THE BNDES' atlantic FOREST INITIATIVE

BNDES

Cover photo: Fernanda Cristina de Barros
Project Semeando Sustentabilidade (Sowing Sustainability) – Akarui
Serra do Mar State Park
(Santa Virgínia – São Paulo state)

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This publication is a partnership between

IUCN

BNDES The Brazilian development bank

MESSAGE FROM THE BNDES

On June 5, 2007, shortly after assuming the presidency of the BNDES, I publicly announced the BNDES' commitment to compensating its greenhouse gas emissions by planting trees. This triggered what later came to be called the BNDES' Atlantic Forest Initiative.

The idea gained momentum to become a voluntary effort that allowed support for projects that aim to restore a total area of almost 3,000 hectares, prioritizing the restoration of riparian forests and public protected areas. The resources provided were non-reimbursable and came from the BNDES' Social Fund.

It is important to note that the benefits from the BNDES' Atlantic Forest Initiative are not limited to carbon sequestration, which is already so important in mitigating climate change. Increased vegetation coverage with native species fosters protection against erosion, the growth of the flora and fauna biodiversity and improving the microclimate the surrounding areas of restored regions. The projects brought about many benefits, ranging from creating jobs and professional training in the field, to strengthening the seed, seedling and nursery production sectors.

In view of the current state of water restrictions, society has realized the urgency to restore water sources. Within this context, mobilizing citizens, businesses and governments to restore the Brazilian biomes should take the form of public policy with general and collective interests, on which the performance of the economy and the well-being of people in urban and rural areas increasingly depend. Over the next twenty years, we will see the dissemination of ecological restoration activities, through compliance with law that resulted from the Forest Code, approved in May 2012.

The results in the first years when the BNDES' Atlantic Forest Initiative was implemented reveal its importance and commitment to priority issues in Brazil's environmental agenda, and now, looking forward, the BNDES must expand its role in restoring native vegetation in the country through financial support earmarked for companies and landowners of all sizes. We are proud to present the partial results of this work in this volume.

Luciano Coutinho
President of the Brazilian Development Bank (BNDES)

MESSAGE FROM THE IUCN

We are currently going through an intense change in our history. The perspective we had decades ago, which saw people and nature as separate players, no longer serves us. It is increasingly evident that we belong to an interdependent socio-ecological system and improving our standards of living on this planet depends on human respect for the laws of the biosphere.

There is nothing more important for humanity at this moment than to making our existence compatible with the laws that govern the biosphere. Therefore, we cannot stop discussing and implementing a transition strategy focused on sustainability, which will lead to a healthy economic process because no society can continue without the services the ecosystems provide us. This should be our main focus for economic development.

Despite intensely disrupting the production of the natural elements that sustain our society – soil, water, forest, climate, oceans –, it is interesting to note that we have a sufficient amount of trained human resources, many institutions structured from the local to the global level, available technologies and financial resources to spare in society. Our situation is paradoxical. We depend on coordinating these elements – human resources, institutions, technologies, financial resources – to foster the great transition we need. This is the civilizational task that has been cast upon us. It is the new social contract that we need to build.

Forest restoration is, therefore, a process to transform degraded areas into healthy and fertile land, where communities and ecosystems can co-inhabit, produce and interact. Considering the alarming global levels of degradation of environments, and the consequent loss of environmental services, such revitalization of nature is one of the fundamental pillars upholding sustainability.

A restored environment must accommodate a mosaic of different land uses, such as agriculture and agroforestry, forest management, protected areas, wildlife corridors. All these activities have an indisputable flow of economic benefits to society.

As we can see in the experiences described in this publication, the benefits of restoring forests can already be felt in the short term, including the creation of jobs and carbon sequestration. However, it is a long-term solution to which communities, businesses, banks, landowners, politicians, and others must be committed. As there is no single model that fits all, solutions must be adaptable and flexible so that sustainable practices are achieved.

It is not easy, but it is possible. John Maynard Keynes, when describing the challenge of deep change in existing systems, once said: “The difficulty lies not so much in developing new ideas, but in escaping from old ones.”

Luiz Fernando Krieger Merico
Coordinator of the International Union for Conservation of Nature (IUCN)

Contents

PRESENTATION – SUPPORT FOR ECOLOGICAL RESTORATION

Since it was founded in 1952, the BNDES has always participated in formulating public policies to develop the country. Over the years, incorporating environmental issues in project financing has gained increasing importance. However, to deal with current challenges, implementing specific environmental policies is crucial, as has happened with the BNDES' support for renewable energy, sanitation and solid waste sectors. Restoring Brazilian biomes is on this list of environmental policies that underpin economic and social development.

In addition to issues relating to carbon sequestration, the main benefits of restoring biomes include maintaining biodiversity, helping preserve water resources, reducing erosion, progressively developing the environment and improving the microclimate.

In the coming decades, Brazilian society will face the challenge of implementing restoration programs for biomes throughout the national territory, as required by Act Nº. 12,651/2012, which stems from the Forest Code, to protect native vegetation. The results of this effort will also depend on the effectiveness of financing instruments, the development of management techniques and models, cost reduction and restoration aims at a territorial level, such as those for watersheds, ecological corridors, springs and sensitive areas regarding biodiversity.

Considering the situation of the Atlantic Forest Biome – which has the lowest coverage regarding the original area, but on the other hand, still has one of the world's highest biodiversity rates -, the BNDES launched the BNDES' Atlantic Forest Initiative (IBMA). Its goal is to directly support projects aimed at restoring this biome, using non-reimbursable resources from the Bank's Social Fund.

Support was designed in compliance with Act Nº. 11,428/2006, also called the Atlantic Forest Law, which establishes the conditions to be met in protecting, conserving and using the Atlantic Forest biome. These include protecting biodiversity and the water regime, fostering research and promoting public awareness on the need to restore and maintain its ecosystems.

This publication, in partnership with the International Union for Conservation of Nature (IUCN), addresses this first experience of the Bank in non-reimbursable support for ecological restoration of the Atlantic Forest Biome. Some 14 projects located in the states of Santa Catarina, Paraná, São Paulo, Rio de Janeiro, Minas Gerais, Espírito Santo and Bahia were analyzed. They were developed by the following institutions:

- Akarui – Associação para a Cultura, Meio Ambiente e Cidadania (Association for Culture, Environment and Civic Awareness)
- Associação Mico-Leão-Dourado (Golden Lion Tamarin Association) – AMLD
- Fundação Oswaldo Cruz (Oswaldo Cruz Foundation) – FIOCRUZ and Fundação para o Desenvolvimento Científico e Tecnológico em Saúde (Foundation for Scientific and Technological Development in Health) – FIOTEC
- Fundação Universidade Regional de Blumenau (Blumenau Regional University Foundation) – FURB

- Instituto de Estudos Socioambientais do Sul da Bahia (Institute for Socio-environmental Studies of Southern Bahia) – IESB
- Instituto Terra (Terra Institute)
- Instituto Terra de Preservação Ambiental (Terra Institute for Environmental Preservation) – ITPA
- Instituto de Pesquisas Ecológicas (Institute for Ecological Research) – IPÊ
- Instituto Pró-Terra (Pró-Terra Institute)
- Mater Natura – Instituto de Estudos Ambientais (Mater Natura – Environmental Studies Institute)
- Natureza Bela
- Entidade Ambientalista Onda Verde (Onda Verde Environmental Organization)
- The Green Initiative – TGI
- Instituto de Conservação Ambiental The Nature Conservancy do Brasil (The Nature Conservancy of Brazil) – TNC

The first part of the publication presents the main results of systematized lessons learned, based on data and information from the 14 projects described above. Individually analyzing each one in addition to comparatively analyzing several aspects and characteristics has allowed us to outline an overview of the restoration that goes beyond planting, highlighting the following activities:

- structuring ecological corridors and connecting forest fragments;
- restoring areas in public protected areas;
- investing in the restoration production sector (nurseries, laboratories, seeds);
- generating employment and income in rural areas;
- professionally training the low-income population; and
- conserving biodiversity (fauna and flora).

The second part of the publication provides more details on the characteristics and the results of projects, including their aims, amount of the support, location and restoration area, as well as maps, photos and testimonials by representatives from supported institutions.

In total, some R$ 42 million was earmarked for the restoration of approximately 3,000 hectares. It is a small amount compared to the BNDES' standard support for other sectors, but extremely important within the universe of those restoring the Atlantic Forest. Support from voluntary sources and the BNDES' own resources is considered unique on a national scale.

Lessons learned and the analysis of results are important tools to improve the BNDES' support for the restoration industry. Currently, the Bank already offers reimbursable lines of credit, such as the BNDES Forestry (BNDES Florestal), the Climate Fund Program (Programa Fundo Clima) and the Low Carbon Agriculture Program (Programa de Agricultura de Baixo Carbono). Non-reimbursable funds, as was the case of the first phase for IBMA, even more limited if compared to reimbursable resources, will play an important role in the coming years in providing support to restore priority areas and strengthen the regional sector for and seedlings and seeds.

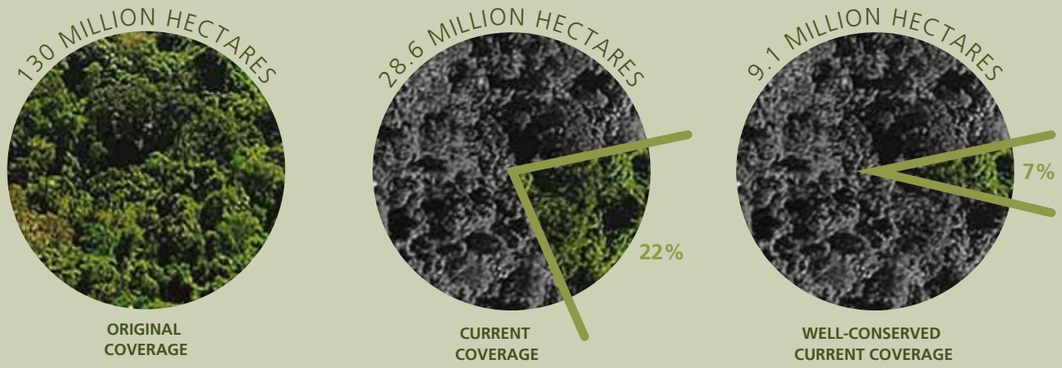
Brazil's development relies on the success of this undertaking.

THE IMPORTANCE OF THE ATLANTIC FOREST

Comprising a wide range of forest formations and associated ecosystems, it is recognized as one of the sites with the most significant biodiversity in the world.

Originally, the Atlantic Forest covered approximately 130 million hectares in 17 Brazilian states (Alagoas, Bahia, Ceará, Espírito Santo, Goiás, Mato Grosso do Sul, Minas Gerais, Paraíba, Paraná, Pernambuco, Piauí, Rio de Janeiro, Rio Grande do Norte, Rio Grande do Sul, Santa Catarina, São Paulo and Sergipe), crossing the borders with Paraguay and Argentina. Today, the remains of native vegetation are down to approximately 22% of its original coverage, but only 7% of the total is well conserved in fragments over 100 hectares.

ATLANTIC FOREST COVER IN BRAZIL



VEGETATION DIVERSITY

Even fragmented, its vegetation diversity is greater than that found in some continents. Currently, approximately 20,000 species make up the Atlantic Forest, equivalent to 35% of the existing species in Brazil. In North America, considering all of its biomes, some 17,000 species are found. In Europe, this amount reaches 12,500.

Expanding and consolidating protected areas – such as protected areas and indigenous lands –, the restoration of degraded areas and the sustainable use of native vegetation are essential to maintaining its biological and cultural diversity.

FAUNA

There are 12 endemic genus in the forest, that is, that do not occur elsewhere in the world, including two genus of endangered primates: the lion tamarins and wooly spider monkeys.

849 species of birds

200 species of reptiles

370 species of amphibians

270 species of mammals

350 species of fish

VITAL IMPORTANCE

It is vitally important to more than **120 million Brazilians** who live in the area, providing very important environmental services.

- REGULATES THE FLOW OF WATER SOURCES
- CONTROLS THE CLIMACTIC BALANCE
- ENSURES SOIL FERTILITY
- PROTECTS CLIFFS AND SLOPES OF THE HILLS

Source: The BNDES, based on data from the Ministry of the Environment.

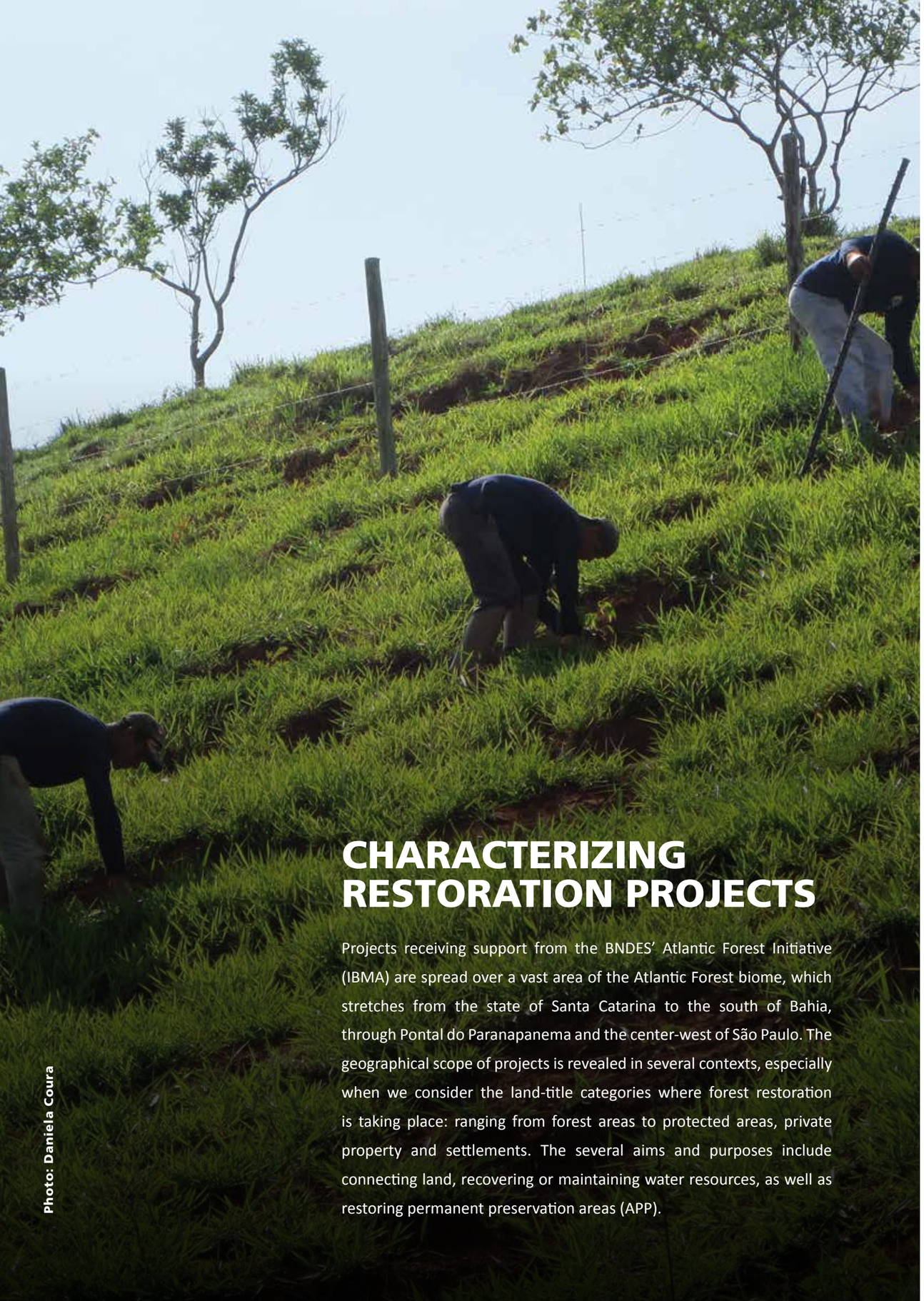


Photo: Daniela Coura

CHARACTERIZING RESTORATION PROJECTS

Projects receiving support from the BNDES' Atlantic Forest Initiative (IBMA) are spread over a vast area of the Atlantic Forest biome, which stretches from the state of Santa Catarina to the south of Bahia, through Pontal do Paranapanema and the center-west of São Paulo. The geographical scope of projects is revealed in several contexts, especially when we consider the land-title categories where forest restoration is taking place: ranging from forest areas to protected areas, private property and settlements. The several aims and purposes include connecting land, recovering or maintaining water resources, as well as restoring permanent preservation areas (APP).

