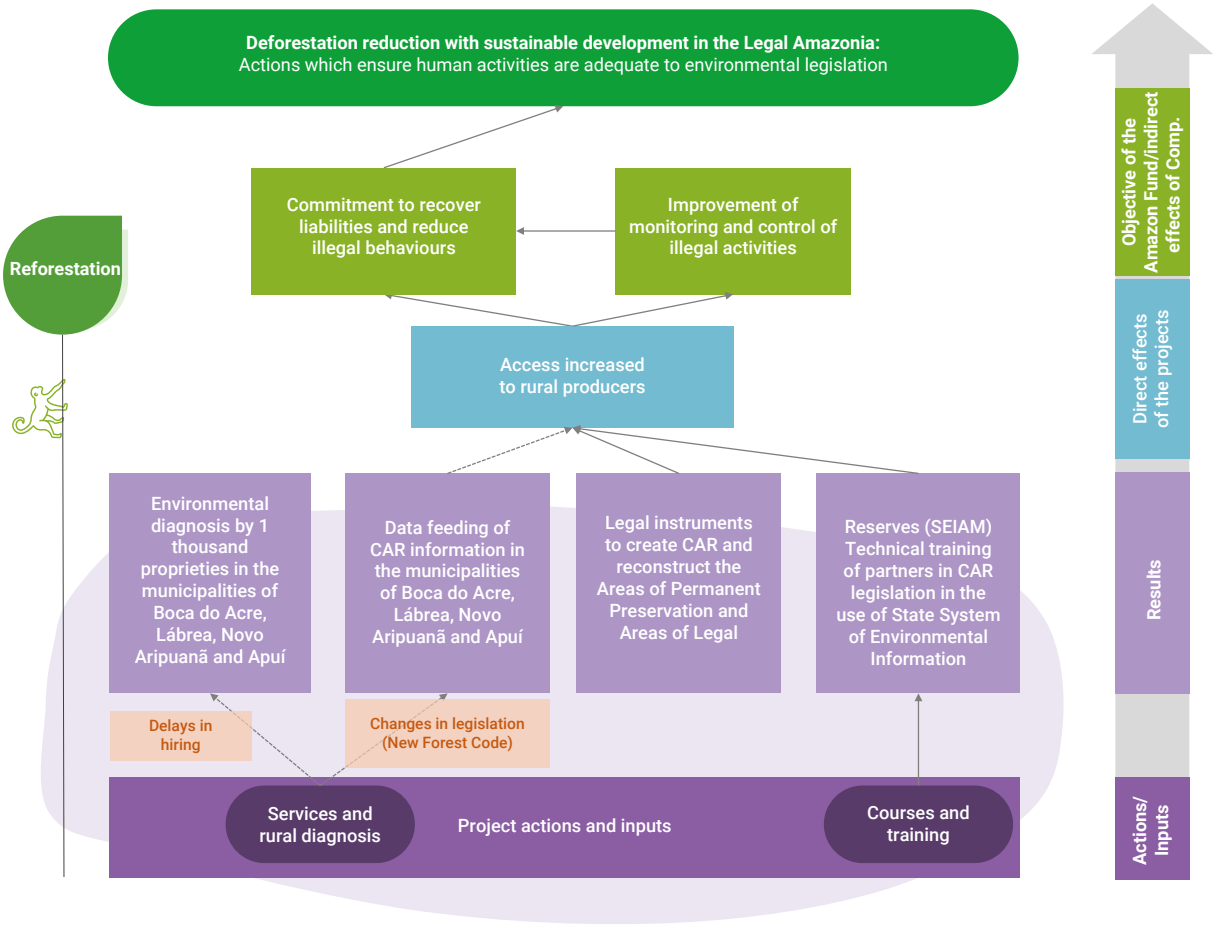
For the registration of the farmers, from April 19 to May 15, 2012, 43 technicians were trained in a Technician Improvement Course (Institute of Environmental Protection of Amazonas State), which included training in data collection on properties in rural areas and the use of geotechnologies. In addition to this training conducted in the four municipalities of the project, due to the enactment of Law No. 3,635/2012 (New Forest Code), a seminar was also held in 2012 on the impacts of the new legislation, which had direct effects on producer registration (presented in the next section).

In addition to these courses, due to the implementation of SICAR, the registration needed to be integrated into the system. To support the technicians, three training sessions were held and the data from the farmers was transferred without prejudice to the project.

Theory of Change

Figure 23 presents the Theory of Change for component 2 (Monitoring and Control).

Figure 23 - Theory of Change for the revised Monitoring and Control component.



OECD criteria

Board 12 summarizes the Evaluation of the Monitoring and Control component, according to OECD criteria. The effectiveness criteria was assessed together for the two components of the project, which is presented below.

Board 12 - Summary of the evaluation of the Monitoring and Control component according to the OECD criteria.

Criteria	Brief definition (based on DAC/OECD)	Relationship with the Theory of Change	Evaluation of the Sustainable Production component
Impact	Assess the positive and negative changes resulting from the project, directly or indirectly, intentional or involuntary.	Direct and indirect effects of project results.	Moderate effect
Relevance	Assesses the coherence of the project's aims according to the demands of the beneficiaries and the political priorities of the target groups, the recipient and the donors.	Relationship between the "direct and indirect effects" of the projects with the "indirect effect of the component" and with the general objective of the Amazon Fund.	Very relevant
Sustainability	Assesses whether the benefits of the project continue to occur after its completion, with an emphasis on social, economic and environmental aspects.	Continuity of direct and indirect effects of project results.	Sustainable
Efficacy (Effectiveness)	Assesses the extent to which the direct aims of the project have been achieved or are expected to be achieved and what factors have been important.	Contribution of efforts to generate project results.	Effective

Impact, sustainability and relevance

In component 2 - Monitoring and Control, the most significant changes are institutional ones. The learning process by technicians and institutions regarding Rural Environmental Registry and Agroforestry Systems and about acting in a distant area was highlighted in several interviews. Amazonas State is a very extensive state and the deforestation ramp up is a recent phenomenon. The regions where this most happens are far from the capital Manaus City and are being occupied by migrants from other states, with a culture very different from that of Amazonas State. Thus, approaching the region brings great knowledge to the institutions and their technical staff.

The 1,000 records in the Rural Environmental Registry were carried out, identifying liabilities and signing terms of commitment. These records can be used (as they still are in fact) for sanctions against illegal activities. Registration in the Rural Environmental Registry remains self-declarable by the producer (validation is lacking), which generates weaknesses and inconsistencies in reporting about the areas. The results from February 2020, the most current at the time of this report, demonstrate that a small portion has already been analysed. Most of the registrations have their statuses as awaiting analysis, in analysis, analysed with pending issues or cancelled by administrative decision:

- Apuí: 1,675 Rural Environmental Registry, 0% analysed;
- Boca do Acre: 3,360 Rural Environmental Registry, 7% analysed;
- Labrea: 3,091 Rural Environmental Registry, only 12% analysed;
- Novo Aripuanã: 1,955 Rural Environmental Registry, only 2% analysed;

A new project from the Amazon Fund with Secretary of Environment and Sustainability of Amazonas State, which proposes to analyse the CARs, is underway in 20206. The CAR's streamlined analysis platform developed by the Federal University of Lavras (*Universidade Federal de Lavras* - UFLA) for the Brazilian Forest Service will allow the CAR review to be done on a large scale. In addition to that, this platform will also check the environmental regularity, the areas of permanent preservation, legal reserve and restricted use7, and whether, in fact, the impacts continue to happen and if they should become more potent in the coming years. This new project of the Amazon Fund with the Secretary of Environment and Sustainability of Amazonas State, which continues to support the Rural Environmental Registry/Environmental Regularization Program, contributes to the sustainability of the process and shows the relevance of continuing with the process in the state of Amazonas.

Efficiency

The efforts carried out by the Reforestation project in component 2 produced results, that is, they were effective. The registration generated the Rural Environmental Registry records, as planned, even with the repetitions that were necessary.

Effectiveness

The effectiveness of the *Reforestation project* is assessed jointly for the two components - Sustainable Production and Monitoring and Control - and deals with the conversion of inputs into efforts. Several hiring processes were inefficient, as they occurred after the deadline,

[34] CAR Amazonas. Available in: http://www.fundoamazonia.gov.br/pt/projeto/CAR-Amazonas/.
[35] As seen: https://www.gov.br/pt-br/noticias/meio-ambiente-e-clima/2020/07/plataforma-do-cadastro-ambiental-rural-agilizara-analise-de-dados-das-propriedades-rurais.

took longer than expected or the efforts had to be repeated. Climatic factors have been cited as problems in some cases. It was also necessary to add the hiring of the company responsible for the removal, cleaning, swathing and harrowing twice (with a deadline of October 2014) due to delays as a result of the rains and difficulties in sending equipment.

Effectiveness under Amazonian conditions is limited by the precariousness of transport, linked to the rainy season. For the production of seedlings, the challenge is to transport the seedlings ready for the best season for planting, when the rain makes the roads impossible to use. One solution found by some of the municipal teams was the production of seedlings inside the properties, which solved the transportation problem.