List of projects receiving support

1. **Semeando Sustentabilidade –Recuperação Florestal (Sowing Sustainability – Forest Recovery)**
   Institution: Akarui – Association for Culture, Environment and Civic Awareness
   Location: municipalities of São Luiz do Paraitinga and Natividade da Serra (São Paulo state)
2. **Restauração Ecológica das Áreas Degradadas da Reserva Biológica Poço das Antas (Ecological Restoration of Degraded Areas of Poço das Antas Biological Reserve)**
   Institution: Golden Lion Tamarin Association (AMLD)
   Location: municipality of Silva Jardim (Rio de Janeiro state)
3. **Restauração Ecológica no *Campus* Fiocruz da Mata Atlântica (Ecological Restoration on the Atlantic Forest FIOCRUZ Campus)**
   Institution: Oswaldo Cruz Foundation (FIOCRUZ) and Foundation for Scientific and Technological Development in Health (FIOTEC)
   Location: municipality of Rio de Janeiro (Rio de Janeiro state)
4. **Restaurar (Restoring)**
   Institution: Blumenau Regional University Foundation (FURB)
   Location: municipality of Indaial (Santa Catarina state)
5. **Restauração de Matas Ciliares com a Participação de Comunidades Rurais na Mata Atlântica do Sul da Bahia (Restoration of Riparian Forests with the Participation of Rural Communities in the Southern Bahia Atlantic Forest)**
   Institution: Institute for Socio-environmental Studies of Southern Bahia (IESB)
   Location: municipalities of Camacan and Una (Bahia state)
6. **Semear (Sowing)**
   Institution: Terra Institute
   Location: municipalities of Aimorés (Minas Gerais state) and Colatina (Espírito Santo state)
7. **Cores da Serra (Colors of the Mountain Ridge)**
   Institution: Terra Institute for Environmental Preservation (ITPA)
   Location: municipality of Miguel Pereira (Rio de Janeiro state)
8. **Corredores de Vida: Restauração de Paisagens e Geração de Renda na Mata Atlântica do Oeste Paulista (Life Corridors: Restoration of Landscapes and Generation of Income in the Atlantic Forest of Western São Paulo)**
   Institution: Institute for Environmental Research (IPÊ)
   Location: municipalities of Mirante do Paranapanema and Teodoro Sampaio (São Paulo state)
9. **Cílios do Rio (Cilia of the River)**
   Institution: Pró-Terra Institute
   Location: municipalities of Jaú and Ibitinga (São Paulo state)

10. **Cultivando Esperança: Recuperar a Floresta para Colher Benefícios (Cultivating Hope: Restoring the Forest to Reap Benefits)**
    Institution: Mater Natura – Environmental Studies Institute
    Location: municipalities of Guarapuava and Inácio Martins (Paraná state)

11. **Corredor Ecológico Monte Pascoal-Pau Brasil: Mata Atlântica, Biodiversidade e Comunidade (Monte Pascoal-Pau Brasil Ecological Corridor: Atlantic Forest, Biodiversity and Community)**
    Institution: Natureza Bela
    Location: municipality of Porto Seguro (Bahia state)

12. **Floresta Rio d'Ouro (Rio d'Ouro Forest)**
    Institution: Onda Verde Environmental Organization
    Location: municipality of Nova Iguaçu (Rio de Janeiro state)

13. **Iniciativa Verde (Green Initiative)**
    Institution: The Green Initiative (TGI)
    Location: municipalities of Formosa do Oeste and Nova Aurora (Paraná state) and municipalities of Lorena, Guaratinguetá, Canas, Cachoeira Paulista, Silveiras, Barra do Turvo, Joanópolis, Nazaré Paulista, São José dos Campos, Botucatu, Pardinho, Torre de Pedra, Ibitinga, Jaú, Gabriel Monteiro, Pacaembu and Garça (São Paulo state)

14. **Sustenta a Mata: Preservando Florestas, Desenvolvendo Comunidades (Support for the Forest: Preserving Forests, Developing Communities)**
    Institution: The Nature Conservancy of Brazil (TNC)
    Location: municipalities of Cananeia, Cajati and Barra do Turvo (São Paulo state); municipality of Turvo (Paraná state); and municipality of Caçador (Santa Catarina state)

Restoration area and implementation period

		TERM OF THE CONTRACT							
PROJECT	**CONTRACTED AREA (HA)**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
Akarui	**160**								
AMLD	**62**								
FIOCRUZ/FIOTEC	**344**								
FURB	**500**								
IESB	**72**								
Terra Institute	**155**								
IPÊ	**200**								
ITPA	**73**								
Mater Natura	**95**								
Natureza Bela	**220**								
Onda Verde	**130**								
Pró-Terra Institute	**117**								
TGI	**425**								
TNC	**130**								

Total contracted area: 2,683 ha

Land-title categories in restoration areas

Supported projects listed per land-title category

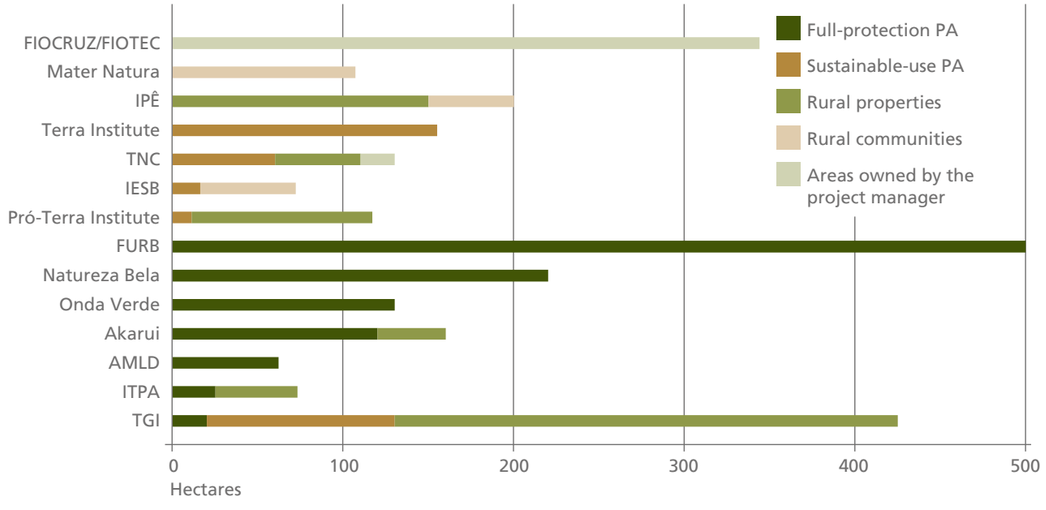
GROUPS	PROJECTS	PLANNED AREA (HA)	NAME OF THE AREAS
Sustainable-use protected areas	Pró-Terra Institute	11	Ibitinga State EPA (São Paulo state)
	TGI	110	Ibitinga State EPA Botucatu State EPA Piracicaba Juqueri-Mirim State EPA
	TNC	60	Mosaic of Jacupiranga/Mojac: Rio Turvo State Park, Quilombos Barra do Turvo SDR and Barreiro Anhemas SDR, Ilha do Tumba ER, Itapanhapima SDR, Pinheirinhos SDR and Lavras SDR (São Paulo state)
	Terra Institute	155	Fazenda Bulcão (Farm) PRNH (711 ha) Itapina Ecological Reserve EPA (105 ha)
	Iesb	16	Nova Angélica PRNH (included in the Una Wildlife Refuge), Serra Bonita PRNH, specifically the Serra Bonita III Reserve (Camacan)
Rural properties	TGI	295	São Francisco Xavier/Cantareira Paraíba Valley and Rio Turvo Valley, Jaú (São Paulo state)
	Akarui	40	Buffer zone of the Serra do Mar State Park. Properties in São Luiz do Paraitinga and Natividade da Serra (São Paulo state)
	ITPA	48	Fazenda Conceição (Farm), Santana River Basin (Rio de Janeiro state)
	Pró-Terra Institute	106	Tiete-Jacaré Basin e Tietê-Batalha Basin in the municipalities of Jaú and Ibitinga (São Paulo state)
	IPÊ	150	Fazenda Rosanela, municipality of Teodoro Sampaio (São Paulo state)
	TNC	50	Municipality of Turvo (Paraná state)
Rural communities	IPÊ	50	Arco Íris Settlement (22 ha) and Santo Antônio Settlement (28 ha) in Pontal do Paranapanema (São Paulo state)
	IESB	56	Nova Ipiranga Settlement (BA)
	Mater Natura	95	Rosa Settlement (57 ha), Rio Pequeno Community (25 ha) and Monte Alvão Community (24 ha). Part located in the Serra da Esperança EPA, south central region of Paraná state.
Full-protection protected areas	AMLD	62	Poço das Antas Biological Reserve (5,052 ha)
	Onda Verde	130	Tinguá Biological Reserve (25,000 ha)
	Natureza Bela	220	Monte Pascoal Historic National Park (22,383 ha)
	TGI	20	Rio Turvo State Park (74,000 ha) – part of Mojac
	Furb	500	Serra do Itajaí National Park – PNSI (57,374 ha)
	Akarui	120	Serra do Mar State Park (115,000 ha)
	ITPA	25	Rocha Negra Municipal Park
Areas owned by the project manager	FIOCRUZ/FIOTEC	344	Atlantic Forest FIOCRUZ Campus (CFMA) based in the Pedra Branca mountain range, where the Pedra Branca State Park is located (12,500 ha)
	TNC	20	EMBRAPA Experimental Station in Caçador (1,154 ha) – EEEC/SC

Restoration activities are conducted predominantly in protected areas (PA), with greater participation in those qualified as full-protection units. Some 12 projects include PAs, totaling 1,429 hectares, more than half of the total area. In six projects, areas in rural properties have been restored, while three projects involve settlements and communities, and only two are located in areas owned by the project manager or areas owned by partners. The following table shows that the call for restoration is spread among different land-title categories. That most areas are in PAs seems to indicate that non-governmental organizations (NGOs) are concerned about restoring protected areas within their scope of operations.

Restored area, per land-title category

LAND-TITLE CATEGORY	HECTARES	PERCENTAGE
Full-protection protected areas	1,077	40
Sustainable-use protected areas	352	13
Rural properties	689	26
Rural communities	201	7
Areas owned by the project manager	364	14
Total	2,683	**100**

Combination of land-title categories per project



Some projects enable a connection between land categories:

- In the FIOCRUZ/FIOTEC project, restoration plays an important role as a buffer for the Pedra Branca State Park.
- In the IPÊ project, restoration in the Fazenda Rosângela rural property connects the two largest PAs in western São Paulo: the Morro do Diabo State Park (37,000 ha) and the Mico-Leão-Preto Ecological Station (ESEC) (6,680 ha).

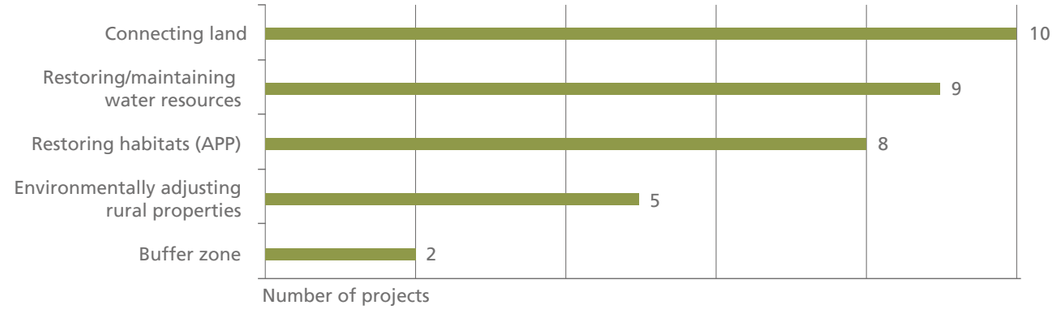
Aims of forest restoration

It was observed that, in the restoration projects located in PAs and their surrounding areas (in this case involving rural producers and/or communities), the emphasis of the aim is on connecting land, restoring and maintaining water resources.

In projects aimed at rural properties and communities, while connecting land is the most emphasized aim, others are highlighted, such as the restoration of habitats (especially in permanent preservation areas) and environmentally adjusting properties.

In the projects carried out in areas owned by the project manager, the most important aims include connecting land, restoring and maintaining water resources.

Aims of projects receiving support



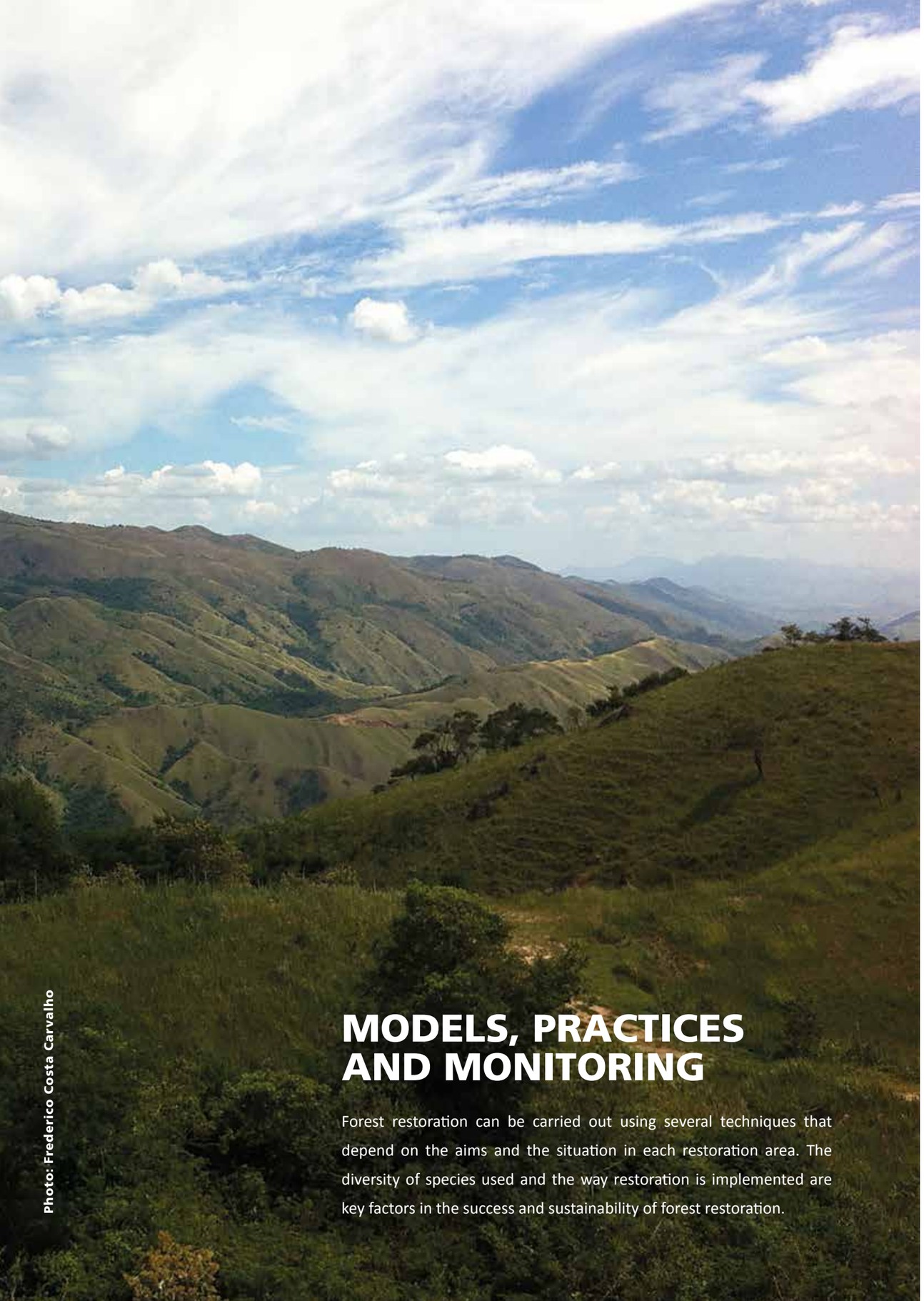


Photo: Frederico Costa Carvalho

MODELS, PRACTICES AND MONITORING

Forest restoration can be carried out using several techniques that depend on the aims and the situation in each restoration area. The diversity of species used and the way restoration is implemented are key factors in the success and sustainability of forest restoration.

Restoration models and techniques

Restoration techniques for the 14 projects analyzed were adopted in accordance with the specific aims of each institution, and it is possible to identify four major diagnostic feature groups:

- **Ecological feature**
  Emphasis on biophysical factors in the restoration area, on the history of use and the extent of degradation or proximity of forest fragments.
- **Economic feature**
  Emphasis on establishing restoration models that generate income or with lower implementation costs.
- **Social feature**
  Emphasis on involving communities of rural producers, focusing on the types of species (economic focus) and how challenging it is to implement and maintain models.
- **Operational feature**
  Emphasis on access conditions and how challenging it is to implement restoration.

Restoration techniques used to systematize information are based on the restoration concept established by the Atlantic Forest Pact (2009 Pact).[1] In total, there are four main techniques:

- **Natural Recovery Management (NRM)**
  Isolating an area for natural regeneration.
- **Crowding Planting (CRO)**
  Occupying empty spaces with seedlings of early successional species.
- **Enrichment Planting (ENR)**
  Introducing species in the final stages of succession in areas with native vegetation, but with low floristic diversity.
- **Total Area Planting (TAP)**
  Areas with no tree species where seedlings of native species are planted in the whole area via modules or planting groups, or transfers from an allochthonous seed bank (which does not exist in the soil at the site to be preserved or restored) or direct sowing.