The company responsible for the socioeconomic diagnosis and georeferencing of the properties was only hired in December 2013. At that time, training with farmers was already underway and along with other provisions of the project as well, such as preparing the properties for receiving seedlings and the production of these seedlings in nurseries. In addition to this, the Rural Environmental Registry records needed to be redone due to the change in legislation.

Regarding the services provided, before joining the Rural Environmental Registry, 1,000 rural farmers who would benefit from the project were selected. During this period, according to information provided by the Amazon Institute (*Instituto Amazônia*), approximately 80% of the farmers initially selected by the state gave up acting as participants in the project. The initial forecast for the joining into CAR was 12 months, but it was concluded after 35 months of signing the contract.

Therefore, effectiveness was reduced, based on this stage of the service provided and considering that the time for development was longer. Direct costs were the same as already planned, which did not minimize, as recorded in the project's evaluation report, the burden of the state government with personnel, logistics and infrastructure to carry out the activity.

Although the costs for the Amazon Fund have remained the same, the counterpart of the government of Amazonas State was greater than initially planned.

Throughout the development of the project, resources were returned due to development problems and there was an extension of the period initially established from three years to more than seven years. Overall, effectiveness was average.

Project coordination could have been more effective. Shared management needs well-defined roles in a detailed action plan with risk mapping, clear quality controls and robust monitoring that not only collects information in a protocol manner, but that uses the information for evidence-based decision making, correcting the route of the efforts when necessary, aiming at the fulfilment of the planned activities with effectiveness and efficiency.

The discontinuity of policies, due to changes in management, was pointed out as one of the problems of continuity. The change of staff of the Secretary of Environment throughout the project made implementation difficult. The interviewees' perception is that about 60% of the team was changed.

Cancun Safeguards (REDD+)

Board 13 presents the evaluation of the Cancun Safeguards[36] for REDD+.

[36] These Safeguards were not required of the project when they were submitted, so the project might not have developed specific strategies to meet them.

Board 13 - Cancun Safeguards (REDD+) applied to the project.

Safeguard/issue	Compliance	Observation
1. Efforts complementary or consistent with the aims of national forest programs and other relevant international conventions and agreements.	**Partially**	
Did the project prove to be in line with the PPCDAm and the state plans for the prevention and control of deforestation?	Yes	Both the realization of the CAR and the Agroforestry Systems and the advances in the normative instruments demonstrate this alignment.
With what other federal public policies or international agreements did the project demonstrate alignment? In what ways?	Yes	The alignment with the New Forest Code (2012) was the most significant aspect during the development of the project, considering that the registration of farmers was largely redone after the Law. The state laws created during the project were all in line with the new code.
Has the project contributed, or could it contribute directly or indirectly to reducing emissions from deforestation or forest degradation? In what way?	Not Applicable	No Evidence.
2. Transparent and effective national forest governance structures, with a view to national sovereignty and national legislation.	**Yes**	
To what extent has the project promoted the articulation between different actors (public, private, third sector or local communities)?	Large	The third sector and the public sector were the central actors in the articulation of efforts, including shared roles and governance. The mapped institutions that were part of the project were: IDAM, SEPROR[37], ITEAM[38], ADS[39], SDS, IPAAM, INCRA[40], MDA[41] Programa Terra Legal, Embrapa, CEP/CAB[42], CEPLAC[43], INPA[44], ASSCOM[45], FAS[46], Company CONNARUS AMBIENTAL, UFAM[47], BANCO DA AMAZÔNIA, BNDES, MAPA[48], FIEAM[49], BANCO DO BRASIL, ICMBio[50], GIZ, FAEA[51], FETAGRI[52], SEJUS[53], IA, SINTRARURAIS[54] and Company UNILOC.
To what extent has the project contributed to strengthening public instruments and forestry and territorial management processes?	Large	The normative instruments approved in the scope of the project's execution were fundamental for the territorial organization. The project contributed positively to the need to discuss the implementation of Rural Environmental Registry and Agroforestry Systems.

[37] Secretary of State for Rural Production of the State of Amazonas (Secretaria de Produção Rural do Amazonas)
[38] Amazonas Lands Institute (Instituto de Terra do Amazonas)
[39] Amazonas Sustainable Development (Agência de Desenvolvimento Sustentável do Amazonas)
[40] National Institute for Colonization and Agrarian Reform (Instituto Nacional de Colonização e Reforma Agrária)
[41] Now-defunct Ministry of Agrarian Development (Ministério do Desenvolvimento Agrário)
[42] Colégio Agrícola de Brasília
[43] The Executive Committee for the Cocoa Farming Plan (Comissão Executiva do Plano da Lavoura Cacaueira - CEPLAC) is an agency of the Ministry of Agriculture, Livestock and Supply - MAPA
[44] National Institute for Amazonian Research (Instituto Nacional de Pesquisas da Amazônia)
[45] Press Office and Communications (Assessoria de Imprensa e Comunicação)
[46] Sustainable Amazonas Foundation (Fundação Amazonas Sustentável)
[47] Federal University of Manaus (Universidade Federal de Manaus)
[48] Ministry of Agriculture, Livestock and Supply (Ministério de Agricultura Pecuária e Abastecimento)
[49] Federation of Industries of the State of Amazonas (Federação das Indústrias do Estado do Amazonas)
[50] Chico Mendes Biodiversity Conservation Institute (Instituto Chico Mendes de Conservação da Biodiversidade)
[51] Agriculture and Livestock Federation of the State of Amazonas (Federação da Agricultura e Pecuária do Estado do Amazonas)
[52] Federation of Rural Workers and Family Farmers of the State of Amazonas (Federação dos Trabalhadores Rurais Agricultores e Agricultoras Familiares do Estado no Amazonas
[53] Department of Justice (Secretaria da Justiça)
[54] Rural Workers' Union (Sindicato dos Trabalhadores e Trabalhadoras Rurais)

Safeguard/issue	Compliance	Observation
3. Respect for the knowledge and rights of indigenous peoples and members of local communities, considering relevant international obligations, circumstances and national laws and noting that the UN General Assembly has adopted the United Nations Declaration on the Rights of Indigenous Peoples	**Partially**	
To what extent has the project influenced the constitutional rights associated with the formal possession and disposal of land in its area of expertise?	Large	Stimulating the registration of farmers (CARs).
To what extent has the project influenced the sustainable use of natural resources in its area of expertise?	Large	Implementing Agroforestry Systems based on 17 species in the region and training farmers and technicians.
If the project's direct beneficiaries were indigenous peoples, traditional communities or family farmers: were their socio-cultural systems and traditional knowledge considered and respected throughout the project?	No answer	No evidence.
Are there any effects that interfere with the traditional way of life of these groups? What kind of effects: on the social, economic organization or the use of available spaces and resources? How do they interfere: positively, negatively or both?	No answer	No evidence.
4. Full and effective participation of stakeholders, in particular indigenous peoples and local communities, in the efforts referred to in paragraphs 70 and 72 of Decision 1/CP 16.	**No answer**	
How did the project guarantee prior consent and the local or traditional way of choosing representatives of its beneficiaries (especially indigenous peoples and traditional communities)?	No answer	There is no evidence, the project did not outline specific efforts for this audience.
What participatory planning and management tools did the project apply during planning and decision-making?	Meetings	There is no evidence that the population participated in the planning decision-making processes directly, only through training. However, the project in its first year held 19 articulation meetings, 14 of them with the municipalities, which may have counted with the participation of the population.
In the case of projects with economic purposes: were any benefits from the project accessed in a fair, transparent and equitable manner by the beneficiaries, avoiding a concentration of resources?	Not applicable	There is no evidence or data available for this validation.
To what extent did the project provide the general public and its beneficiaries with free access and easy understanding of information related to the project's efforts?	Average	The beneficiaries had information on the project in their training and the websites of the institutions involved reported news about the project's implementation in the municipalities.
Was the project able to build a good system for monitoring results and impacts? Did it systematically monitor and disseminate the results achieved and their effects?	Partially	The project implemented an Aims Monitoring Plan, mainly monitored by the BNDES, to verify its results, but the information is incomplete mainly for the year 2014, in which most of the indicators have no results, possibly due to managers switching around in state agencies.

Safeguard/issue	Compliance	Observation
5. Efforts consistent with the conservation of natural forests and biological diversity, ensuring that the efforts referred to in paragraph 70 Decision 1/CP 1611 are not used for the conversion of natural forests, but rather to encourage the protection and conservation of natural forests and their ecosystem services and to improve other social and environmental benefits.	**Partially**	
How did the project contribute to the expansion or consolidation of protected areas?	Through CAR and SAF	Despite the direct effect of implementing Agroforestry Systems, of reforestation areas, and CAR registration, there is little evidence on the sustainability of post-project efforts associated with deforestation in the region - which occurs at a higher speed than reforestation, resulting in an increase deforested areas - the project did not contribute to the expansion or consolidation of protected areas, but progress has been made (listed in the following questions).
How did the project contribute to the recovery of deforested or degraded areas?	Yes	The project reforested 1,076 ha and the results of the Reforestation Report showed that the area where the project operated and contributed to the estimated regeneration of 7,335.83 hectares (considering both planting and natural regeneration).
In the case of restoration and reforestation activities in areas, did the methodologies used prioritize native species?	Yes	The 17 species chosen for reforestation are native.
To what extent has the project contributed to establishing recovery models with an emphasis on economic use?	Partially	In its logical model and in the choice of species that made up the Agroforestry Systems. However, neither the results of the project, nor interviews with actors or data from secondary sources demonstrate that the project was able to establish these models with an emphasis on economic use. Production flow, market and consumer studies, collective efforts of associations or cooperatives, monitoring of revenues/expenses or elements associated with the farmers' income were not part of the project's monitoring system so that economic use could be measured.
6. Efforts to address the risks of reversals in REDD+ results.	**Sim**	
What factors constitute risks to the permanence of REDD+ results? How did the project approach them?	Crops and livestock	One of the pillars of the project to keep the forest standing was the implementation of Agroforestry Systems so that it was possible to generate family income and maintain the forest. Crops and livestock were activities that competed with the success of Agroforestry Systems during the implementation of the project. An ex post monitoring, in addition to the evaluation interviews, is highly recommended in projects of this format, because, at the end of the intervention, the objective is for farmers to continue with their learning and not to cut down the forest again to the detriment of other activities.
7. Efforts to reduce the displacement of carbon emissions to other areas.	**Not applicable**	
Has there been a shift in emissions avoided by the project's efforts to other areas?	Not applicable	Not applicable

Cross-cutting criteria

Board 14 evaluates the cross-cutting criteria "poverty reduction" and "gender equality"[55]

Board 14 - Cross-cutting criteria for poverty reduction and gender equality applied to the project.

Cross-cutting criteria/ question	Compliance	Observation
Poverty reduction	**Partially**	
To what extent has the project contributed effectively to economic alternatives that value standing forests and sustainable use of natural resources?	Partially	The project was designed - in its logical model - under guidelines that combined reforestation with the importance of generating income for farmers. The implementation of Agroforestry Systems associated with the training and registration of farmers was the means of achieving the expected direct and indirect effects. This was the conceptual design. The implementation, in turn, despite providing economic alternatives through the cultivation of 17 selected species, was not widely thought to be effective as an economic alternative: the results presented do not show evidence of economic returns to farmers that can be directly associated with the effects of the project, although we have some indications that some species, part of the Agroforestry Systems, have become part of a wider production (RAT, 2020)
To what extent has the project positively influenced poverty reduction, social inclusion and improved living conditions for beneficiaries (mainly: traditional communities, settlers and family farmers) who live in its area?	Not available	There is no evidence of these results.
Has the project managed to promote and increase the production in value chains of timber and non-timber forest products, originating in sustainable management?	Not available	There is no evidence of these results.

[55] The Crosscutting criteria were not a requirement to the projects at the time of their submission, so the project might not have developed specific strategies to meet them.

Cross-cutting criteria/ question	Compliance	Observation
In the case of a project that contains the component of scientific and technological development, did it contribute to the construction of a development model suited to the region?	Not available	There is no evidence of these results.
Gender Equity	Partially	
Did the project manage to integrate gender issues into its strategies and interventions, or did it address the issue in isolation? How?	Partially	Treated in isolation. Despite not having specific efforts on gender equity, the project encouraged the participation of families in training and, in the nurseries, the reports highlight the presence of women.
Was there gender separation in data collection for project planning and monitoring?	No	
How did the project contribute to gender equality?	Not consistently	There are only occasional reports: In an interview, the actors reported that there was taken care to involve families and women. There are nurseries in Apuí with 35 women working. Example: "Dona Ester de Apuí. Women working effectively." Other inputs used as a source for the evaluation highlight that another important factor (the training of farmers) was family participation, with the presence of wives and children in the training process, which in fact demonstrates the interest of families in seeking new alternatives that can contribute to daily life inside the rural property.

Conclusions

With regards to the Sustainable Production component, there is reasonable evidence that the *Reforestation project* has achieved its aims in two of the four municipalities. The results were delivered, but there were problems in selecting the beneficiaries, lack of participation in the definition of SAF and in the delivery of seedlings as well as lack of technical assistance. However, the biggest limitation was the context of two municipalities (Lábrea and Boca do Acre), where land tenure insecurity, turnover of farmers on lots, land conflicts and discontinuity of rural extension reduced the effectiveness of efforts and their effects. The effectiveness of the partnerships established between public agencies belonging to state governments (SEMA, IPAAM, ADS and IDAM) and the Brazilian Agricultural Research Corporation Embrapa allowed for greater sustainability and dissemination of results, despite challenges in coordination and joint execution.

Hiring non-governmental organizations and companies presented some problems, generally related to the difficulties of coordinating the contracted agendas and to the logistical difficulties typical of the Amazon region. The problem, in this case, is that small delays in

hiring can cause long delays in the implementation of services, which need to obey the seasonal conditions of the Amazon.

Regarding the Monitoring and Control component, the project was able to deliver the proposed results. Despite the rework necessary due to the changes introduced by the New Forest Code, these results have a lasting impact, such as the possibility of embargoing areas and holding those who cause illegal deforestation responsible for their efforts. It is arguable that deforestation would have grown much more in the municipalities the project operates if it had not been there.

Lessons Learned

General

- The training was very positive and the legacy of technical knowledge to the institutions involved, about Rural Environmental Registry and Agroforestry Systems and about the region, was always highlighted by all of those interviewed.
- Although management shared with other bodies presents coordination challenges, such as monitoring, team changes and decision making, it allows for greater sustainability and dissemination of results.
- The distances with the managers' offices (most of which are located in Manaus) made monitoring difficult.
- The time of implementation for a bid following the procedures of the government and the BNDES must be considered in the Project Planning, together with the Amazonian seasonality, so that the process is not harmed.
- Good project implementation practices, such as selection criteria, mobilization of local actors, *ex ante* diagnosis of the intervention, systematic and continuous monitoring and quality control of information, are key factors for successful implementation.

Sustainable Production Component

- The region receives other projects and actors simultaneously. Isolating the effects of a single program or verifying the impacts of the intervention in the face of what would naturally occur in the region is a challenge.
- The regional context is important to consider the feasibility of supporting the implementation of Agroforestry Systems, especially land security, the perspective of the producer/permanence on land, social services and land conflicts.
- The SAF pointed out as the most interesting were wood and essential oils, but their viability depends especially on overcoming the difficulties in transportation and production flow.
- It is important to guarantee technical assistance and rural extension during the implementation and at least the start of production for SAF, including commercial and financial advice.
- It is important to implement efforts aimed at commercialization.

Monitoring and Control Component

- An effective communication and mobilization strategy are important to achieve CAR results, overcoming local resistance.

Recommendations

To the project coordinators

- To create activity monitoring indicators for all actors, so that bottlenecks are identified in a timely manner when making strategic decisions and, if necessary, changing the project's route.
- Carry out the socio-economic diagnosis of the area before the intervention, outlining specific strategies for the territories if necessary.
- Risk mapping and a contingency plan in case for those risks.
- Have technical notes and glossaries that guide the technical team in proper data recording, guaranteeing the temporal comparability and the accumulated analysis of the data in their reports.
- Reinforce the importance of performance reports and other follow-up reports, not as *pro-forma* mechanisms but as the project's memory and the adequate records of evidence.
- Have a plan in case of team changes, so that the learning stays in the institution and not just in people's memory.
- Document reports and good practices.
- Be aware of international agreements and Safeguards during the process of selecting beneficiaries.
- Emphasize the logical chain of project activities.
- Consider a larger time frame for procurement.
- In the supply of seedlings, take into consideration, in the bidding process, the previous study of the production and delivery logistics and an action plan with contingency factors in case of any production delay or difficulty in delivery, considering the production or local nurseries as a differential in how to evaluate selected companies.
- Involve employees temporary or long standing in project management.
- The actors that are part of the cooperation, at the time of institutional changes in the state, need to dialogue with other teams and ensure the continuity of the project.
- Strengthen the participation of the beneficiaries during the entire project cycle, from its conception, as well as in the implementation and evaluation.

To the Amazon Fund's Management Department

- Reinforce the importance of accuracy in performance reports, which must go beyond the project's *pro-forma* documentation, a bureaucratic obligation, since these reports are official sources of information that assist institutions in decision making throughout project development and are the main input for evaluations.
- Request the maintenance of a project information library (preferably digital) that gathers information in an easy, quick and reliable way.
- Considering external monitoring (by non-profit institutions, universities or international organizations that support the project) can be a way of ensuring well defined standards for information over time.

7.2 OECD CRITERIA, CANCUN SAFEGUARDS (REDD+), CROSS-SECTORS AND EVALUATING ISSUES

7.2.1 OECD criteria

This evaluation was based on the relevance, effectiveness, efficiency, impact and sustainability criteria of the OECD (Board15), defined in 1991 through its Development Assistance Committee (DAC).