[1] *Pact to restore the Atlantic Forest: a reference in concepts and efforts for forest restoration.* São Paulo: LERF/ESALQ: Instituto BioAtlântica, 2009.

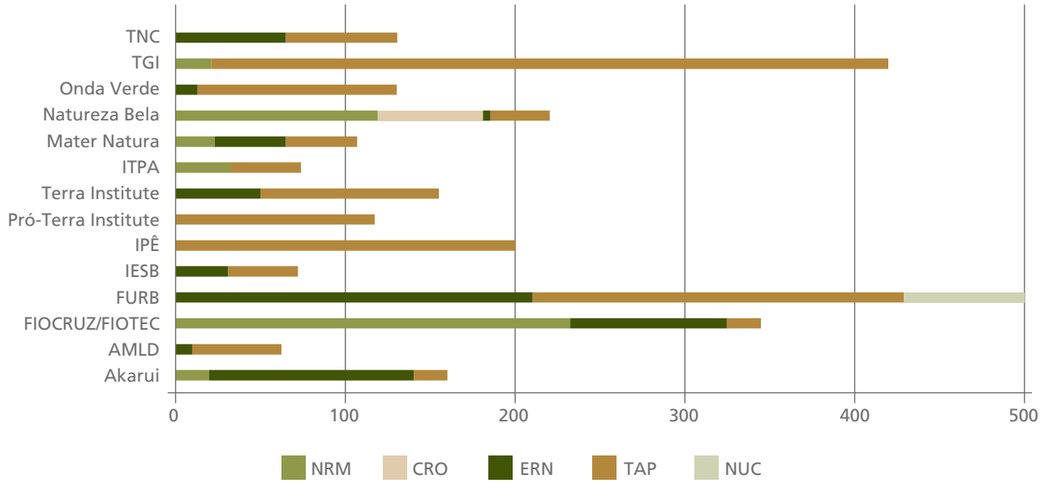
Techniques used, per project

PROJECTS	NUMBER OF PROJECTS	TECHNIQUES
FURB, Natureza Bela	2	NRM CRO ERN TAP
Akarui, Mater Natura	2	NRM ERN TAP
ITPA, TGI	2	CRN TAP
FIOCRUZ/FIOTEC, Instituto Terra, Onda Verde, AMLD, IESB, TNC	6	ERN TAP
IPÊ, Pró-Terra Institute	2	TAP

Number of projects and area (in ha) per restoration technique

TECHNIQUE	NUMBER OF PROJECTS	TOTAL REPORTED (HA)
NRM	6	448
CRO	2	62
ERN	10	637
TAP	14	1,472

Restoration area (in ha) per project according to the restoration technique used



Among the 14 projects, that implemented by FURB was dedicated to implementing other restoration techniques, in a specific group called nucleation, (NUC). Nucleation techniques seek to use the resilience of forest fragments not only through fauna activities at several levels but also through the use of plant propagation material[2] from these fragments. Nuclei or islands are created within the degraded area (hence, nucleation), which allow plant and animal species to inhabit them or use such nuclei, facilitating not only interaction between organisms but also, and as a consequence, restoration.

[2] Structures that detach from adult plants to generate new plants genetically identical to the originals.

Practices adopted

In this section, we present the operational efforts to implement and maintain restoration areas that are most used in the 14 projects analyzed. The restoration techniques described above require practices that are already known, such as isolation, controlling ants and competing vegetation, soil preparation by opening pits, hoeing and liming, planting seedlings, among others. Operational efforts can be made in accordance with the restoration techniques, such as planting the total area or enrichment, as well as the situation of the site to be restored.

Implementation practices in restored areas

The following table presents the implementation practices most frequently used in the several projects. Fencing was used in 80% of the projects, followed by soil correction in pits and other soil fertilization practices (organic for half of the projects, and chemical for 43% of them).

It was observed that mechanization is not widely used when implementing the areas: only five projects use mechanical hole digging, and only three projects utilize soil harrowing.

Only two projects employ wildlife attraction techniques using artificial perches (FURB and Pró-Terra Institute).

Implementation practices

MODALITY	NUMBER OF PROJECTS	% IN RELATION TO ALL PROJECTS
Isolating the area	11	79
Soil: soil correction with lime in the pit	9	64
Soil: organic fertilization (pit)	7	50
Solo: terracing and water containment practices	6	43
Soil: chemical fertilization (pit)	6	43
Mechanization: hole digging	5	36
Removal of exotic species	3	21
Mechanization: harrowing	3	21
Soil: soil correction with lime in the whole area	2	14
Techniques for attracting fauna	2	14
Soil: manual decompacting	1	7

Practices to maintain restored areas

Maintenance in restored areas in the 14 projects takes place three to four times a year during the first two years. The table below lists the maintenance techniques most commonly used in the projects. As expected, replanting and hoeing techniques are present in all projects.

Manual weeding is the most widely used practice for cleaning (93% of projects), semi-mechanized clearing (backpack brush cutter) is used in 71% of the projects, and mechanized clearing is only used in one project.

Ant control is performed in 86% of projects, amounting to 6% of the restoration costs in some projects. Projects like IESB and FIOCRUZ/FIOTEC make use of agro-ecological techniques to control ants.

Maintenance practices

MODALITY	NUMBER OF PROJECTS	% IN RELATION TO ALL PROJECTS
Replanting	14	100
Hoeing	14	100
Clearing/manual weeding	13	93
Ant control	12	86
Topdressing	11	79
Semi-mechanized clearing	10	71
Fire lines	10	71
Chemical clearing	7	50
Mulch	7	50
Control of other insects	2	14
Irrigation	2	14
Mechanized clearing	1	7

Monitoring restoration

Most projects reported they use the monitoring methodology proposed by the Pact to Restore the Atlantic Forest (2013 Pact).[3] Four projects developed their own monitoring systems while only one project followed the methodology proposed by Melo.[4]

Monitoring restoration

METHODOLOGIES USED	NUMBER OF PROJECTS
Pact to Restore the Atlantic Forest	9
Melo (2007)	1
Other	4

[3] 2013 Pact. Monitoring Protocol for forest restoration programs and projects. São Paulo. 62p.

[4] Melo *et al. Guia para monitoramento de reflorestamentos para restauração.* (Technical Circular.) São Paulo, 2007. 10 p. (Riparian Forests Project).

Monitored indicators

Five of the six projects that answered the question on the effectiveness of indicators affirm that these provided a good measure of the project's impacts, and one project (Akarui) says the opposite, citing the need to review these indicators.

As for the most used indicators, as shown in the following table, there is more use of indicators related to dendrometric and silvicultural performance than ecological performance indicators. The "ecological diversity in regeneration" indicator is the most used by the projects (71%) that are currently monitoring, followed by silvicultural indicators such as weed competition (57%) and mortality (50%).

Indicators most used by projects

GROUPS	INDICATORS	PROJECTS THAT FALL INTO GROUPS AND INDICATORS	% IN RELATION TO ALL PROJECTS
Ecological diversity	Density of regenerating individuals	10	**71**
Silvicultural	Weed competition or weed infestation	8	**57**
Silvicultural	Mortality rate	7	**50**
Ecological diversity	Regeneration	7	**50**
Dendrometric	Coverage with shrubs and tree species	6	**43**
Dendrometric	Total height of seedlings	6	**43**
Silvicultural	Survival rate	6	**43**
Dendrometric	Area at the tree crown	5	**36**
Silvicultural	Ant infestation rate	5	**36**
Ecological diversity	Monitoring birdlife	5	**36**
Degradation agents	Identifying the cause of degradation and defining remediation	4	**29**
Dendrometric	Diameter or circumference at breast height (DAP or CAP)	3	**21**
Dendrometric	Basal area	3	**21**
Ecological diversity	Distribution of individuals per dispersion syndrome	3	**21**
Ecological diversity	Total diversity of tree species	2	**14**
Ecological diversity	Distribution of individuals per environmental group	2	**14**
Silvicultural	Rainfall and drought index	1	**7**
Silvicultural	Presence of chlorosis in plants, symptom of malnutrition	1	**7**
Ecological diversity	Monitoring insects, reptiles and bats	1	**7**

As for monitoring results, only two projects presented data from indicators other than the restored area and the mortality rate. In particular, the IPÊ project, which performs detailed monitoring focusing on ecological sustainability in the restored areas.

Findings and lessons learned

This section presents the main factors that affected restoration activities and the lessons learned from the projects receiving support to implement forest restoration models and techniques, according to what was reported by those responsible.

Threats to restored areas

1. Extreme weather
   - Adverse weather events disrupted the schedule or caused damage (drought – Akarui, TGI, Terra Institute, TNC, FIOCRUZ/FIOTEC; excessive rainfall – ITPA, Pró-Terra Institute).
2. Man-made factors in degradation
   - Fires were the main threat to the integrity of restored areas (AMLD, IPÊ, Pró-Terra Institute, Terra Institute, ITPA, Natureza Bela);
   - Cattle invasions took place in restored areas (IESB, Mater Natura, Onda Verde, FURB, Natureza Bela, and TGI).

The main reasons project planning and implementation were out of synch

1. Recruiting difficulties
   - Hiring temporary labor caused a delay in the initial schedule (IESB, Pró-Terra Institute).
2. Access to restoration areas
   - Accessing areas was difficult due to heavy rains (Pró-Terra Institute);
   - The start-up date was too close to the rainy season, affecting implementation (ITPA).
3. Difficulties negotiating with partners
   - There was a setback as agreements within the project in settlements were not complied with, such as the water supply in the nursery, repairing fencing of areas, and abandoning farming practices in permanent preservation areas (APP), which were to be restored (IESB).
4. Extreme weather
   - Severe drought in the 2013-2014 period compromised the expected development of seedlings (Akarui).
   - Low rainfall occurred immediately after planting and illegal fire hit the area (Terra Institute).
5. Insufficient planning
   - There was little time to initial plan the nursery to produce seedlings as per the list defined by the technical team (Akarui).
   - There was little time to better detail restoration techniques per area (Akarui).

6. Rising costs of supplies
   - Fertilizing planted areas was compromised due to the rising price of fertilizers after the project was awarded (AMLD).
7. Bureaucracy
   - The bidding process caused a delay in the commencement of construction works for the school garden, requiring longer timeframes for its completion (FIOCRUZ/FIOTEC).

Lessons learned

1. Diversity of species in restored areas
   - Decisions regarding the diversity of restoration depends on the supply and quality of seedlings, as well as the project's aims, which, in their turn, depend not only on the reason for restoration (environmental or economic), but also on the land category of the restoration area (private, areas owned by the project manager, protected areas, settlement).
   - The supply of seedlings depends on how structured the nurseries are and different responses to existing support policies in the states.
   - There were cases of limited supply of nurseries, and partners depending on the structure of the production sector:
     - » Paraná – the support policy (number of seedlings and less variety) discouraged private nurseries from setting up shop, currently leading to lower quality;
     - » São Paulo – the support policies (such as minimum number of species) associated with inspection led to the creation of several commercial nurseries;
     - » Bahia – a lack of nurseries and a restoration sector.
   - Community nurseries responded to the growing demand for diversity by purchasing guarantees; however, they face greater difficulties in registration and certification.
2. Effectiveness of restoration
   - Plantations with seedlings of good quality and genetics, planted and maintained by skilled and dedicated technical staff, are a guarantee of success (IPÊ).
3. Planning restoration areas
   - Assessment and planning strategies for intervention schemes for restoration require time to assess intervention responses to the different restoration areas.
   - Environmental assessment must be precise and conducted on-site in the areas to be restored, increasing the success of the treatments chosen for each situation (Natureza Bela).
   - It is important to learn more and observe the behavior of the areas to be restored for a longer period (Akarui).

- The history of land-use on planting sites is an important variable for the success of the projects (IPÊ).

4. Improving restoration techniques
   - Having enough time to plan and establish suitable techniques for each area (Akarui).
   - Reasonable time limits to maintain the planted areas (3-4 years after planting).
5. Economic feasibility of restoration in the communities
   - The use of yerba mate in 20% of total seedlings brought about two advantages which would have made the project impossible: landowners were in strong favor, and a wider range of APPs was protected than that required by law (Mater Natura).
   - The TNC models aimed at restoration by using economic returns in the short, medium and long term for participating communities. Integration, community involvement and the economic approach were key to implementing the project.
6. Firefighting
   - Fire is the most devastating threat to restored areas. Firefighting strategies are costly and often not previously included in projects. It is recommended to prepare fire risk maps and perform fire statistic analyzes to focus more on prevention and less on firefighting, as well as on maintaining a voluntary team of fire wardens, rather than permanent staff.

Photo: Márcio Macedo Costa

RESTORATION COSTS

This chapter presents an analysis of restoration costs based on the budgets for projects IBMA has awarded. In the group of projects that have completed or are finalizing implementation, a comparison was carried out between the planned and real budget, based on tables for use and sources provided by the projects.

Cost analysis methodology

The analysis is focused on restoration costs and the factors that most affect the cost per hectare. It is important to note that the analysis is based on the budgets proposed in the projects and includes the several expenditure items (restoration, communication/training the workforce and project management).

When comparatively assessing the costs of restoration projects, there must be a list of the types of items (investment in equipment, costs of supplies and labor, services etc.). Without these details, findings may not correspond to the reality. Still, as the cost is one of the most restrictive factors in restoring forests on a large scale, understanding the breakdown is fundamental for any support program and financing in the sector.

Projects were grouped according to their achievements in terms of restoration goals. The planned budget was compared to the real budget for the period ending in October 2014.

Planned vs. real: area and amounts

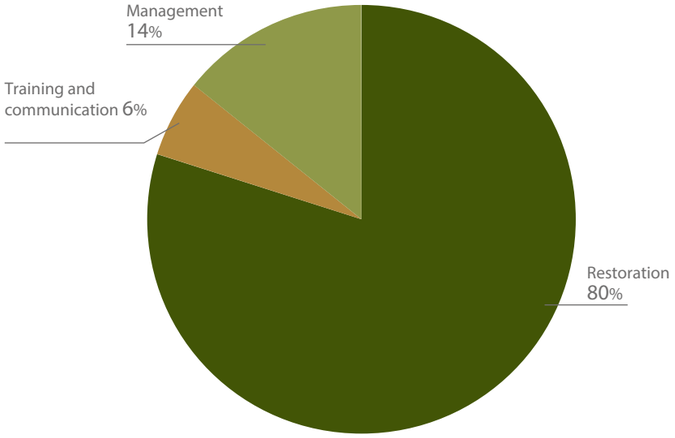
		PROJECT	PLANNED		REAL*	
			R$	HA	R$	HA
GROUP 1	100% of the restoration target accomplished	IPÊ	3,601	200	3,537	205
		Pró-Terra Institute	2,055	117	1,553	117
		Terra Institute	2,470	155	2,071	155
		ITPA	1,270	73	1,018	73
		Natureza Bela	3,061	220	3,061	220
GROUP 2	65%-80% of the restoration target accomplished	TGI	7,870	425	4,940	338
		Akarui	1,495	160	1,062	112
GROUP 3	50%-60% of the restoration target accomplished	TNC	1,705	130	998	86
		AMLD	1,024	62	602	39
		Mater Natura	1,418	95	1,039	60
		IESB	790	72	605	40
GROUP 4	Recently awarded	FIOCRUZ/FIOTEC	2,544	344	1,511	55
		Onda Verde	1,942	130	493	5
		FURB	4,878	500	1,303	0

*Based on data from monitoring reports on the projects. Reference: up to October 2014.

Total cost per item

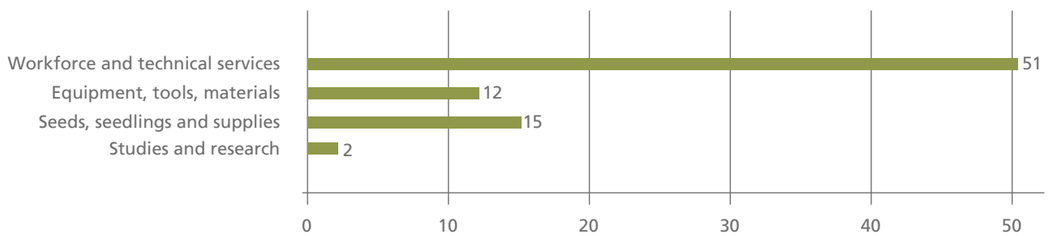
Three items were analyzed: Restoration; Training the workforce and communication; and Project management. On average, based on the contracted budgets, the restoration cost in the 14 projects analyzed represented 80% of the total project budget, while 14% was spent on management and 6% on training and communication.

Budget of the projects – percentage per item



In the breakdown of Restoration costs, the workforce represented 51% of the total budget for the project, followed by seeds, seedlings and supplies (15%), then equipment, tools and materials (12%). Studies and research represented 2% of the total cost.