Board 15 - Five Evaluation Criteria defined by the OECD

Criteria	Brief definition (based on DAC/ OECD)	Relationship with the Theory of Change	Possible values
Impact	Evaluates the positive and negative changes resulting from the project, directly or indirectly, intentional or involuntary.	Direct and indirect effects of project results.	Effect not achieved or low; moderate effect; strong effect[56]
Relevance	Assesses the coherence of the project's aims according to the demands of the beneficiaries and the political priorities of the target groups, the recipient and donors.	Relationship between the "direct and indirect effects" of the projects with the "indirect effect of the component" and with the general objective of the Amazon Fund.	Low relevance; moderately relevant; very relevant.
Sustainability	Assesses whether the benefits of the project continue to occur after its conclusion, with an emphasis on social, economic and environmental aspects.	Continuity of direct and indirect effects of project results.	Low sustainability; moderately sustainable; very sustainable.
Effectiveness	Assesses the extent to which the direct aims of the project have been achieved or are expected to be achieved and what factors have been important.	Efforts contribution to the generation of project results.	Low effectiveness; moderately effective; effective.
Efficiency	Measures the cost-benefit of the results, if the financial resource was invested in an economical manner and if the results were achieved in a satisfactory manner.	Contribution from procedures, management arrangement, works, equipment and other inputs to the project's efforts.	Not efficient; moderately efficient; efficient.

[56] Possible values proposed by this evaluation

7.2.2 Cancun Safeguards (REDD+)

Board 16 shows Cancun's Safeguards for REDD+.

Board 16 - Cancun Safeguards (REDD+)

Safeguard/issue
1. Efforts complementary or consistent with the aims of national forest programs and other relevant international conventions and agreements.
2. Transparent and effective national forest governance structures, with a view to national sovereignty and national legislation.
3. Respect for the knowledge and rights of indigenous peoples and members of local communities, considering relevant international obligations, circumstances and national laws and noting that the UN General Assembly has adopted the United Nations Declaration on the Rights of Indigenous Peoples.
4. Full and effective participation of stakeholders, in particular indigenous people and local communities, in the efforts referred to in paragraphs 70 and 72 of Decision 1/CP 16.
5. Efforts consistent with the conservation of natural forests and biological diversity, ensuring that the efforts referred to in paragraph 70 Decision 1/CP 1611 are not used for the conversion of natural forests, but rather to encourage the protection and conservation of natural forests and their ecosystem services and to improve other social and environmental benefits.
6. Efforts to address the risks of reversals in REDD+ results.
7. Efforts to reduce the displacement of carbon emissions to other areas.

7.2.3 Cross-cutting criteria

Board 17 - Cross-cutting criteria for poverty reduction and gender equality applied to the evaluated projects

Cross-cutting criteria/question
Poverty reduction
1. Contributes to poverty reduction
2. Empowers the poorest
Gender equality
1. Has a gender strategy
2. Empowers women

7.3 LIST OF INTERVIEWS

7.3.1 Interviews conducted – *SEMAS Pará Project*

- Ayamy Migiyama – Director General of the Implementation of the Green Municipalities Program
- Daniel Azeredo – General Prosecutor of the Republic in the Public Federal Ministry
- Ema Castanheira – Coordinator for the Regional Centre (NURE of Altamira, Pará State
- Fernanda Costa Miranda – Coordinator for the NURE of Marabá, Pará State
- Justiniano Neto – M&D Lawyer, former Extraordinary Secretary of the Coordination of the Green Municipalities Program (2011 to 2017)
- Lília Reis – NURE Director, SEMAS PA

- Márcia Sidônio – Municipal Secretary of the Environment Forum of Pará State
- Maria Gertrudes Oliveira – Coordinator of the *project SEMAS Pará* in 2015
- Maximira Silva – Director of Geotechnologies at SEMAS PA
- Paulo Arruda – NURE Paragominas, Pará State
- Rosa Mendes – Manager of Articulation and Municipalization of Environmental Management for the SEMAS PA
- Selma Solange Monteiro Santos – Aide to the Adjunct for Environmental Regulation Management Secretary
- Vinícius Silva – Coordinator for Organization and Decentralization of Environmental Management
- Wendell Andrade – Director for Strategic Planning and Corporative Projects
- Wesley Storch – Municipal Secretary of the Environment of Altamira, Pará State

7.3.2 Interviews conducted – Reforestation Project

- Alexsandra Bianchini – Ex-coordinator of the Reforestation Project and IPAAM analyst (SEAGA29/SDS)
- Antonio Luiz Menezes de Andrade – Technical aide at SEMAS PA and, and later, Executive Management Secretary (administrative) and Adjunct Secretary
- Antônio Stroski – Manager at SEMA, Amazonas State
- Bárbara Nascimento – Technical Advisor at GIZ, Project CAR
- Benivaldo Vaz – Field coordinator
- Chrysologo Rocha – Technician at Amazon Institute
- Daniel Azeredo – Federal Public Ministry
- Edimar Vizolli – Technical Aide at SEPROC and President at IDAM at the time of the project
- Eduardo White – Environmental Aide at IPAAM and, at the time of the project, at IDAM
- Eurico Polaco – Rural farmer, in Apuí, Amazonas State, participant of the Reforestation project
- Hamilton Cabral – Extension of the in Apuí, Amazonas State
- Jeferson Macedo – Researcher at Embrapa, Amazonas State
- Josafá Novais Macedo – Head of IDAM in the south of Lábrea, Amazonas State
- Marcos Lise – Deputy Mayor at Apuí, Amazonas State, manager at IDAM in Apuí and Nova Aripuanã, Amazonas State, at the time of the project

[57] Executive Secretariat for Administrative Management (Secretaria Executiva de Gestão Administrativa)

- Neila Cavalcante – Ex-project coordinator at SEMA, Amazonas State
- Ney de Freitas Assis – Manager at the local office at Institute of Agricultural and Sustainable Forest Development of the State of Amazonas in Boca do Acre
- Paulo Henrique de Castro – President of the Amazônia Institute
- Silvio Romero Xavier – Technical Aide of the Amazônia Institute

7.4 ANALYSIS OF THE SITUATION OF FOREST RECOVERY IN THE MUNICIPALITIES COVERED BY THE REFORESTATION PROJECT IN THE SOUTHEAST OF AMAZON

7.4.1 Introduction

This chapter aims to present, in a corroborative way, the results of the recovery of degraded areas in the municipalities that the *Reforestation in the Southern part of the State of Amazonas* project, supported by the Amazon Fund, proposed to recover, namely: Apuí, Boca do Acre, Lábrea and Novo Aripuanã. For this, an analysis of the effects of forest recovery at the end of the project was carried out, in the form of temporal analysis of satellite images before project implementation and after its conclusion. This work was done according to the contract signed between the Center for Intelligence in Environmental Management and Technology (*Centro de Inteligência em Gestão e Tecnologia Ambiental* - CIGTA) and *Deutsche Gesellschaft für Internationale Zusammenarbeit* (GIZ) GmbH.

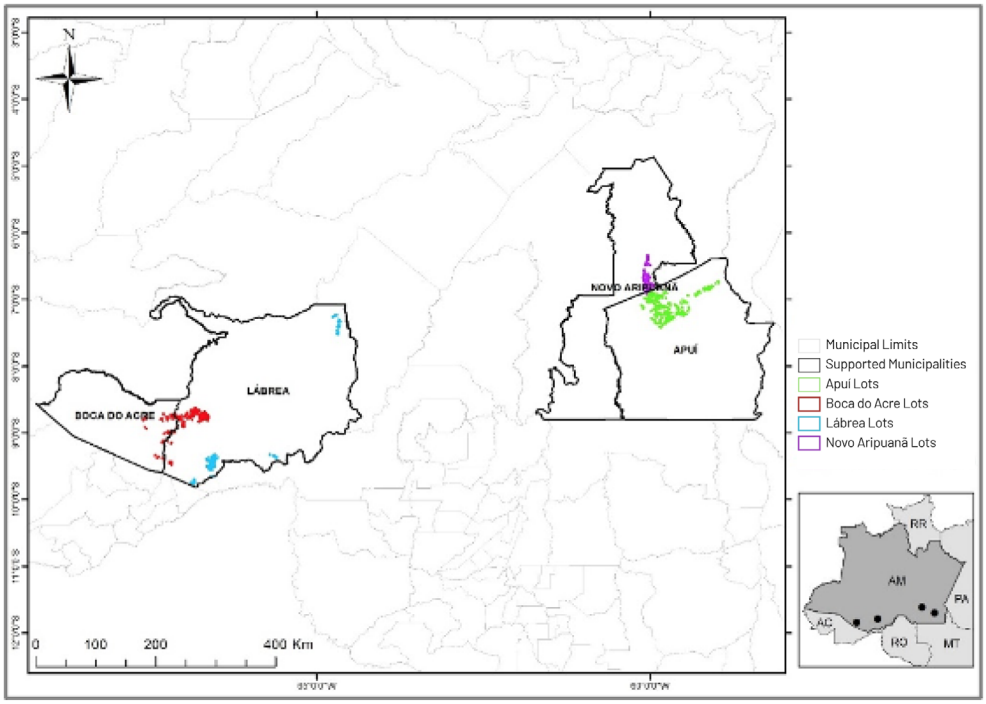
7.4.2 Metodology

The methodology used sought to analyse the degree of compliance with the projects' aims and targets, as well as the impacts and sustainability of the results achieved. First, a secondary data collection was carried out, based on the coordinates provided by the project and the data from the Rural Environmental Registries. The available data are formed by shapefile of the boundaries of the lots and areas of remnants of native vegetation and areas of alternative land use, mapped before the implementation of the project (2010) through satellite images. These data were separated by municipality, in order to have knowledge of the area (in hectares) of the project in each municipality (Table 13).

Table 13 - Area of the lots boundaries and areas mapped in 2010 and 2019 by municipality of operation of the *Reforestation project*

Municipality	Limit (ha)	2010		2019		Differential
		Vegetation (ha)	Area of use (ha)	Vegetation (ha)	Area of use (ha)	Rate (%)
Apuí	25.570,68	14.852,94	10.717,75	15.837,17	9.733,54	3,85
Boca do Acre	24.970,60	13.299,66	11.671,02	10.626,32	14.344,39	10,71
Lábrea	15.917,19	12.043,11	3.882,01	9.867,65	6.057,38	13,67
Novo Aripuanã	8.958,72	6.623,34	2.335,38	6.732,07	2.226,65	1,21
Total	**75.417,19**	**46.819,05**	**28.606,16**	**43.063,21**	**32.361,96**	**29,44**

Figure 24 - General map of lots by municipality analysis of the *Reforestation project*



With the aid of the mentioned data and images from July to September 2019 from the Sentinel-2 satellite, in high resolution (10 m), in the false colour composition, it was possible to map the areas that have regenerated or are currently regenerating in the period from 2010 to 2019 (Figure 25), these being the areas of interest of the project.

Figure 25 – Example of an area undergoing regeneration.

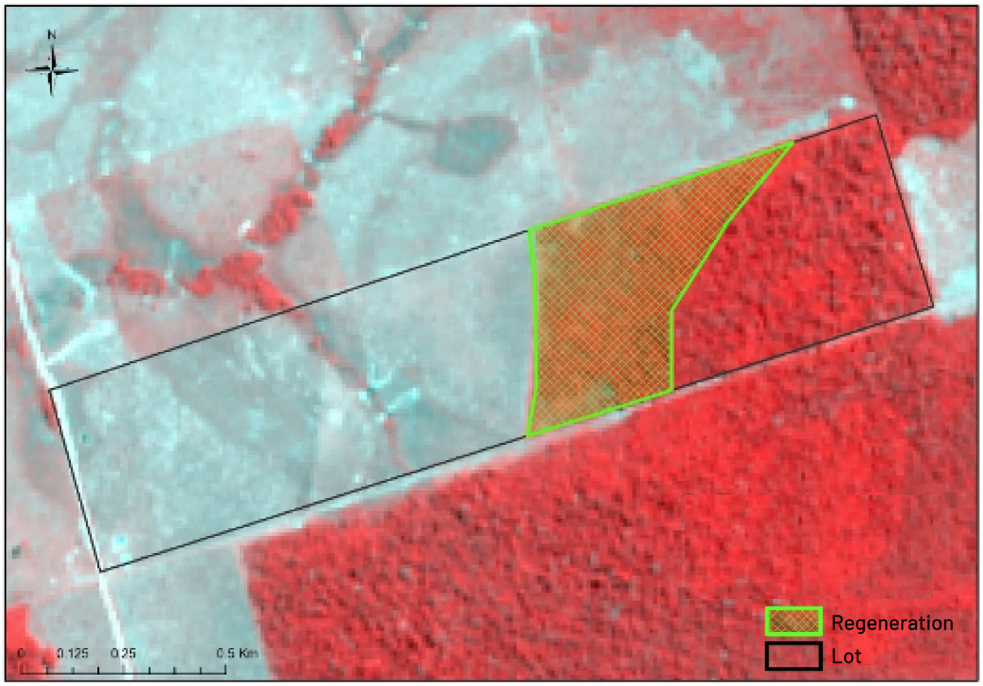
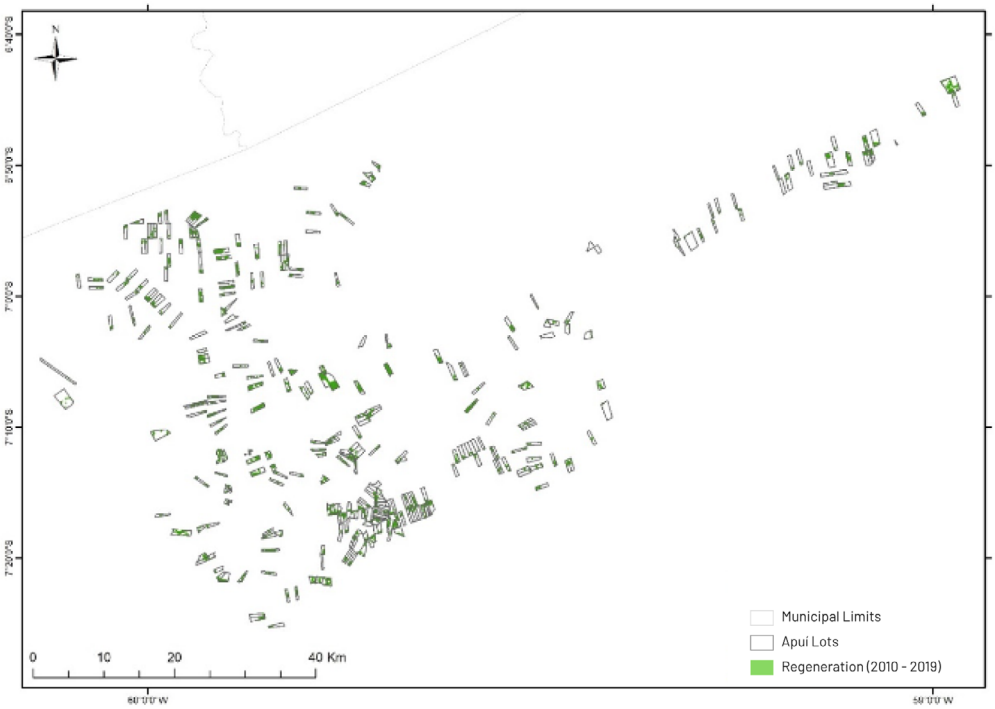


Figure 26 - Demonstrative map of regeneration areas in the municipality of Apuí.



7.4.3 Results

Table 14 presents the regeneration areas (in hectares) and the regeneration rate (%) per municipality under the project in the period from 2010 to 2019. Next, the demonstrative maps of each municipality are presented, with the map referring to the municipality of Lábrea divided into two parts (north and south) for better viewing.

Table 14 - Areas by municipality of regeneration and regeneration rate, in the period from 2010 to 2019.

Municipality	Limit (ha)	Regeneration (ha) (2010-2019)	Regeneration rate (%) (2010-2019)
Apuí	25.570,68	3.581,25	14,01
Boca do Acre	24.970,60	1.863,15	7,46
Lábrea	15.917,19	816,09	5,13
Novo Aripuanã	8.958,72	1.075,34	12,00
Total	**75.417,19**	**7.335,83**	**38,60**

Figure 27 - Demonstrative map of regeneration areas in the municipality of Boca do Acre.

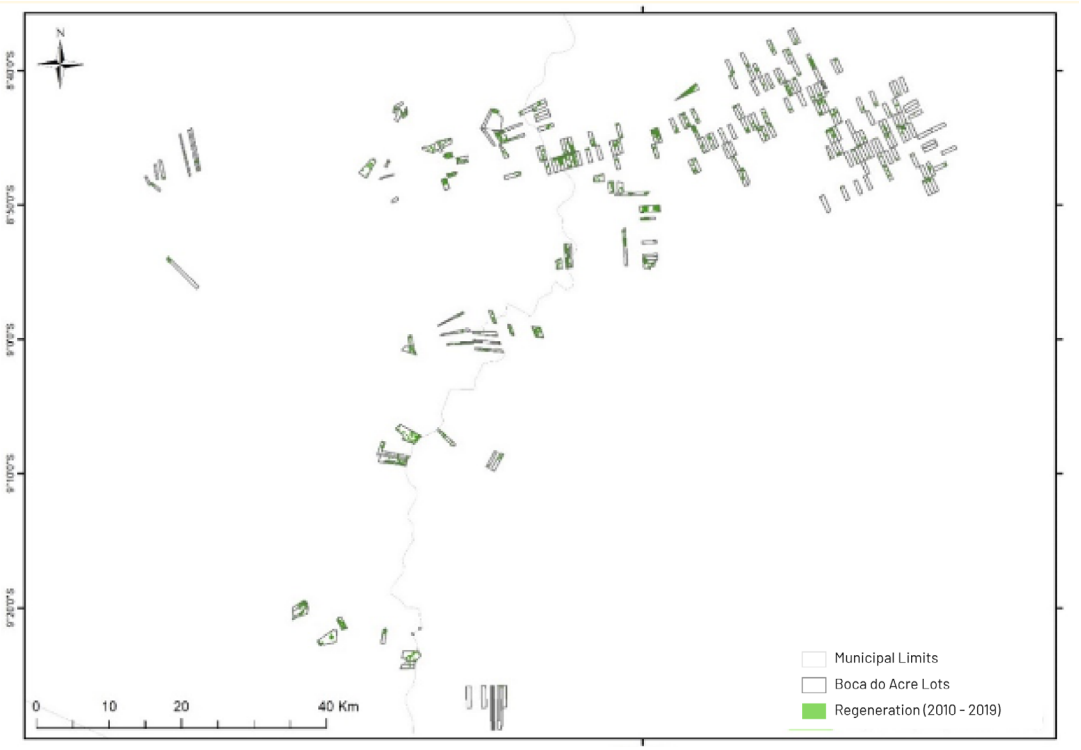


Figure 28 - Demonstrative map of regeneration areas in the municipality of Lábrea (North).