Budget of the projects – percentage per Restoration item



The following table presents the averages and standard deviations in the percentage of each item in relation to the planned budget while highlighting the projects with the highest and lowest amounts.

Average and standard deviation in the percentage of each item

ITEM	AVERAGE	STANDARD DEVIATION	HIGHEST	LOWEST
Restoration	80	8.7	Onda Verde, FURB	TNC, Akarui, Mater Natura
Training and communication	6	3.7	Akarui, Mater Natura, IPÊ	FIOCRUZ/FIOTEC, AMLD
Management	14	8.8	FIOCRUZ/FIOTEC, TNC	Onda Verde, Terra Institute, FURB

Similarly, average and standard deviations in the percentages of the planned budget are listed as Restoration items. For Studies and Research as well as Equipment, tools and materials, the standard deviation is high compared to the average, which shows the differences when choosing to include, or not, such items.

Average and standard deviation in the percentages of the Restoration items

RESTORATION	AVERAGE	STANDARD DEVIATION	HIGHEST	LOWEST
Studies and research	2	3.4	Natureza Bela, Akarui, Mater Natura	Pró-Terra Institute, ITPA, FIOCRUZ/FIOTEC
Seeds, seedlings and supplies	15	6.9	Onda Verde, TGI, ITPA	FURB, Terra Institute, IPÊ
Equipment, tools, materials	12	9.1	FURB, Onda Verde	TNC, IPÊ
Workforce and technical services	51	14.5	IPÊ, Terra Institute	Mater Natura, Akarui, FIOCRUZ/FIOTEC

Restoration cost per hectare

Understanding what makes restoration costs vary is of vital importance. Several factors may affect the restoration costs per hectare, such as restoration techniques, costs of supplies and manpower in the region, the institutional arrangement of partnerships for restoration, contracting models to directly implement areas or bring in third parties, the scale of restoration, just to name a few.

In this analysis, only the costs of restoration items were considered. That is, it does not include the amounts for Training and communication and Management items, which, when added to Restoration, result in the total budget of the project.

The average restoration cost per hectare for the 14 projects analyzed is R$ 12,085/ha and the standard deviation is R$ 3,146, including the minimum and maximum cost reported, respectively R$ 4,282/ha (FIOCRUZ/FIOTEC) and R$ 17,253/ha (IPÊ). Analyzing the restoration cost per hectare seeks to understand some of the reasons for the vast differences in the restoration costs between different projects. Importantly, monetary correction was not performed in relation to projects presented in 2009. Each beneficiary incorporated increased costs their own way according to projected inflation. In addition, costs refer to the amounts in the planned budget because all projects were still ongoing at the end of 2014.

Another important detail refers to the fact that most projects run by NGOs included amounts invested in equipment, such as vehicles, machinery or tractors, which generally are not considered in restoration projects run by companies, for example. These factors may raise the uncertainty of the analysis performed. Therefore, conclusions presented herein should be considered with due caution.

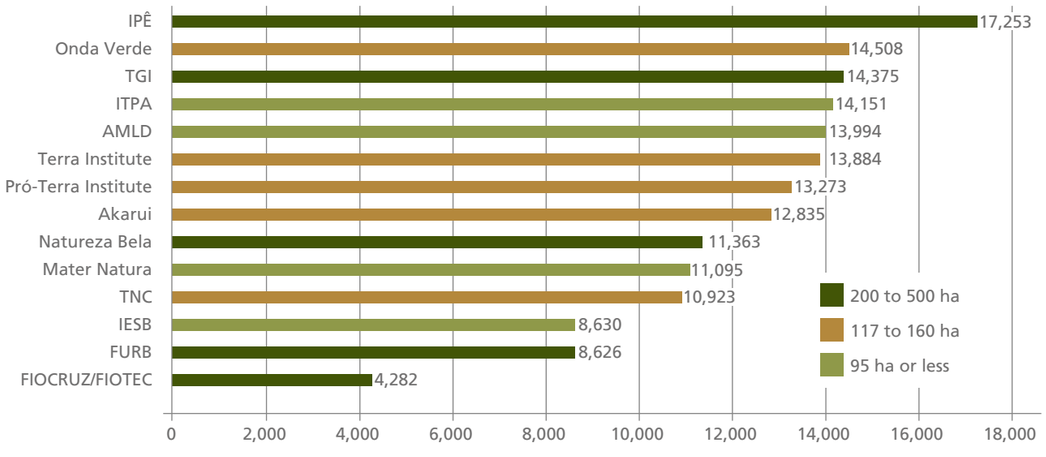
Three variables potentially affecting costs were taken into consideration:

- scale of the restoration target;
- percentage of the total area planting (TAP) technique in the restoration target; and
- direct and indirect implementation, when restoration is performed by staff hired directly by the project or outsourced to companies, cooperatives or others.

In the chart below, projects were divided into three color groups according to the area to be restored. Five projects with the largest area covered 200-500 hectares, the intermediate projects, 117-160 hectares, and those with least area, 95 hectares.

It was observed that only the group with intermediate goals seems to have a correlation with intermediate project costs, which may indicate that the scale of restoration, at least in this project range (up to 500 hectares), is not the determining factor in reducing costs per hectare.

Total cost (R$) per hectare of restored area, per project



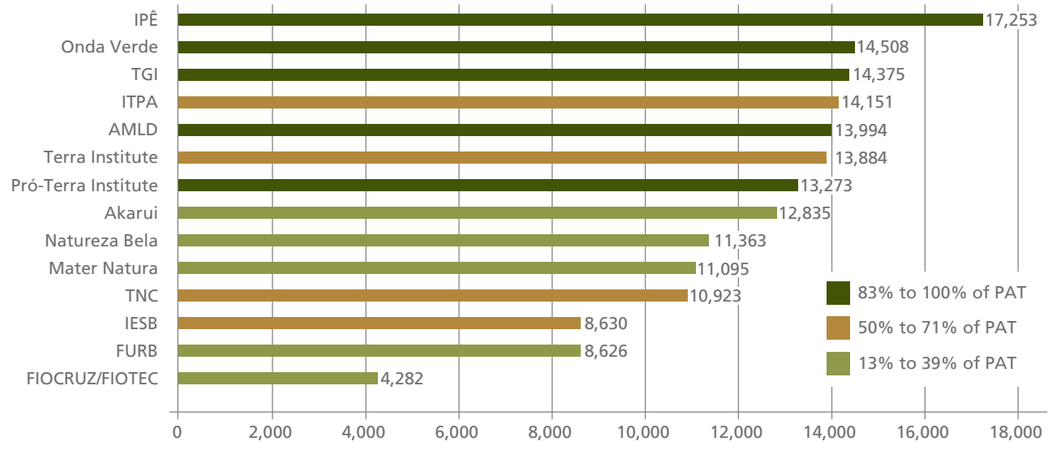
The projects with the highest proportion of TAP technique – requiring a greater number of seedlings per hectare – posted higher restoration costs, whereas projects with a lower percentage of this technique have lower costs per hectare.

In the table and chart below, the projects were divided into three color groups, according to the TAP technique percentage compared to the total area of the project. The categories range from 13% to 39%, 50% to 71%, and 83% to 100%. The table shows the average and the standard deviation of costs per hectare in Brazilian reais, in each category. The chart shows the costs of each project in Brazilian reais.

Total area planting (TAP) – average cost per hectare (R$)

TAP PROPORTION	%	AVERAGE	STANDARD DEVIATION
IPÊ	100	14,856	1,211
Pró-Terra Institute	100		
TGI	99		
Onda Verde	90		
AMLD	83		
IESB	71	12,839	930
Terra Institute	68		
ITPA	56		
TNC	50		
Mater Natura	39	8,711	2,458
FURB	39		
FIOCRUZ/FIOTEC	18		
Natureza Bela	16		
Akarui	13		

Total area planting (TAP) – Cost per hectare (R$)



Findings and lessons learned

This section presents the main factors related to restoration costs, according to information provided by those responsible for the 14 projects analyzed.

Cost increase factors not foreseen in the projects

- Higher cost to collect seeds (IESB);
- Higher cost to acquire and/or produce seedlings than planned (Akarui, FIOCRUZ/FIOTEC) and due to the failure to update input prices in the proposal and in the contract, especially fuel and fertilizers (ITPA, Natureza Bela, TGI, TNC);
- Increase in labor costs due to the difference between negotiation and contracting amounts (Akarui, AMLD, TGI);
- Tax and social security expenses for farmers and the requirement to legally comply with health-and-safety issues increased the costs of the restoration projects (IPÊ, TGI, IESB and Pró-Terra Institute);
- The need to isolate areas also raised restoration costs (IPÊ and Mater Natura);
- Much more maintenance required than expected (Akarui);
- Cost to maintain vehicles was higher than expected due to the poor access (Pró-Terra Institute);
- Higher cost of replanting due to extreme events such as excessive rainfall (TNC), prolonged drought and criminal fire (Terra Institute);
- Unexpected investment in fire brigades (ITPA).

Lessons learned regarding the cost of restoration projects – review and financial planning

- Need to revise the budget for different activities: more resources for the workforce (Akarui), budget much lower than expenses (IESB), more clarity in post-diagnostic intervention strategies (Mater Natura);
- To reduce tax and social security costs for farmers, the activities carried out by the farmers should be characterized as provision of environmental services, in an effort to be eligible for exemptions provided for in Article 41 of Act Nº. 12,651/2012 (TGI).

Measures that would help reduce cost

1. Optimizing and reducing labor costs, through the following efforts:
   - Planning labor costs after defining the areas to be implemented (Akarui);
   - Reducing tax and social security costs for farmers who are beneficiaries of the project through:
     - » implementing economic instruments provided for in Article 41 of Act Nº. 12,651/2012, which addresses tax exemption for raw materials (wire, for example), in which the remuneration for the producer without paying the Service Tax (ISS) and other charges would be seen as providing environmental services, thus reducing taxes, shrinking restoration costs, and enabling greater involvement of farmers and communities.
2. Improved restoration planning, through the following efforts:
   - Purchasing inputs in larger quantities from manufacturers when possible (TGI);
   - Seeking alternative areas with lower costs (TGI);
   - Planning restoration efforts on a weekly and monthly basis, taking into account regular monitoring, defining cultural issues and logistics (Pró-Terra Institute);
   - Reducing seedling production costs by replacing materials (FIOCRUZ/FIOTEC) and establishing partnerships with existing nurseries rather than implementing new ones (Mater Natura);
   - Cutting planned strategic activities, such as communication and training and environmental education (Mater Natura and Natureza Bela).
3. Use of less costly restoration techniques:
   - Prioritizing lower-cost restoration techniques (crowding planting and natural management) where possible (AMLD);
   - Redefining and adjusting restoration techniques to reduce the need for maintenance (Akarui).
4. Negotiating with suppliers and developing strategic partnerships:
   - Research prices and conditions among suppliers (TGI);
   - Negotiating with suppliers and service providers to reduce costs below market values (Natureza Bela);
   - Establishing partnerships in the field to reduce cost:
     - » strategic partnerships to raise funds through the counterpart (TNC, IPÊ);
     - » partnerships with community nurseries to produce seedlings and purchase-planning (TNC); and
     - » greater involvement of owners and farmers in restoration activities (Akarui).

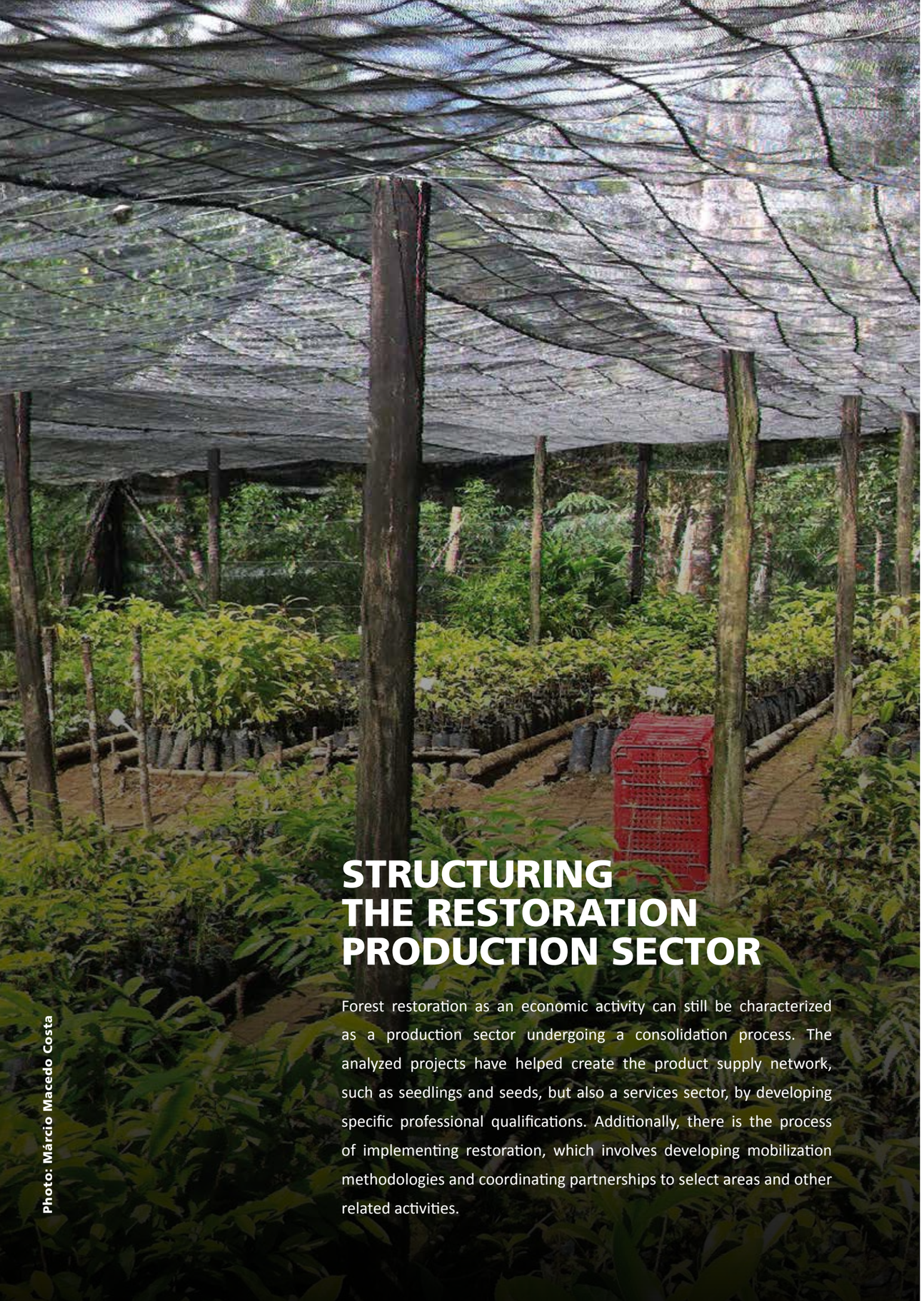


Photo: Márcio Macedo Costa

STRUCTURING THE RESTORATION PRODUCTION SECTOR

Forest restoration as an economic activity can still be characterized as a production sector undergoing a consolidation process. The analyzed projects have helped create the product supply network, such as seedlings and seeds, but also a services sector, by developing specific professional qualifications. Additionally, there is the process of implementing restoration, which involves developing mobilization methodologies and coordinating partnerships to select areas and other related activities.

The forest restoration sector

The figure and table below show the stages in the forest restoration sector as well as the strategies and efforts that are key to structuring, which were inspired by efforts developed in projects the IBMA has supported. These stages and structuring efforts have helped systematize information for this chapter.

Stages in the forest restoration sector

STRUCTURING THE SECTOR	
STRATEGIES	EFFORTS
Raising awareness and recruiting	Selecting areas Mobilization strategies Incentives to sign on
Institutional and political coordination	Incentives and regional support for forest restoration efforts Mobilizing public and private managers Alliances and partnerships Integrating policies and economic opportunities
Generating models and knowledge	Models and practices for different areas and publics Research and innovation Process management
Making products and services available	Seedlings Seeds Training service renderers (collectors, farmers, firefighters etc.)
Social and production inclusion	Strengthening family activities and generating income Formal and qualified workstations

Selecting areas

This activity is related to identifying areas and mobilizing agents to implement restoration. The land-title category has implications for selection, as in each category there is a specific social group, as well as public managers involved. Therefore, reflections on selecting areas were organized into three types according to categories (areas owned by the project manager or by partners; full-protection PAs; and sustainable-use PAs, rural communities and properties), in addition to other selection types and lessons learned.

Areas owned by the project manager or by partners

Reference projects: FIOCRUZ/FIOTEC and TNC (with EMBRAPA). Reference projects (RPPN belonging to BNDES)[5]: Terra Institute and IESB.

As they belong to project managers, selecting areas is solely about identifying areas that are a priority for restoration, with no need for mobilization efforts, which can accelerate the process.

Difficulties related to recruiting areas

- Even in areas owned by the project manager, there might be difficulties in land-title regularization in some areas where restoration is planned.