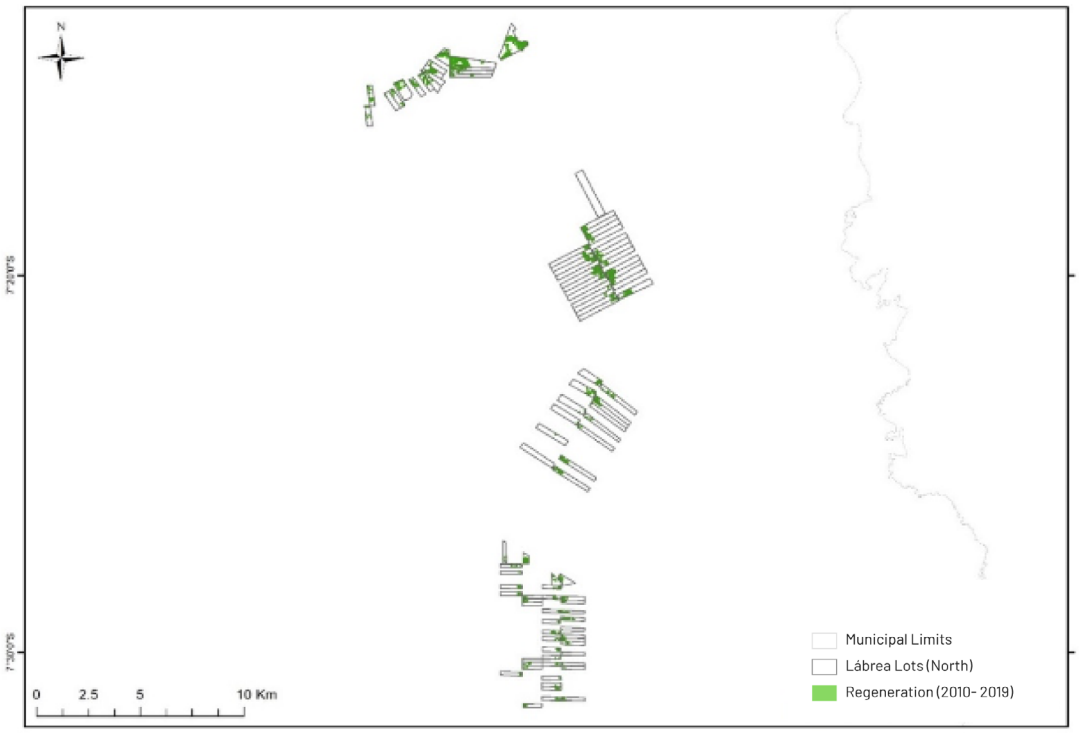


Figure 29 - Demonstrative map of regeneration areas in the municipality of Lábrea (South).

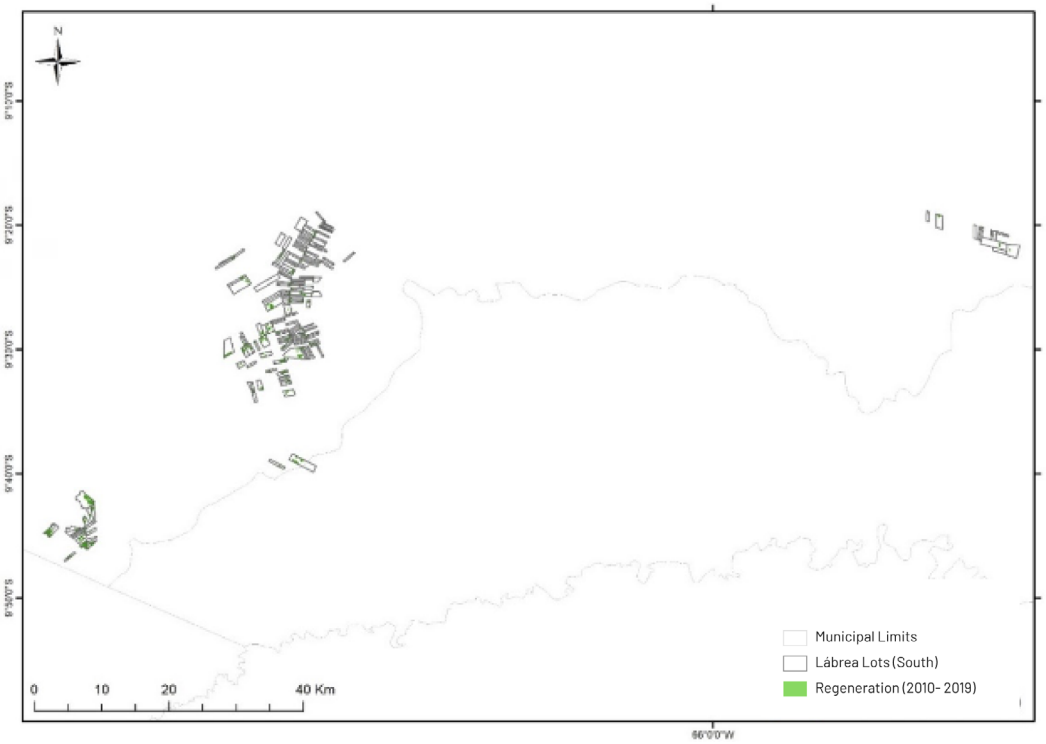
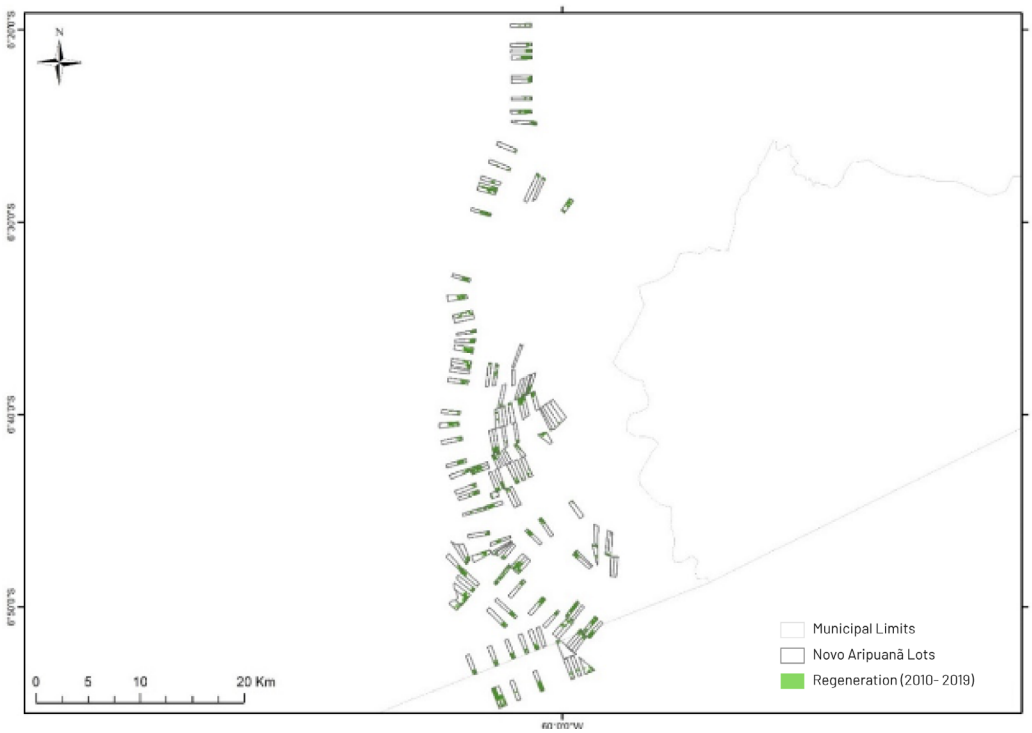


Figure 30 - Demonstrative map of regeneration areas in the municipality of Novo Aripuanã.



7.4.4 Conclusive Analysis

According to the analysis of the results, it is possible to verify a good performance of the *Reforestation project*, mainly in relation to the municipalities of Apuí and Novo Aripuanã, which had higher regeneration rates in the period from 2010 to 2019, 14,01% and 12,00% respectively. The project aimed, through the simultaneous cultivation of agricultural crops and forest species, through Agroforestry Systems, to recover 1,400 hectares by planting seedlings, the total being recovered or in the process of recovery by 2019, both by planting and by natural forms, equivalent to 7,335.83 hectares. Therefore, it is possible to conclude that, even after the end of the project, the areas under regeneration continue to meet what was proposed by the project during its active period.

7.5 COMPARATIVE ANALYSIS OF DEFORESTATION RATES IN PLOTS WITH CAR REGISTRATION UNDER THE *REFORESTATION PROJECT IN THE SOUTH OF AMAZONAS STATE* AND SURROUNDING AREAS

This chapter aims to present the results regarding deforestation and recovery of degraded areas in the municipalities of influence of the *Reforestation project*, supported by the Amazon Fund, namely: Apuí, Boca do Acre, Lábrea and Novo Aripuanã.

For this purpose, an analysis of the effects of deforestation on the properties of under the project's influence and of the forest recoveries carried out by them was done, in the form of temporal analysis of satellite images, before project implementation and after its closure. This work was carried out according to the contract signed between the CIGTA and GIZ.

7.5.2 Metodology

The methodology used sought to analyse the degree of compliance with the objectives and aims of the project, as well as the impacts and sustainability of the results achieved. First, the project collected secondary data, based on the coordinates provided by the project and data from the Rural Environmental Registries. The available data are formed by shapefile of the lots' boundaries and areas of native vegetation and areas of alternative land use, mapped before the implementation of the project (2010) through satellite images. The data was separated by municipality, in order to have knowledge of the area (in hectares) of the project's influence in each municipality (Table 15).

Figure 31 - General map of the lots by project analysis of municipality.

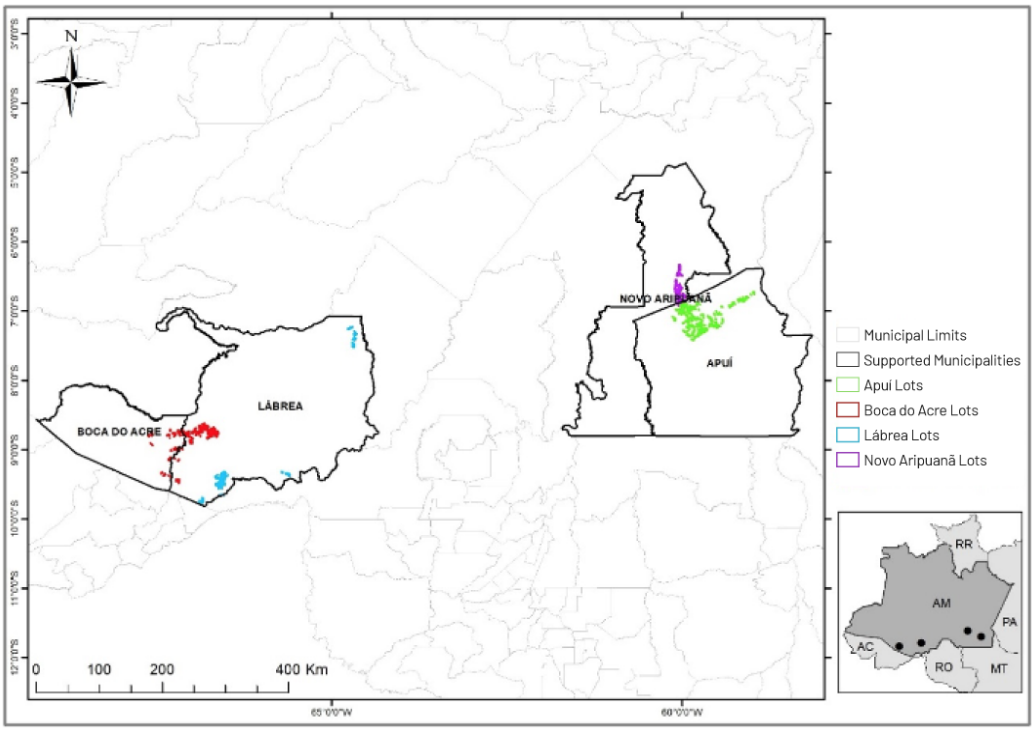


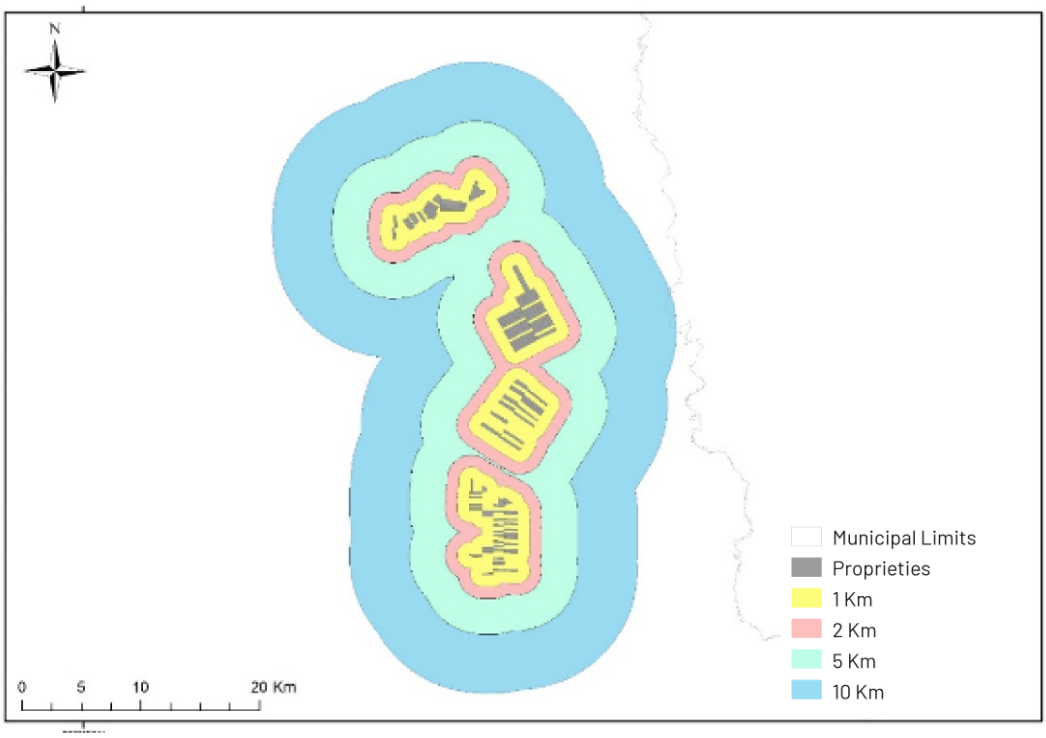
Table 15 - Area of the boundaries of the lots and areas mapped in the period from 2010 to 2019 by municipality in which the project operates.

Municipality	Limits (ha)	2010		2019		Differential
		Vegetation (ha)	Area of use (ha)	Vegetation (ha)	Area of use (ha)	Rate (%)
Apuí	25.570,68	14.852,94	10.717,75	15.837,17	9.733,54	3,85
Boca do Acre	24.970,60	13.299,66	11.671,02	10.626,32	14.344,39	10,71
Lábrea	15.917,19	12.043,11	3.882,01	9.867,65	6.057,38	13,67
Novo Aripuanã	8.958,72	6.623,34	2.335,38	6.732,07	2.226,65	1,21
Total	**75.417,19**	**46.819,05**	**28.606,16**	**43.063,21**	**32.361,96**	**29,44**

Within the properties (lots), the deforested and regenerated areas accumulated between 2010 and 2019 were mapped. For this purpose, the classification of vegetation and land use areas mapped before the project started (2010) were used, which were compared with recent images, from July to September 2019, from the Sentinel-2 satellite, with a 10 meters resolution. In this way, it was possible to vectorize the differences, that is, what is no longer vegetation, being possibly incorporated into the productive areas of the properties, and what is being regenerated.

In order to have a view of the territorial influence of the project in reducing deforestation, a database was structured containing the limits of the properties and analysis ranges around them. For this, the shapefile of the property limits was used, and, from them, buffers were generated at the 1 km, 2 km, 5 km and 10 km marks (Figure 32). For one analysis range not to overlap another, the erase process was used.

Figure 32 - Deforestation analysis ranges in the project properties (Detail of a group of properties in the municipality of Lábrea).



The analysis ranges correspond to an increasing area around the properties (Table 16) and allow a structured view of the scope of the project's efforts.

Table 16 - Territorial coverage of properties (lots) and distance bands.