Comparative advantage: experimenting with models

- In areas owned by the project manager, where there is more flexibility to experiment with models and develop restoration techniques.

Full-protection PAs

Reference projects: AMLD, Onda Verde, Natureza Bela, TGI, FURB, Akarui and ITPA.

Even though there is no need to mobilize producers in these PAs, coordinating partnerships with the managing entity, unit's board and other organizations that operate in the area is important to make efforts more effective.

Factors that contribute to restoration in full-protection PAs

- Regularized land-title status;
- The unit management plan, defining the degraded areas to be restored;
- Consolidated partnerships with the unit's management entity:
  - » decision-making involving local partners and the unit's management entity (ICMBIO, secretariats and state or municipal institutes);
  - » involving employees of protected areas in the operational implementation of areas.
- Involving the surrounding communities in planning and implementing activities:
  - » possibility of raising awareness and project appropriation;
  - » opportunity to increase restoration on private properties and in surrounding communities;
  - » opportunity to generate local revenue (seeds, seedlings and services), reducing the amount of the unit's natural resources that the surrounding populations are consuming.

[5] RPPNs fall under the restoration areas in sustainable-use PAs. However, in terms of lessons learned these areas were considered areas owned by the project manager.

Important aspects for restoration in full-protection PAs

- It is important to work in areas with updated land-title regularization and duly indemnified landowners, when applicable.
- No need to install isolation fences in PAs (in the absence of cattle-raising activities), which reduces one costly item.
- The more difficult the access to UCs, the less pressure, but this can increase implementation and maintenance costs.
- Potential for fewer threats to the integrity of areas, depending on the inspection that the management entity carries out.

Difficulties in negotiating with other agents

- The limitations of PAs management can result in a slow process to obtain licenses and difficulties for inspection and monitoring.
- Lawsuits filed by environmental entities that do not agree with the proposed restoration methodologies.
- Difficult access to restoration areas in PAs.

Sustainable-use PAs, rural communities and properties

Reference projects: Pró-Terra, TGI, TNC, Akarui, ITPA, IESB and Mater Natura.

Projects developed in rural properties and communities, or at sustainable-use PAs, necessarily have more significant mobilization efforts from traditional populations, farmers and rural landowners. In these cases, the selection of areas and people is required.

Difficulties in recruiting that involves producers

- Uncertainties generated by alterations to the Forest Code have caused demobilization and have weakened the argument to convince landowners and farmers to sign on.
- Raising awareness and convincing producers and landowners is often slow.
- Demobilizing producers due to the time required to negotiate the project.
- Technical assistance and rural expansion models at public entities make it difficult for farmers and landowners to take part in restoration.

Recruiting models

Continuous recruiting: voluntary enrollment (ITPA, TGI, Pró-Terra Institute, IPÊ)

- Voluntary enrollment of areas (area databank) must be a continuous process, making it possible to mobilize producers who are "already convinced" of the need to restore areas.

- It would be ideal if the selection of areas were conducted beforehand, together with efforts to raise awareness concerning environmental problems in the region. Nevertheless, the delay in starting activities can be demobilizing for producers who have already enrolled.

Area selection that is coordinated with partners: network efforts (TGI, TNC, Mater Natura)

- Network efforts increase the reach of areas selection; therefore, the "institutional potential" of partnerships can be the basis for selecting regions that are a priority for restoration projects.
- Involving local organizations, with more representativeness when it comes to landowners and communities, is important for selection of efforts.

EXAMPLES OF AREA SELECTION ACTIVITIES

Continuous selection – "property databank" (for example, ITPA, TGI, Pró-Terra Institute, IPÊ)

- Lectures to raise awareness in rural unions and trade associations on the importance of biodiversity and water, among other subjects;
- Voluntary enrollment of properties and landowners;
- Registration required when there is an opportunity for financing.

Selection coordinated with partners – networks (for example, TGI, TNC, Mater Natura)

- Forest and land entities suggest areas/regions and/or producers;
- Identifying priority and strategic areas for restoration through landscape ecology studies, analysis using remote sensing, master planning and zoning;
- Coordinating with representative organizations (unions, trade associations) that mobilize producers;
- Using prioritizing criteria by integrating other public policies for restoration;
- Continuous mobilization in the priority area until the project's goal is reached;
- Requiring partner registration.

Selection based on the project profile (for example, Akarui)

- Mobilizing producers specific to the project profile (riparian areas restoration, documented areas);
- Lectures and registration based on criteria defined by the financier;
- Field diagnosis to identify and characterize the area and property restoration techniques.

Lessons learned

Approaching and convincing producers

- The producers' opinion that the native forest harms property needs to be transformed. We need to highlight the importance of environmental conservation for productivity, break down the barrier between production and restoration, as well as expand the integrated view of property.
- In situations in which environmental problems are evident, for example, water shortage, registration should be made more easy.
- Usually, restoration is isolated from other activities on the property. We need to disclose the approach of agriculturally adjusting the property through rural expansion: producing more using the same area.
- Restoration models must be economically viable and include the possibility to generate income in restored areas.
- We need to invest in research to reduce restoration costs and increase producer registration.
- It is important to disclose the role of general education among producers.
- Social work, focusing on convincing and mobilizing producers, is not easy to quantify and assess, and financiers have been reluctant to support these efforts.
- Project deadlines related to area selection and registration must consider whether there is already consolidated mobilization.
- Constant presence in the region and credibility achieved through positive experiences encourage rural producers to sign on.

Conditions that favor subscription of landowners

- Environmental regularization of properties, preparing Rural Environmental Registration (CAR) and restoring permanent preservation areas (APP) with no or low cost to the producer.
- Direct economic benefits from the restored area (yerba mate in the Mater Natura project and cassava in the IPÊ project) to encourage small producers to sign on.
- Adding value to rural real estate by building fences to isolate the APPs.

Sustainable-use PAs

- Importance of involving unit managers in decisions related to recruiting and prioritizing areas, as well as involving unit councils in decision making related to restoration.

Area documentation

- Documenting property can require quite a lot of time.
- Document requirements must be clarified beforehand to accelerate recruiting and ensure the property is eligible, with no loss of resources and investments.
- Preparing and implementing an agreement with the landowner must be included.
- With the revision of the Forest Code, it is suggested that the CAR registration number be the only requirement to register rural properties that the project will benefit.

Ecological importance in area selection

- Recruiting areas with no strategic view of the land can make restoring continuous areas difficult so as to create ecological corridors.

- Recruiting areas that were previously mapped according to ecological importance might require considerable effort to convince producers and landowners.

Seeds and seedlings

One of the greatest bottlenecks in increasing the scale of forest restoration in Brazil is the structure of the production sector, especially at the stages of seed collection, storage and seedling production. Increasing demand for restoration activities, especially due to obligations resulting from the Forest Code, tends to consolidate the restoration sector as an economic sector.

Seed supply and collection

Seed collection is important to ensure the proper diversity of species in the restoration models. Low-cost models, as is the case in direct planting, require a larger volume of seeds; therefore, investing in the seed supply is key to reducing costs.

Out of the 14 projects analyzed, eight invested in seed supply:

- five projects with production organization strategies in community and/or family nurseries; and
- three projects focusing on technical analysis of seed quality.

The remaining six projects did not collect seeds and acquired ready seedlings.

Seed collection

NO SEEDS COLLECTED	ORGANIZED COMMUNITY OR FAMILY COLLECTION	SEED ANALYSIS LABS
6 PROJECTS	5 PROJECTS	3 PROJECTS
TNC	Akarui	FIOCRUZ/FIOTEC
Pró-Terra Institute	Natureza Bela	Terra Institute
Mater Natura	IPÊ	FURB
TGI	AMLD	
ITPA	IESB	
Onda Verde		

Conditions for seed collection in projects

- Legal requirements:
  - » Registration on the National Seeds and Seedlings Registry (RENASEM);
  - » State legislation: states have different requirements related to seed collection in PAs, which are often the most important source of seeds in regions with significant forest degradation and fragmenting. There is a need to further studies on state legislation and suggests changes that make access to seed sources easier, ensuring sustainable collection.
- Seed collection and storage are important activities; they require not only professionals with specific knowledge but also training for professional collectors with proper equipment (depending on the species).
- Seed production planning and organization require considerable efforts in mobilization and training, but can be an important form of income generation for communities.
- The high rate of degradation in the region can make seed availability more difficult (degraded and isolated fragments).

Supplying and producing seedlings

Efforts were made in projects to ensure a suitable supply of seedlings. This implies identifying suppliers and organizing production. Nevertheless, there might be problems related to the quality of seedlings and delivery deadlines. As in seed collection, support for projects has been key to structuring processes related to producing seeds in the region, more than to nursery infrastructure per se.

While analyzing supported projects, the following points related to seedling production were examined:

- technical support for family and community nurseries to register;
- training the workforce;
- infrastructure;
- coordinating the seed supply to ensure seedling diversity;
- support to plan production according to demand;
- guarantee of purchases, which generates confidence to invest.

Most projects have adopted diversified strategies to supply seedlings. A little over half of the projects (eight) invested in family or community production, with a significant impact on income generation at a local level. In this respect, we highlight that purchases guaranteed in a contract with families and associations is a key factor in consolidating this supply sector.

Donation is one main source of seedlings and is used in the state of Paraná (Mater Natura), where public entities have a firm performance in this area. Seedling donation in a supplementary fashion was used in a few other projects (IPÊ, TGI, IESB, TNC).

Seedling production or purchase strategies that projects adopted

SUPPLY INCLUDES FAMILY AND/OR COMMUNITY PRODUCTION		OTHERS		
8 PROJECTS		6 PROJECTS		
7	1	2	3	1
Community or domestic nurseries and complementary source (their own or commercial nurseries)	Community or domestic nurseries (only)	Commercial nurseries (only)	Their own production (only)	Seedling donation (main source)
IPÊ, Akarui, Natureza Bela, IESB, TNC, TGI, Onda Verde	AMLD	Pró-Terra Institute, ITPA	Terra Institute, FURB, FIOCRUZ/ FIOTEC	Mater Natura

Production capacity at nurseries

Projects have included several investments to structure the supply stage for seeds and seedlings. This is done by supporting training, registering and planning production in approximately 36 nurseries, with a total production capacity of approximately two million seedlings. Half of them are in the nursery belonging to Terra Institute. Family and community nurseries, even though they have a smaller capacity, have made to possible to generate expressive increases in income at a local level.

Production capacity at nurseries structured or supported using IBMA resources

PROJECT	TYPE OF NURSERY	PRODUCTION CAPACITY (SEEDLINGS/YEAR)
Terra Institute	Owned by the project manager	1 million
FURB	Owned by the project manager	250,000
FIOCRUZ/FIOTEC	Owned by the project manager	10,000
Natureza Bela	Owned by the project manager	200,000
	Community (Cooplanjé)	60,000
IPÊ	8 community nurs. (CEAT, CERB and others in several settlements)	400,000
AMLD	7 family owned nurs.	125,000
TNC	Mojac: 10 family owned nurs. (EEEC): community / domestic	50,000-100,000
Akarui	4 family owned nurs.	50,000
IESB	1 community nurs. (Nova Ipiranga) and 1 owned by the project manager (Nova Angélica)	50,000
	Approximate total	**2.2 million**

Rendering services and generating employment

As mentioned before, IBMA projects have made it possible to structure services related to restoration. This section will emphasize the area restoration stage; nevertheless, data related to generating employment while managing the project and training the workforce will also be shown.

Employment in restoration activities

Issues related to planting and maintenance techniques are discussed in the chapter entitled Models, Practices and Monitoring. This chapter focuses on the types of contracted services, including third parties. They are:

- preparation and planting;
- isolation (fences);
- maintaining areas; and
- firefighting and prevention.

IBMA projects adopted two strategies to render restoration services:

- **Direct implementation (nine projects):** project performers conduct planting and maintenance activities with their own team or temporary labor contracts that they manage. In this case, performers render services.
- **Indirect or networked implementation (five projects):** this happens through contracting companies, community organizations or through partnerships with development entities. Performers guide and monitor work. Performers coordinate a service rendering network.

Implementation strategy

DIRECT	INDIRECT / NETWORKED	
Direct implementation (their own team or temporary contracts)	**Company contract**	**Community organizations and others (company, partnership)**
9	1	4
FIOCRUZ/FIOTEC Terra Institute Onda Verde ITPA Pró-Terra Institute Mater Natura IESB FURB AMLD	Akarui	Natureza Bela IPÊ TNC TGI

Inherent in sectors undergoing structuring, teams are never "ready." There are high turnover and almost no mastering techniques. Qualification is key to ensuring the quality of services. Projects have prioritized hiring staff in the region and/or surrounding communities. Nevertheless, restoration activities have come up against some competition in hiring staff in regions where constructions and enterprises offer comparative advantages.

In the case of family farmers and small producers, producer remuneration mechanisms, for example, contracting for restoration activities or payment for environmental services, are a path to area restoration. Still, it has been identified as intense work that requires exclusive dedication during a period of time that is not always compatible with other activities.

Restoration and socio-production inclusion

This is a process that requires continuous efforts in the region. It must be developed as a strategic effort, requiring technical qualification, organizational strength and leadership training. In addition, there is a "business" component, with market research, planning and production organization. However, projects with training in key issues and guaranteed purchases (in the case of seeds and seedlings) are already making it possible to develop new local enterprises, of both a community and family (individuals) nature.

Considering planting, maintenance, fencing, seed collection and seedling production (the latter two in some projects only), a total of 477 people with basic education were hired, including rural workers and members of the communities that projects are assisting. There is an average of 34 people per project, and the project with less staff hired is IESB (five people) while the largest team hired is at TNC (100 people).

The following table presents the number of rural workers involved in restoration per project and presents the contracted area per project. It is not possible to correlate the number of workers hired with the size of the area to be restored, due to different levels of dedication (partial or permanent). It can be noted that the projects that adopted indirect hiring have generated more service positions.

Number of workers and total restoration area

IMPLEMENTATION	PROJECT	CONTRACTED AREA (HA)	NUMBER OF RESTORATION STAFF *
INDIRECT	TNC	130	100
	TGI	425	87
	Natureza Bela	220	84
	Akarui	160	49
	IPÊ	200	33
DIRECT	Pró-Terra Institute	117	30
	Terra Institue	155	21
	FURB	500	15
	ITPA	73	13
	AMLD	62	12
	Onda Verde	130	10
	FIOCRUZ/FIOTEC	344	10
	Mater Natura	95	8
	IESB	72	5
Total		**2,683**	**477**

* Includes only people directly involved in field work.

The 14 projects analyzed reported 17 positions focused on managing restoration projects with specific responsibilities (table below).

Management of projects receiving support

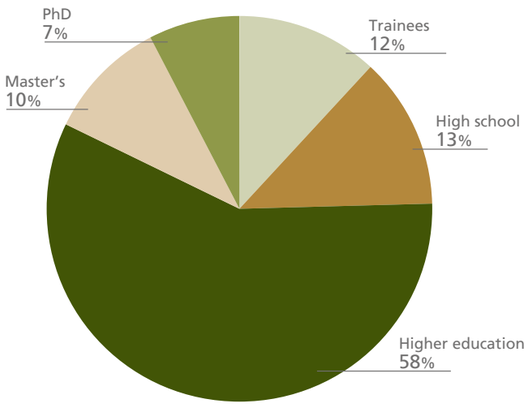
MANAGEMENT POSITIONS	RESPONSIBILITIES
Institutional coordinator	Legal responsibility for the institution and contracts
Institutional arrangement coordinator	Developing partnerships and monitoring public policies
General coordinator	Planning, financing and technical supervision, technical responsibilities for the project.
Restoration coordinator	Coordinating and implementing restoration activities (seeds, seedlings, planting and maintenance), possibly taking on the responsibility of purchasing supplies and materials as well as supervising training.
Restoration assistant	Support for restoration activities (seeds, planting and maintenance), organizing events and training, educational activities, environmental education and monitoring activities, as well as mobilizing and involving producers/communities.
Seedlings production coordinator	Managing nursery and seedling production
Restoration technician	Diagnosis: phytosociological survey and licensing; Seeds: matrice marking, seed processing and testing, and other technical level issues.
Geoprocessing coordinator	Coordinating process: measurement, registration and mapping of restored areas.
Geoprocessing assistant	Support for processes: measurement, registration and mapping of restored areas.
Coordinator of environmental education (EA) and training	Responsible for planning, content and implementing training courses, as well as selecting participants, coordinating environmental education efforts.
EA and training assistant	Support for environmental education and training efforts
Monitoring coordinator	Planning, implementing and supervising restoration monitoring.
Monitoring assistant	Implementing monitoring
Financing and/ or administrative coordinator	Financing (financing reports, bank routines, payroll, accounting) and/or administrative management.
Financing and administrative assistant	Support for financial and administrative management
Controller	Supervising financial management
Communication advisor	Communication advice on disclosing the project

The 17 jobs in the projects can be categorized into groups: institutional (two jobs), restoration (seven jobs), environmental education and training (two jobs), monitoring (two jobs), financial/administrative (three jobs) and communication (one job). The total number of people hired to manage the 14 projects is 119, of which 53% work on restoration, some 18% in environmental education and training, and 13% in administrative and financial positions.

The job with the highest number of staff hired is the restoration assistant (20 people hired, in nine projects), followed by restoration technician (15 people, in five projects) and general coordinator (14 people, on 14 projects), together with environmental education and training assistant (14 people, in two projects). The most common jobs (number) in different projects are general coordinator (14 projects) and restoration assistant (nine projects).

Regarding the educational level of the 119 staff members, some 58% have a higher education and 13% finished high school, as shown on the following graph. Half of those with higher education hold the positions as general coordinators, restoration technicians and restoration assistants.

Percentages for education levels of staff managing restoration projects



Partnerships for restoration

The projects were developed by beneficiaries together with partner institutions such as NGOs, producer associations, government agencies, research and education institutions, and companies aimed at planting, maintenance, monitoring, mobilization, financial support and training. Communities and small producers were intensely involved in the projects known as Akarui, Mater Natura and Natureza Bela.

According to managers, implementing the projects produced several results related to the institutional projection of organizations:

- Developing and strengthening institutions (Akarui, Mater Natura, Natureza Bela);
- Consolidating institutional efforts in the region (Akarui, Mater Natura, Natureza Bela);
- Increasing the credibility of the organization with several actors (Akarui, AMLD, IESB, Natureza Bela) and creating new partnerships (ITPA, TGI);
- Institutional projection by strengthening the institutional reputation with other sponsors (Akarui, AMLD) and concerning issues associated with public policies (IPÊ);
- Potential to replicate the project within the organization (FIOCRUZ/FIOTEC).

The challenges of working in partnerships were the following:

- Accommodating interests and ways of working (Akarui, Mater Natura, FURB, TGI);
- Fostering the involvement of the local public authorities in forest restoration (Akarui);
- Delays in coordinating and reaching compromise with entities responsible for the areas (IESB, Onda Verde);
- Changing people in the partnerships established requiring new coordination efforts for agreements to move forward (Akarui);
- Maintaining partnerships (TNC);
- Convincing financiers to continue supporting participatory planning and shared environmental management (Natureza Bela);
- Improving the fragmented and hierarchical management models for assets and public interests (Natureza Bela);
- Partners and services providers are unaware of the techniques proposed related to Agroecology – "conceptual" alignment (Akarui);
- Difficulties in defining communication strategies to prospect new resources so as to continue with forest restoration (Natureza Bela).

The advantages identified are the following:

- Complementing profiles and capacity (TGI) overcoming technical problems and challenges and making it easier to include the project in communities (Mater Natura);
- Sharing responsibilities (Akarui);
- Political and social experiment in working with networks: reducing costs, enhancing results, reducing the risk of shutdown, sharing knowledge (Natureza Bela, IESB, FIOCRUZ/FIOTEC, FURB, TNC);
- Strengthening the agenda for forest restoration and public policies related to conservation at the regional level (IPÊ, Terra Institute);
- The BNDES' support strengthened the organization's inclusion in the regional political context.

Photo: Fernanda Cristina de Barros

CONCLUSIONS AND RECOMMENDATIONS

This chapter consolidates the results of the research and the workshop on systematizing the experiences of the 14 projects receiving IBMS support. The recommendations listed stem from discussions between representatives of the institutions responsible for the projects, carried out at BNDES' headquarters in November 2014.

Challenges for restoration

Today, biomes restoration is a challenge for Brazil. With Act Nº. 12,651/2012, the restoration sector and its production segment will tend to grow in size and quality. The National Plan for Native Vegetation Recovery (PLANAVEG), prepared by the Ministry of the Environment, presents measures to increase and strengthen public policies, financial instruments, the private markets and sustainable agricultural practices.

The BNDES already provides reimbursable and non-reimbursable credit facilities that make it possible to offer support to landowners of all sizes. Systematizing learning in this publication is a critical look and assessment that can assist those working with ecological restoration, environmental agencies and financial institutions in improving their activities in this sector.

Understanding the role of forest restoration

Managers of projects receiving IBMA support highlighted how vital it is for the public to understand the importance of forest restoration to the Brazil's development and to the population's standard of living. This is crucial to leveraging restoration as a public policy for the required scale of investments. With this, they made the following recommendations:

- The feasibility of forest restoration on properties depends on integrating said property with economic activities, working as a strategy to conserve soil and water.
- In the case of rural properties, it is necessary to expand the position of purely ecological restoration to include economic returns, with the possibility of investments in property by engaging reimbursable and non-reimbursable funds.
- Restoration has to be a good deal, and so it should include elements that increase financial viability. Following, we recall some ideas that did not represent a consensus among project managers, but illustrate possible solutions:
  - » establish a consortium with exotic species (e.g., include one or two eucalyptus cuts);
  - » pay for environmental services to create a cash flow that makes it possible to reduce costs such as those for maintaining restored areas;
  - » make it feasible to award loans to carry out forest restoration by expanding the grace period in the Low-Carbon Agricultural Program (BNDES environmental ABC) with longer terms, for example, seven years, in order to coincide with the cash flow from selling wood from species interspersed with native wood on legal reserves; and
  - » involve rural producers as service providers, implementing and maintaining areas, and as environmental service providers, encouraging producers to sign on.

Public policies for fostering restoration

Forest restoration means structuring public policies that support this activity from an economic and legal point of view. Public policies prioritized in the discussion among managers of the projects receiving IBMA support include:

- policy for environmental regularization (associated with command and control);
- policies fostering the constitution of nurseries with diverse native species;
- facilitating regularization for community nurseries and mechanisms to guarantee purchases of seedlings to promote these nurseries;
- creating regional structures for seed banks of native species to supply varied and high-quality genetic material;
- structuring and organizing infrastructure to prevent fire, and fighting fires using brigades in municipalities;
- reviewing restrictive state laws against seed collection in full-protection protected areas (PA);
- promoting local diagnostic processes for the sector and integrating players so as to define structuring plans.

Forest restoration as a strategy for increasing resilience to water shortages

Considering the seriousness of water shortages in urban supplies in the country, especially in the Southeast Region, and the importance of forest restoration in salvaging and maintaining water resources, managers of projects receiving IBMA support recommend linking the Payment Schedule for Environmental Services (PSA) for water to the forest restoration policy. Following, we list some issues that need to advance so at to link these agendas:

- PSA is an instrument that still needs to advance in terms of regulation, including restoration;
- tax exemptions and incentives for restoration are required, taking advantage of their importance not only in maintaining and restoring water resources, but also in the conditions for required to make environmental adjustments related to restoration and to water, and in licensing production projects.

Benefits and impacts

In general, it is argued that the restoration of native vegetation presents a series of economic, social and environmental benefits. Establishing a production sector for restoration in regions and locations can boost the increasing supply of timber and non-timber products. Restoring vegetation makes it possible to reduce the risk of landslides and river silting.

Economically, creating jobs mainly in rural areas induces higher growth in income, thus reducing poverty and improving food safety. Environmentally, the major highlights are linked to water resources, preserving soil, maintaining biodiversity and carbon sequestration.

The projects in the BNDES' Atlantic Forest Initiative have resulted in further benefits. The demand for seedlings and investment in nurseries has risen, influencing the seed sector, identifying matrixes and developing research, as well as experimenting with different restoration techniques. The local forest restoration sector was strengthened by improving the technical capacity of producers, training skilled labor and fostering inter-institutional cooperation for restoration.

Many reported the importance of results related to restoration as well as conservation of water and soil resources. The main environmental benefits include creating ecological corridors and connecting fragments of forests.

For those participating in activities in the IBMA projects, some developments have been particularly important. Implementing projects made it possible to strengthen the technical and financial management capacity for agents in the restoration production sector. The role of project beneficiaries has increased the importance of forest restoration within local and regional contexts, progressively boosting not only the interest of producers and farmers, but also the support and recognition offered by the state government, as well as involving and integrating communities. Efforts made by the institutions in their respective areas of expertise were consolidated, increasing credibility, establishing new partnerships and projection by strengthening the institutional image as perceived by other sponsors and in terms of issues associated with public policies.

Beneficiaries listed their expectations for project impact in the medium and long term:

- consolidating restored areas as the habitat of the Atlantic Forest's fauna and flora;
- consolidating protected areas;
- consolidating forest restoration and strategies for participative management of the territory in priority areas for ecological corridors, multiplying environmental, economic and social benefits;
- environmentally adjusting properties and restoring environmental damage;
- new partnerships and strengthening the conservation agenda and forest restoration;
- promoting and paying for environmental services: linking the restoration agenda with social and economic development of low-income populations;
- disclosing good practices to conserve the soil;
- social and economic benefits for communities involved in restoration;
- involving rural actors in restoration and forest conservation.

The focus was also on strengthening the restoration sector related to providing specialized services, establishing a network of actors cooperating to restore forests and to include restoration as part of management duties related to land and more sustainable properties.

Finally, highlights include perspectives for sustainability of projects in terms of maintaining areas and potential expansion, increasing the scale of restoration:

- integrating areas for forest restoration in other state PSA projects;
- including the project in an inter-institutional program with a wide range of public and private partnerships;
- expanding restoration efforts in private areas, essential to meeting the targets to connect land by developing financial and institutional arrangements, involving the BNDES to boost the scale of restoration;
- creating a fund to receive revenue from selling seedlings and testing seeds, which would be used to hire labor to maintain areas;
- importance of economically using several species – including agricultural – in restoration, so that the areas are maintained by the producers over the long term.

Restoration models and techniques

The sustainability of forest restoration depends not only on the availability, quality and genetic variability of seeds but also on seedlings of varied species. Policies that help structure these services are essential to strengthening the restoration sector.

Developing more effective techniques in relation to sustainability and cost is essential to achieving the necessary scale in forest restoration. Similarly, disseminating research and exchange activities between restoration projects is key to creating solutions.

The economic feasibility of restoration methods in the short, medium and long terms is a strong drawcard to recruit producers and, consequently, areas for restoration.

Restoration costs

The cost of forest restoration is high, and strategies to reduce costs collaborate decisively in restoring existing environmental damage:

- prioritizing lower-cost restoration techniques (crowding planting and boosting natural regeneration) as well as using the resilience of the areas to be restored, whenever possible;
- reducing labor costs by reducing the tax and social security costs when paying rural producers who are beneficiaries of the project;
- structuring a restoration sector by providing inputs, such as seeds and seedlings, and skilled labor.

Quantitative vs. qualitative approach and the social aspect

In financing restoration projects, there is tension between the quantitative approach, which focuses on the number of hectares planted, and, the qualitative approach, which focuses on ecological processes that led to the result in the restored area. This tension results from the need to prioritize scarce resources, which has led to cutting social efforts. What is generally referred to as the "social process" that lies behind the planted hectares may include efforts, such as: raising environmental awareness and education for varied audiences; political coordination; developing partnerships; socio-production inclusion strategies. Using the expression offered by one of the managers, "the sauce can become more expensive than the chicken meat," but it is this "sauce" that can ensure more effective results in restoration as a rural development policy. The issue is to define the most important social efforts in each context, the expected results and how to monitor them.

Socio-production inclusion

Projects have implemented several socio-production inclusion strategies: supplying seeds and seedlings, partnerships for recruiting areas and mobilizing people, providing planting services, fire brigades, and others. The results achieved emphasize that involving communities, producers and small family entrepreneurs is an important solution for structuring the restoration sector, not only from an economic point of view to generate income, but also for the quality of products and services offered to the sector. Nevertheless, these efforts are not only for "project time," i.e., consolidation depends on continuous efforts and should comprise strategies for the organization implementing the project, as well as the institutions that finance the projects.

Photo: Frederico Costa Carvalho

SUPPORTED PROJECTS

All in all, the BNDES Atlantic Forest Initiative amounts to R$$ 42 million in contracts to restore approximately 3,000 hectares in 14 projects located in the states of Santa Catarina, Paraná, São Paulo, Rio de Janeiro, Minas Gerais, Espírito Santo and Bahia. This chapter presents the objectives and results of the projects, as well as the amount of support, locations and the restoration area.

Photo: Fernanda Cristina de Barros

PROJECT NAME
Semeando Sustentabilidade – Recuperação Florestal (Sowing Sustainability – Forest Recovery)

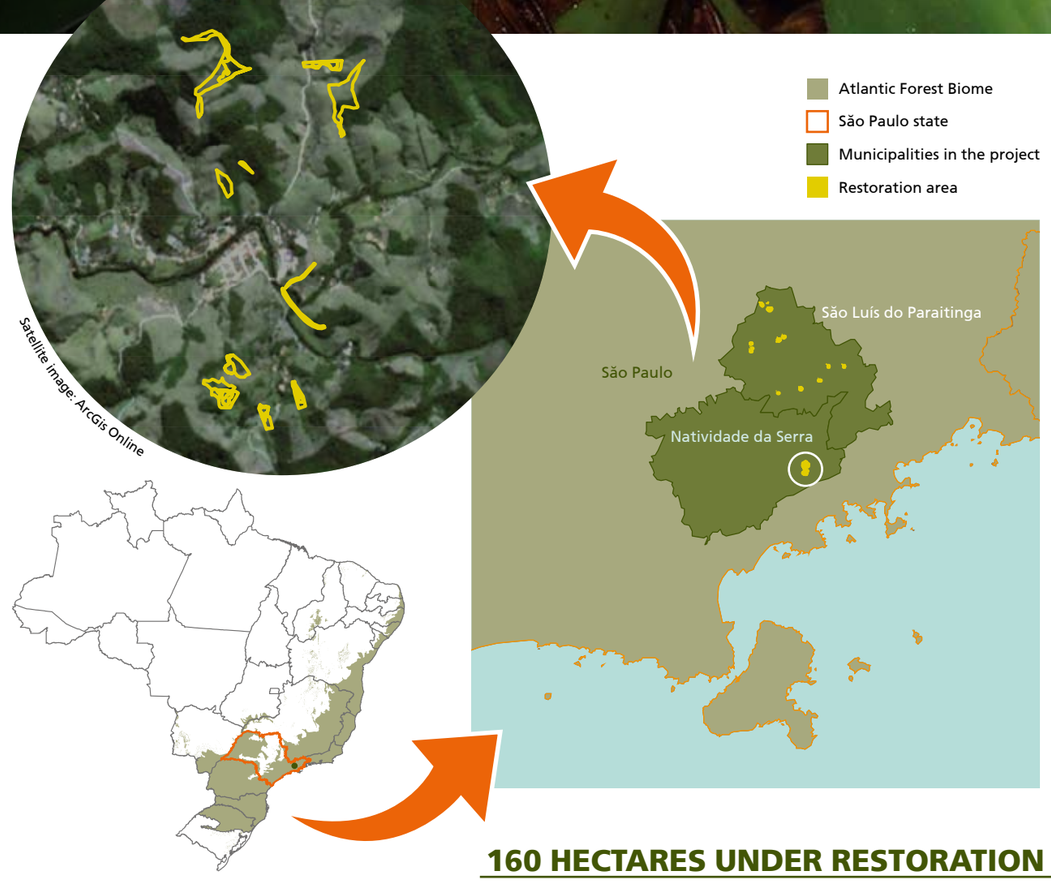
PROJECT MANAGEMENT
Akarui – Association for Culture, Environment and Civic Awareness

TERRITORIAL SCOPE
Municipalities of São Luiz do Paraitinga and Natividade da Serra (São Paulo state)

OBJECTIVE
Restoration of 160 hectares of Atlantic Forest in the Serra do Mar State Park and permanent preservation areas along rivers

TOTAL AMOUNT OF THE PROJECT
R$ 1,495,000.00

DATE AWARDED
3.27.2012



160 HECTARES UNDER RESTORATION

SEMEANDO SUSTENTABILIDADE

AKARUI

Restoring 160 hectares of Atlantic Forest in the municipalities of São Luiz do Paraitinga and Natividade da Serra and in Santa Virgínia Nucleus in the Serra do Mar State Park (PESM), in the southeast region of the state of São Paulo, in the basin of the Paraíba do Sul River. There are two work fronts:

Restoring 40 hectares in permanent preservation areas along rivers on rural properties in the municipalities of Natividade da Serra and São Luiz do Paraitinga

The rural properties are located in the headwaters, water-forming region, which features large forest fragmentation, and 70% of its territory has a landscape of degraded pasture. The adopted techniques are for Total Area Planting and Enrichment Planting on 20 hectares, with approximately 30,000 native seedlings; and Natural Recovery Management on over 20 hectares, enclosing areas and removing cattle, which is the main reason areas become degraded.

Restoring 120 hectares in the Serra do Mar State Park (PESM) – Santa Virgínia Nucleus

Two public domain areas were selected in the Santa Virgínia Nucleus to implement Enrichment Planting activities with two main techniques:

- 75 hectares to plant of native species seedlings, with emphasis on extremely important and endangered species, such as the jussara palm tree (*Euterpe edulis Mart.*); and
- 45 hectares for Enrichment Planting by scattering jussara seeds.