Municipalities	Range Analysis	Area (ha)
Apuí	**Lotes**	**25.570,68**
	1 km	130.874,17
	2 km	110.876,00
	5 km	205.222,59
	10 km	232.575,27
Boca do Acre	**Lots**	**24.970,60**
	1 km	93.850,70
	2 km	74.925,97
	5 km	193.432,57
	10 km	294.255,29
Lábrea	**Lots**	**15.917,19**
	1 km	47.516,80
	2 km	36.483,82
	5 km	111.797,64
	10 km	219.091,07
Novo Aripuanã	**Lots**	**8.958,72**
	1 km	43.756,74
	2 km	24.895,93
	5 km	58.151,84
	10 km	100.543,91

The data referring to the analysis ranges were taken from the PRODES database[58] and are related to deforestation that occurred during the evaluation period of the project and after its closure (2010 to 2019). These data were used as a basis for comparison with the deforested areas within the properties.

7.5.3 Results

The analysis ranges provide a view of the scope of the project's activities. The deforestation value of the lots is relative to the accumulated deforestation from the years 2010 to 2019 and, through this data, it is possible to monitor how the dynamics of deforestation within the properties compared to those of their surroundings after the end of the project.

Table 17 - Deforestation by range in each municipality.

Apuí						
Deforestation by range (ha)						
Year	Lots	1km	2 km	5 km	10km	Yearly total
2010	2.597,04	1.638,59	1.200,80	624,25	454,9	3.918,54
2011		978,07	902,01	838,59	568,47	3.287,14
2012		1.804,39	1.172,32	1.760,55	1.646,23	6.383,49
2013		2.004,53	1.315,94	2.253,49	1.481,57	7.055,53
2014		1.840,12	1.692,05	2.237,27	1.118,10	6.887,54
2015		2.528,57	1.515,93	2.198,65	2.291,22	8.534,37
2016		3.286,44	2.773,45	5.067,60	3.423,65	14.551,14
2017		2.934,79	2.260,79	5.729,97	3.892,19	14.817,74
2018		2.347,86	2.102,71	4.366,72	3.500,96	12.318,25
2019		3.351,53	4.290,94	8.905,56	7.339,66	23.887,69
TOTAL	**2.597,04**	**22.714,87**	**19.226,93**	**33.982,66**	**25.716,94**	**101.641,40**

Boca do Acre						
Deforestation by range (ha)						
Year	Lots	1 km	2 km	5 km	10 km	Yearly total
2010	4.536,50	1.119,74	295,15	530,35	481,67	2.426,91
2011		1.356,87	839,51	1.048,49	1.054,48	4.299,35
2012		1.840,14	812,12	1.171,52	1.126,98	4.950,76
2013		1.763,06	1.125,14	1.428,70	2.581,46	6.898,36
2014		1.273,69	831,81	2.174,27	2.322,58	6.602,35
2015		1.119,72	1.268,12	2.593,95	5.010,44	9.992,23
2016		2.142,01	1.633,22	2.383,06	3.359,59	9.517,88
2017		1.343,49	733,31	1.975,07	2.893,59	6.945,46
2018		1.764,36	1.073,38	2.730,82	2.691,29	8.259,85
2019		1.773,27	1.337,36	4.322,11	4.963,67	12.396,41
TOTAL	4.536,50	15.496,35	9.949,11	20.358,34	26.485,75	72.289,55

[58] Available in: http://www.dpi.inpe.br/prodesdigital/prodesmunicipal.php.

Lábrea						
Deforestation by range (ha)						
Year	Lots	1 km	2 km	5 km	10 km	Yearly total
2010	2.991,56	456,67	97,75	130,33	130,99	815,74
2011		484,67	271,14	569	624,58	1.949,39
2012		709,09	111,25	304,61	222,77	1.347,72
2013		1.000,84	398,77	700,99	483,48	2.584,08
2014		1.202,21	224,17	1.290,46	762,18	3.479,02
2015		1.239,09	430,81	773,07	2.171,50	4.614,47
2016		997,77	382,68	1.799,26	3.250,72	6.430,43
2017		872,02	651,95	1.793,25	2.502,93	5.820,15
2018		1.056,49	397,01	414,27	1.486,24	3.354,01
2019		1.201,33	915,94	1.318,97	5.310,10	8.746,34
TOTAL	**2.991,56**	**9.220,18**	**3.881,47**	**9.094,20**	**16.945,48**	**39.141,33**

Novo Aripuanã						
Deforestation by range (ha)						
Year	Lots	1 km	2 km	5 km	10 km	Yearly total
2010	966,61	604,25	183	179,1	269,05	1.235,40
2011		282,8	160,46	137,88	115,26	696,40
2012		578,1	337,63	407,74	287,82	1.611,29
2013		753,34	328,57	337,19	328,31	1.747,41
2014		646,78	292,19	550,95	358,08	1.848,00
2015		1.010,12	445,74	319,67	443,43	2.218,96
2016		1.431,21	492,17	1.462,62	630,26	4.016,26
2017		983,53	566,46	1.136,13	808,41	3.494,53
2018		1.022,78	353,2	700,43	1.036,01	3.112,42
2019		2.442,72	1.791,62	1.573,67	1.554,50	7.362,51
TOTAL	966,61	9.755,63	4.951,05	6.805,38	5.831,13	27.343,19

In Apuí, considering the annual deforestation rate, data for the cumulative total from 2010 to 2019 show a value of 10.16% of the area converted into the project's influence properties. This value increases significantly in the 1 km range (17.36%) and decreases from the 2 km range. These values show that, despite the occurrence of deforestation, the rate of area converted within the properties of Apuí is the lowest in the region, especially when compared to the 1 km range. Therefore, comparing the deforestation rates of the lots and the 1 km range, there was a difference of 7.2%, which means that, in the period, 1,841.08 hectares of forest were left to be deforested within the properties under influence of the project in Apuí.

In Boca do Acre, the data for the accumulated total from 2010 to 2019 show a value of 18.17% of the area of the properties under project's influence being converted, a value that decreases from the 1 km range. Bearing in mind that the most distant bands are influenced by other factors and, in this case, making a comparison taking into account the 1 km range, the deforestation rate within the properties was 1.66% higher than the deforestation rate in the properties outside the 1 km range. This difference in the rate means that, in this period, the properties of Boca do Acre lost about 413.43 hectares of forest more than expected when compared to the surrounding region.

In Lábrea, in turn, the data for the cumulative total from 2010 to 2019 indicate a value of 18.79% of the area of the properties under project's influence being converted. This value increases in the range of 1 km (19.40%) and decreases from the range of 2 km. Bearing in mind that the most distant bands are influenced by other factors and, in this case, making a comparison taking into account the 1 km range, the deforestation rate within the properties was 0.61% lower than the deforestation rate of the surrounding areas of the project's properties. This drop in the rate means that, in the period, 97.02 hectares of forest were left to be deforested within the project's influence properties in Lábrea.

In Novo Aripuanã, finally, the data for the cumulative total from 2010 to 2019 point to 10.79% of converted area in the properties under the project's influence, a value that increases considerably in the 1 km range (22.30%) and it decreases from the 2 km range, intensifying in the 10 km range, which shows a peculiar deforestation dynamic in the place. Bearing in mind that the most distant bands are influenced by other factors and, in this case, making a comparison taking into account the 1 km range, the deforestation rate within the properties was 11.51% lower than the deforestation rate in the areas in its surroundings. This rate drop means that, during the period, 1,030.75 hectares of forest were left to be deforested within the project's influence properties in Novo Aripuanã.

7.5.4 Avoided deforestation in the area of supported municipalities

If the areas of the four supported municipalities are added together, deforestation was avoided in 2,555.42 hectares of forest on the properties within the project's, that means that even after its ending, deforestation within the properties continues to be avoided.

In addition, through awareness raising work with farmers and owners regarding the recovery of degraded areas and through the simultaneous cultivation of agricultural crops and forest species through Agroforestry Systems, until 2019 or 7,335.83 hectares of forest were or are being recovered, which represents 38.6% of the areas under the influence of the regeneration project (Table 18).

Table 18 - Area under Regeneration (ha) and Rate of Regeneration (%) by municipality under project influence.

Municipality	Boundaries (ha)	Regeneration (ha) (2010-2019)	Regeneration rate (%) (2010-2019)
Apuí	25.570,68	3.581,25	14,01
Boca do Acre	24.970,60	1.863,15	7,46
Lábrea	15.917,19	816,09	5,13
Novo Aripuanã	8.958,72	1.075,34	12,00
Total	**75.417,19**	**7.335,83**	**38,60**

The results of the project supported the regeneration of vegetation in its area of influence, however, it is also possible to observe that, considering the annual sum of deforestation between 2010 and 2019, the three highest deforestation rates in the municipalities were registered in 2015. On average, 10,000 hectares (or 100 km²) of deforestation were recorded in the municipalities, with the highest rates recorded in Apuí (average of 17.7 thousand ha) and the lowest in Novo Aripuanã (average of 5,000 ha).

In summary, the development of the *Reforestation project* has shown itself to be effective in recovering degraded areas over the period of its development and the following year. However, the CAR has only temporary effects regarding to the reduction of deforestation. After the year 2015, the supported municipalities registered their highest rates of deforestation, that is, doing Rural Environmental Registry brings with it the emergence of policies that can dialogue and strengthen the PRA, to strengthen the sustainable use of land, associating production and conservation in the registered areas.