"People are part of the restoration process and it is important they have an integrated view of the property and not only the restoration area. But how can we engage them?

Over time, we have been trying to understand what is most attractive, what motivates them, etc. And, from what motivates them – water, native fruits, beekeeping, seeds to produce seedlings, managing jussara palms, producing milk etc. – we are building a way of working together with farmers and owners, breaking paradigms.

It is not easy, but, gradually, people start to look at their land, their water sources, at their production areas in a different way."

DANIELA COURA | *PROJECT COORDINATOR*

Predatory and illegal extraction of jussara palm trees for palm hearts, in remaining forests, is severely threatening biodiversity in the Atlantic Forest Biome. The species is undergoing an extremely critical and delicate moment due to the significant reduction in plantations and especially the area where this is happening, having been included as "Vulnerable to Extinction" on the Official List of Endangered Species in Brazilian Flora.

HIGHLIGHTS

Enriching the biome with jussara palms and engaging farmers in the surrounding areas in sustainable management of fruit and not palm hearts.

Fostering the production of forest seeds and seedlings with natural inputs through local nurseries.

Training producers and technicians in agroecological practices, contributing to restoring areas and improving production areas: orchards, vegetable gardens, nurseries, pastures.

Engaging landowners through meetings and workshops in which an integrated view of the property is promoted.

Training and creating jobs in the areas surrounding the project: 48 direct and 24 indirect jobs.

Photo: André Telles

PROJECT
Restauração Ecológica das Áreas Degradadas da Reserva Biológica Poço das Antas (Ecological Restoration of Degraded Areas of Poço das Antas Biological Reserve)

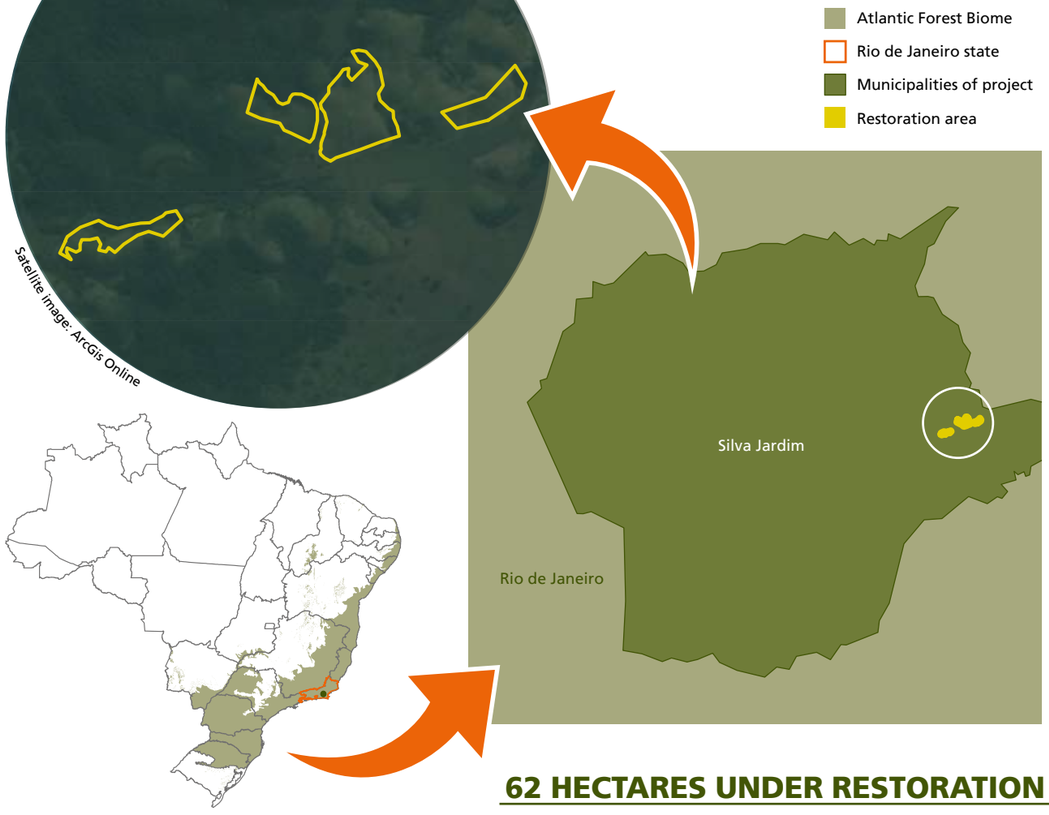
PROJECT MANAGEMENT
Golden Lion Tamarin Association (AMLD)

TERRITORIAL SCOPE
Municipality of Silva Jardim (Rio de Janeiro state)

OBJECTIVE
Restoration of 62 hectares in the Atlantic Forest in the Poço das Antas Biological Reserve

TOTAL AMOUNT OF THE PROJECT
R$ 1,024,000.00

DATE AWARDED
8.8.2012



62 HECTARES UNDER RESTORATION

RESTAURAÇÃO DA RESERVA BIOLÓGICA POÇO DAS ANTAS

AMLD

*More than a mere restoration project, this is a project to restore an ecosystem. Its objective – to restore 62 hectares of Atlantic Forest in the Poços das Antas Biological Reserve (REBIO), in the municipality of Silva Jardim, in the state of Rio de Janeiro – will help connect the forest sections where the golden lion tamarin (*Leontopithecus rosalia*), an endangered primate, lives, as the population needs forest land to expand.*

With 5,052 hectares and managed by the Chico Mendes Institute for Biodiversity Conservation (ICMBIO), the Poço das Antas Biological Reserve – the first protected area (PA) on a biological reserve – was established in 1974 by the Brazilian government precisely due to the critical situation of the species' natural habitat. It is a very important area to preserve in the Atlantic Forest, since it houses the largest remaining part of Rio de Janeiro's lowland tropical rainforest, with a significant number of other endemic and threatened species in addition to the golden lion tamarin, namely the Fluminense swallowtail butterfly (*Paridis ascanius*) and the jussara palm (*Euterpe edulis*).

Monitoring the planted forest

Twelve permanent lots with a 500 m² area were established in the project; each area will assess three variables: survival and mortality rates; the average area; and density of regenerating individuals. Data collection is conducted once every six months, and a monitoring and assessment report is prepared after each collection. During data collection, photographic monitoring (in fixed and predetermined points) is carried out to track and record how planting in selected areas is developing.

"It is worth highlighting that the golden lion tamarin is a species that only lives in the Atlantic Forest's lowland areas in the inland region of Rio de Janeiro and not in mountainous regions, where the better-preserved forests are located.

From the total original area that the golden lion tamarin occupies, only 2% of forests remain, and still, in a very fragmented manner, in small islands of forest. Therefore, restoring the forest in these environments is extremely important and necessary to save the species from extinction."

LUIS PAULO FERRAZ | *EXECUTIVE SECRETARIAT AMLD*

The golden lion tamarin is an endemic species found roaming freely in eight municipalities in the state of Rio de Janeiro and nowhere else in the world. For the species to be considered safe from the threat of extinction, a population of about two thousand free individual tamarins in nature is required. Therefore, some 25,000 hectares of coastal lowland forests need to be protected. This project is part of AMLD's effort to achieve this goal by 2025.

HIGHLIGHTS

Recovering degraded areas for over twenty years in the Poço das Antas Reserve, the only habitat the golden lion tamarin lives, but in fragmented areas.

Training 30 low-income citizens residing in the surrounding areas, in techniques to restore the forest.

Strengthening the production sector for seedlings and inputs in the region.

Contributing to water availability in the basin of the São João River, which supplies the population in the Lakes Region (Rio de Janeiro state) and also houses the Juturnaíba Dam, whose current demand for reservoir water is approximately 1,600 liters per second, aimed at approximately 300,000 residents in seven municipalities.

PROJECT
Restauração Ecológica no *Campus* Fiocruz da Mata Atlântica (Ecological Restoration on the Atlantic Forest FIOCRUZ Campus)

PROJECT MANAGEMENT
Oswaldo Cruz Foundation (FIOCRUZ) and Foundation for Scientific and Technological Development in Health (FIOTEC)

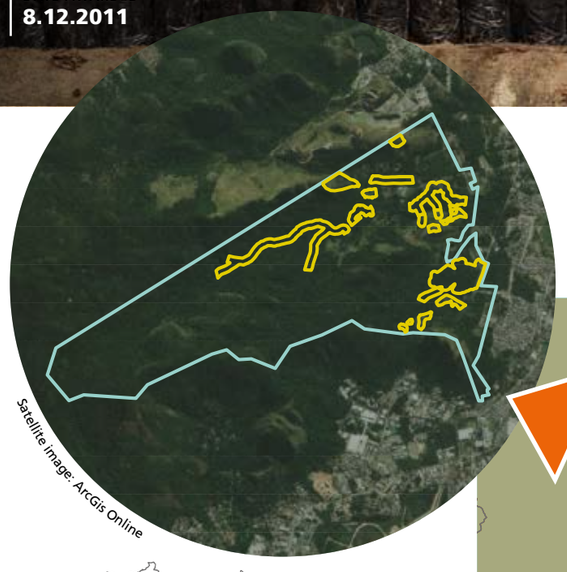
TERRITORIAL SCOPE
Municipality of Rio de Janeiro (Rio de Janeiro state)

OBJECTIVE
Restoration of 344 hectares of Atlantic Forest with native species in the Pedra Branca State Park and in riparian areas on the Atlantic Forest FIOCRUZ Campus; and reestablishing the horticulture school on this campus.

TOTAL AMOUNT OF THE PROJECT
R$ 2,544,000.00

DATE AWARDED
8.12.2011

Photo: Lin Lima



Satellite image: ArcGis Online

- Atlantic Forest Biome
- Rio de Janeiro state
- Municipality of project
- Park area
- Restoration area

344 HECTARES UNDER RESTORATION

RESTAURAÇÃO ECOLÓGICA NO *CAMPUS* FIOCRUZ

FIOCRUZ/FIOTEC

The aim is to restore 344 hectares of degraded areas in the municipality of Rio de Janeiro, with 108 hectares in riparian areas of the Atlantic Forest FIOCRUZ Campus (CFMA) and 236 hectares in the Pedra Branca State Park.

Surrounded by urban areas, the Pedra Branca State Park is a protected area (PA) with 12,500 hectares of Atlantic Forest. The plant formations predominate over lowland montane tropical rainforest and lowland tropical rainforest. In turn, the CFMA occupies a 506-hectare area on the foothills of the Pedra Branca Forest, which borders the park.

Producing seedlings of regional species

An abandoned nursery is being restored on the FIOCRUZ Campus to produce seedlings needed both to reactivate the horticulture school and in other state park restoration projects. Reactivating the school will boost production capacity to 250,000 seedlings of native species per year.

Seed laboratory

A partnership between FIOCRUZ and the Rio de Janeiro Botanical Garden Seed Laboratory will also develop studies related to the germination potential of species with a high chance of being used in forest restoration projects. Such technical cooperation, in addition to offering scientific knowledge through technical guidance, will help structure the Botanical Garden seed laboratory for the project.

"We work with the perspective to integrate conservation and ecological restoration with the creation of a healthy environment.

Many diseases, such as leishmaniosis, leptospirosis and dengue fever occur in the area the project covers. Degradation has generated greater interaction between wild and domestic animals, aggravating this situation. That is, conserving the area also aims to increase the supply of food for wild animals, minimizing the interaction with domestic animals, which helps reverse the progress of local diseases."

ANDREA VANINI | *BIOLOGIST, TECHNICAL COORDINATOR*

The intervention area of the project is located in Jacarepaguá, a region across which the municipality of Rio de Janeiro is expanding. The population growth is heavily concentrated in the West Side. This demographic change intensified as of the 1970s, bringing impacts on its resources and a serious threat to the remaining environmental reserves. In the second half of the nineteenth century, territorial occupation, which mainly developed from paths in the surrounding areas of farms came together, took on urban features, with large houses, roads and busy trade.

HIGHLIGHTS

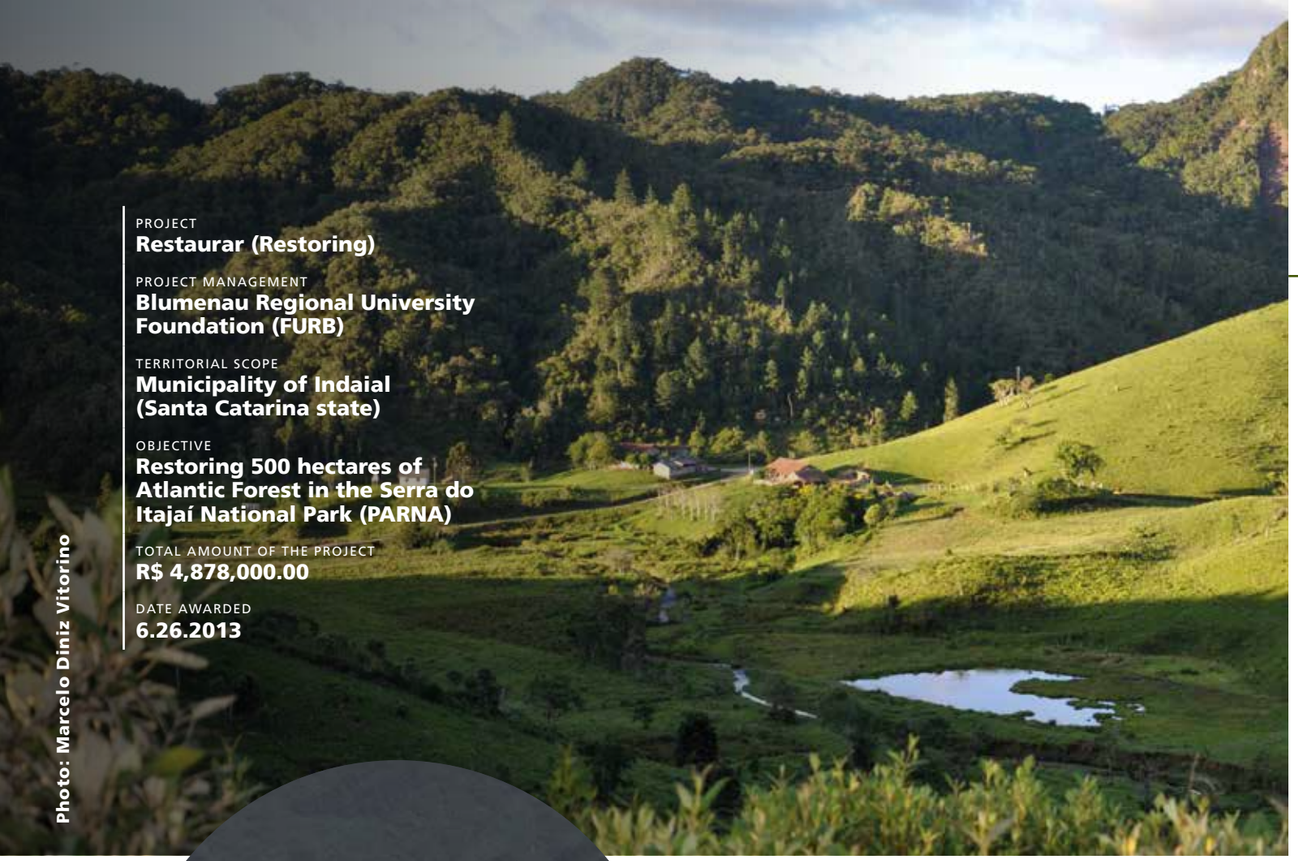
Revitalizing the horticulture school on the Atlantic Forest FIOCRUZ Campus.

Marking regional native limits to provide seeds that have genetic and floral diversity.

Implementing the nursery to produce seedlings of regional species.

Training and including surrounding communities through environmental education and engaging people in the project, including modules on how to produce seedlings of native species, restoration techniques and matrix mapping.

Monitoring and assessing parameters regarding the success of planting and effects on animal sickness in the surrounding community.



PROJECT
Restaurar (Restoring)

PROJECT MANAGEMENT
Blumenau Regional University Foundation (FURB)

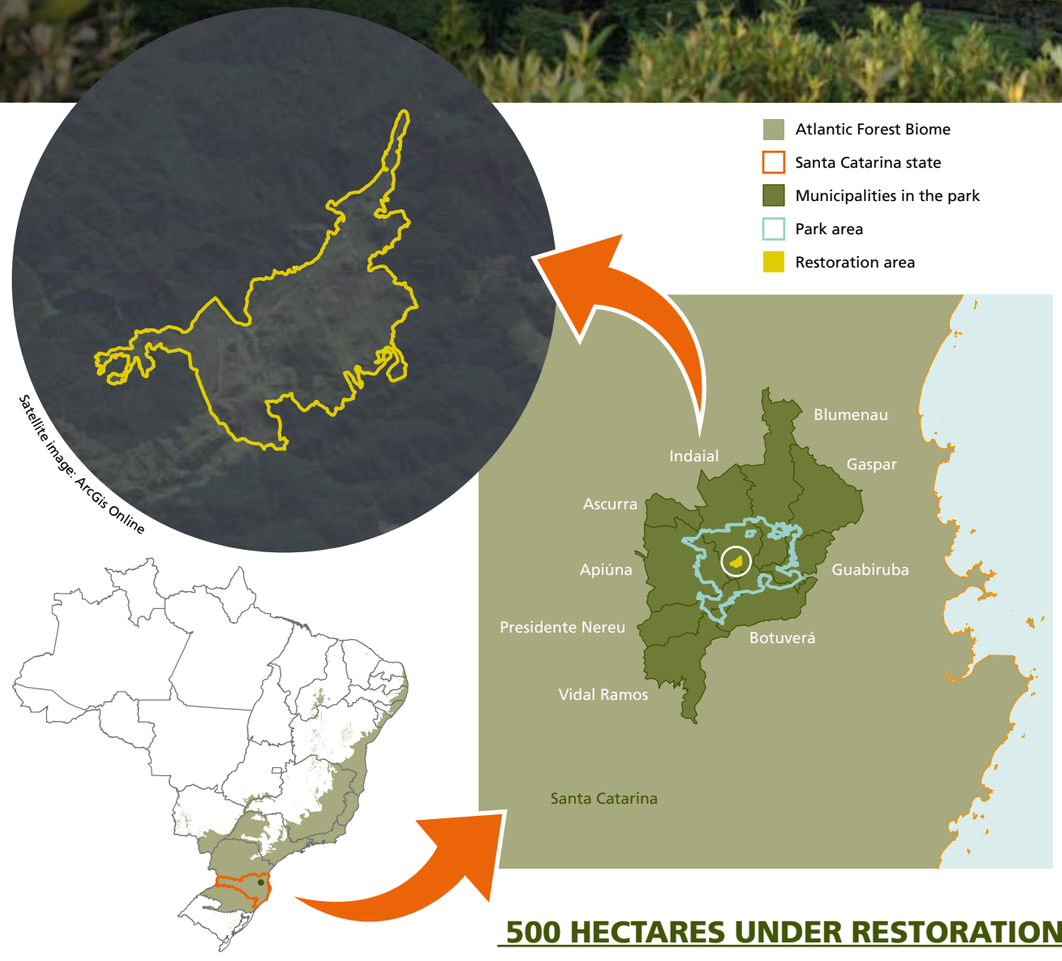
TERRITORIAL SCOPE
Municipality of Indaial (Santa Catarina state)

OBJECTIVE
Restoring 500 hectares of Atlantic Forest in the Serra do Itajaí National Park (PARNA)

TOTAL AMOUNT OF THE PROJECT
R$ 4,878,000.00

DATE AWARDED
6.26.2013

Photo: Marcelo Diniz Vitorino



500 HECTARES UNDER RESTORATION

RESTAURAR

FURB

Ecological restoration of 500 hectares of Atlantic Forest in the Serra do Itajaí National Park Protected Area (PARNA), in the state of Santa Catarina. The areas are in the restoration zone established by the PARNA Management Plan and are located in two sites in the municipality of Indaial:

Faxinal do Bepe (435 hectares)

In this area, the presence of agriculture in lowland areas and pastures on slopes and hilltops is striking. The vegetation is formed by many lowlands with coconut trees in the wetlands, many of which have been destroyed. The area is covered by pastures (about 90%) and agricultural crops, such as corn, beans, rice and vegetables (about 10%). Native tree species are limited to a few remaining individual trees in pastures and along the paths and highways. Several invasive herbaceous species have been found here.

Possamai (65 hectares)

In this area, human disturbance takes the shape of using exotic invasive species to produce lumber (specifically genus Pinus spp., whose restoration was stopped in 2005).Currently, there are stretches mainly covered with bracken (*Pteridium aquilinum*), cará yams (*Chusquea sp.*) and taquara bamboo (*Merostachys sp.*), forming a dense vegetation cover that prevents the pioneer and early secondary tree plants from taking root. The average height of the vegetation is approximately four meters. The slope of the land is steep, predominantly areas with slopes between 20% and 40%. There are virtually no flat areas in this region.

"Restaurar is an important project to manage and maintain biodiversity. It is already known, for example, that the cougar is a species that inhabits the park and that there are frog species unknown to science in that area. However, the park is also home to thousands of springs that supply about one million inhabitants of Vale do Itajaí.

Taking out the pasture, fostering natural recovery and connectivity between the forest in the surroundings and the currently degraded area but, which in three, four years, will be in the initial restoration process, is critical to the region."

MARCELO DINIZ VITORINO | *FORESTRY ENGINEER*

Managed by the Chico Mendes Institute for Biodiversity Conservation (ICMBIO), PARNA is a Brazilian protected area with full protection, covering 57,374 hectares which protects the largest continuous area of Atlantic Forest in the state, involving nine municipalities in Santa Catarina: Apiúna, Ascurra, Blumenau, Botuverá, Gaspar, Guabiruba, Indaial, Presidente Nereu and Vidal Ramos.

HIGHLIGHTS

Seed enhancement and analysis. Every four months of storage, the germination, purity, moisture content and seed weight will be assessed.

Implementing two cold storage rooms in the nursery to maintain continuous control of environments with different temperature ranges and relative humidity.

Producing 520,000 seedlings. of regional native species. That will result in 130,000 seedlings per year over the four-year period.

Total Area Planting in 300 hectares, with a density of 1,666 plants/ha, with 1,111 seedlings/ha with pioneering species and 555 seedlings/ha with secondary species in terms of density.

Photo: Márcio Macedo Costa

PROJECT
Restauração de Matas Ciliares com a Participação de Comunidades Rurais na Mata Atlântica do Sul da Bahia (Restoration of Riparian Forests with the Participation of Rural Communities in the Southern Bahia Atlantic Forest)

PROJECT MANAGEMENT
Institute for Socio-environmental Studies of Southern Bahia (IESB)

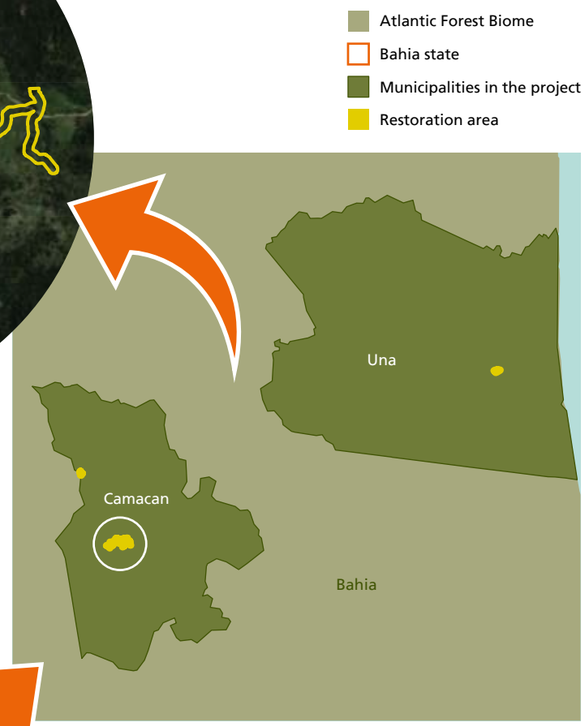
TERRITORIAL SCOPE
Municipalities of Camacan and Una (Bahia state)

OBJECTIVE
Restoration of 72 hectares of Atlantic Forest in riparian areas of permanent preservation of private properties in the region

TOTAL AMOUNT OF THE PROJECT
R$ 790,000.00

DATE AWARDED
10.13.2011

Satellite image: ArcGis Online



72 HECTARES UNDER RESTORATION

RESTAURAÇÃO DE MATAS CILIARES NO SUL DA BAHIA

IESB

Restoring 72 hectares of permanent preservation riparian areas on land reform settlements and natural heritage private reserves (RPPN), located in southern Bahia. The areas proposed to restore riparian forests comprise three sites located in the municipalities of Camacan and Una.

Nova Ipiranga Settlement

The chosen area is in the surrounding areas of the Mutuns River and its offshoots, in the municipality of Camacan (Bahia state), within the Nova Ipiranga land reform settlement. From the total settlement area (809 hectares), some 83 hectares are in permanent preservation areas, of which 70% are devoid of forest vegetation.

Serra Bonita Private Natural Heritage Reserve

The selected area is also in the municipality of Camacan, on the banks of the Pratas stream, in Fazenda Cascata, private property that belongs to Agroflorestal Camacan Preservação Ambiental Ltda. Fazenda Cascata is part of the RPPN Serra Bonita, comprising private properties that cover 1800 hectares in Serra Bonita, located in the municipalities of Camacan and Pau Brazil, in the Central Corridor of the Atlantic Forest.

Nova Angélica Private Natural Heritage Reserve

This area is on the borders of the Serra stream, in the municipality of Una. It is an RPPN owned by Southern Bahia Institute for Social and Environmental Studies (IESB) and is part of the Una Wildlife Refuge, which was made an RPPN by Ordinance Nº. 26/2006, of the State Environmental Department, becoming the first RPPN recognized by Bahia's state government.

The region is of high ecological significance, as it houses one of the most important humid submontane forests remaining in Bahia, which is a unique habitat due to altitudinal levels between two hundred and nine hundred meters above sea level. Exceptionally important for birds – Important Bird Area (IBA) – of BirdLife/SAVE Brasil, the region is home to over four hundred bird species, where 59 are endemic. Recently, a new genre was discovered, the pink-legged gravateiro (Acrobatornis fonsecai).

HIGHLIGHTS

Training and including the settlers' community in restoration activities, including managing the nursery responsible for providing the project with seedlings.

The Nova Angélica RPPN is a neighboring property of the Una Biological Reserve, an integral protected area with one of the last remaining coastal forests in Bahia and the main place where the golden lion tamarin is found.

"We always seek to involve the local community in all stages of the project: collecting seeds, producing seedlings and also planting. We conducted a workshop with twenty people from the settlement; we trained these people. The workshop took four days and we took five nurserymen from the workshop to help us.

A 72-hectares project may seem little, but to southern Bahia that is a lot, especially in APPs. It all comes down to you helping improve the water, helping improve these people's standards of living. It is extremely important."

LEONARDO NEVES | *BIOLOGIST, PROJECT COORDINATOR*

Photo: Elisângela Ferreira da Silva

PROJECT
Semear (Sowing)

PROJECT MANAGEMENT
Terra Institute

TERRIROTRIAL SCOPE
Municipalities of Aimorés (Minas Gerais state) and Colatina (Espírito Santo state)

OBJECTIVE
Restoration of 155 hectares with native species, of which 50 hectares are in riparian forest area at Fazenda Bulcão (Minas Gerais state) and 105 hectares are in the Itapina Ecological Reserve (Espírito Santo state)

TOTAL AMOUNT OF THE PROJECT
R$ 2,470,000.00

DATA DA CONTRATAÇÃO
12.22.2010

Satellite image: ArcGis Online

155 HECTARES UNDER RESTORATION

SEMEAR

INSTITUTO TERRA

The initiatives of the Terra Institute supported by IBMA include restoration two reforestation sites in the state of Minas Gerais (MG) and Espírito Santo (ES), originally covered by the Atlantic Forest Biome, which, for decades have been taken by pastures and crops. Currently, the remaining forest areas are rare in the Vale do Rio Doce, and problems with the soil and the water balance are more severe. The following are the project sites:

Restoration on 50 hectares of riparian forest in the Fazenda Bulcão RPPN, jn Aimorés (Minas Gerais state)

This farm was the first Private Natural Heritage Reserve (RPPN) established on degraded soil and has already benefited from a restoration project that retored the area, but with limited diversity of species and slightly excessive number of pepper trees. The current project involves enrichment of riparian vegetation and implementing a seed laboratory – a research center in which to select tree species that are more resistant and favorable for restoration activities in degraded areas.

Forest restoration on 105 hectares in the Itapina Ecological Reserve, in Colatina (Espírito Santo state)

Most of the reserve has been cleared and covered with a kind of grass that hinders natural regeneration. Its restoration is of great ecological interest to the region, as it is home to the source of the stream that supplies the population in the Itapina district.

"One of the bottlenecks in restoring forests is to collect seeds from nature and turn them into seedlings. Thus, we had the idea to build a laboratory to work with seeds from the Atlantic Forest. We have been operating since 2011. We are studying seed germination and storage tolerance. The importance of this is that, knowing how the seed germinates and how much of it can be stored, we can conduct production in a coordinated manner in time."

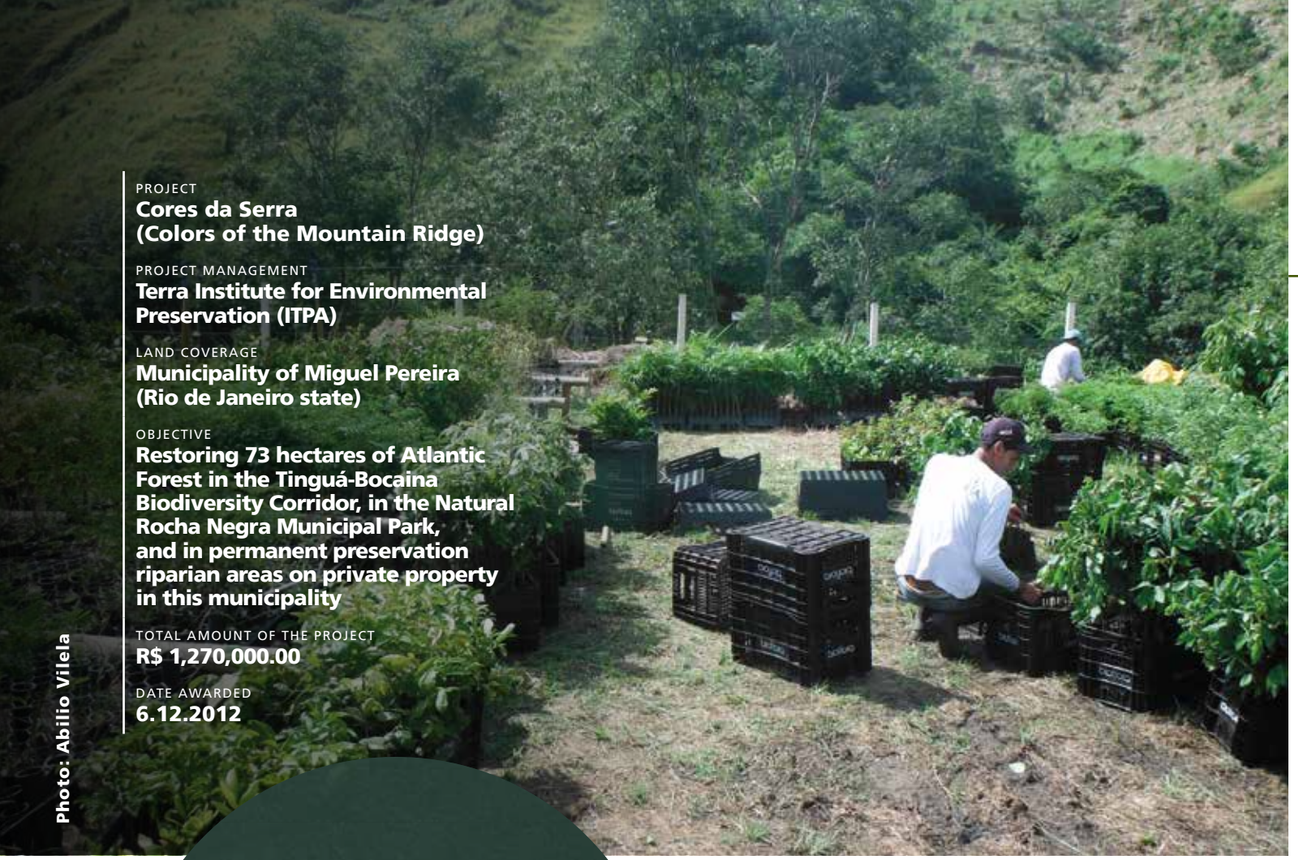
JAEDER LOPES VIEIRA | *SENIOR ENVIRONMENTAL ANALYST*

As part of the project, the Terra Institute launched a pioneering initiative: the Semear website (portalsemear.org), the first online database in Brazil, which brings together information on the entire production of forest seedlings from seeds. The database has technical documentation on eighty Atlantic Forest native species, with directions on how to produce successful seedlings. However, the goal is to register all 297 species already produced in the Terra Institute's nursery. With easy access to this information, professionals in the field of earth sciences, nurserymen, landowners, among others, will feel more comfortable producing their own seedlings for restoration, reducing purchasing costs, and ensuring more success in plantations to regenerate degraded areas.

HIGHLIGHTS

Implementing the seed eco-physiology laboratory to support research on seed technology and produce high-quality seedlings

Professional training and generating income in the surrounding areas, by creating one hundred jobs and training 150 people from the local population.



PROJECT
Cores da Serra (Colors of the Mountain Ridge)

PROJECT MANAGEMENT
Terra Institute for Environmental Preservation (ITPA)

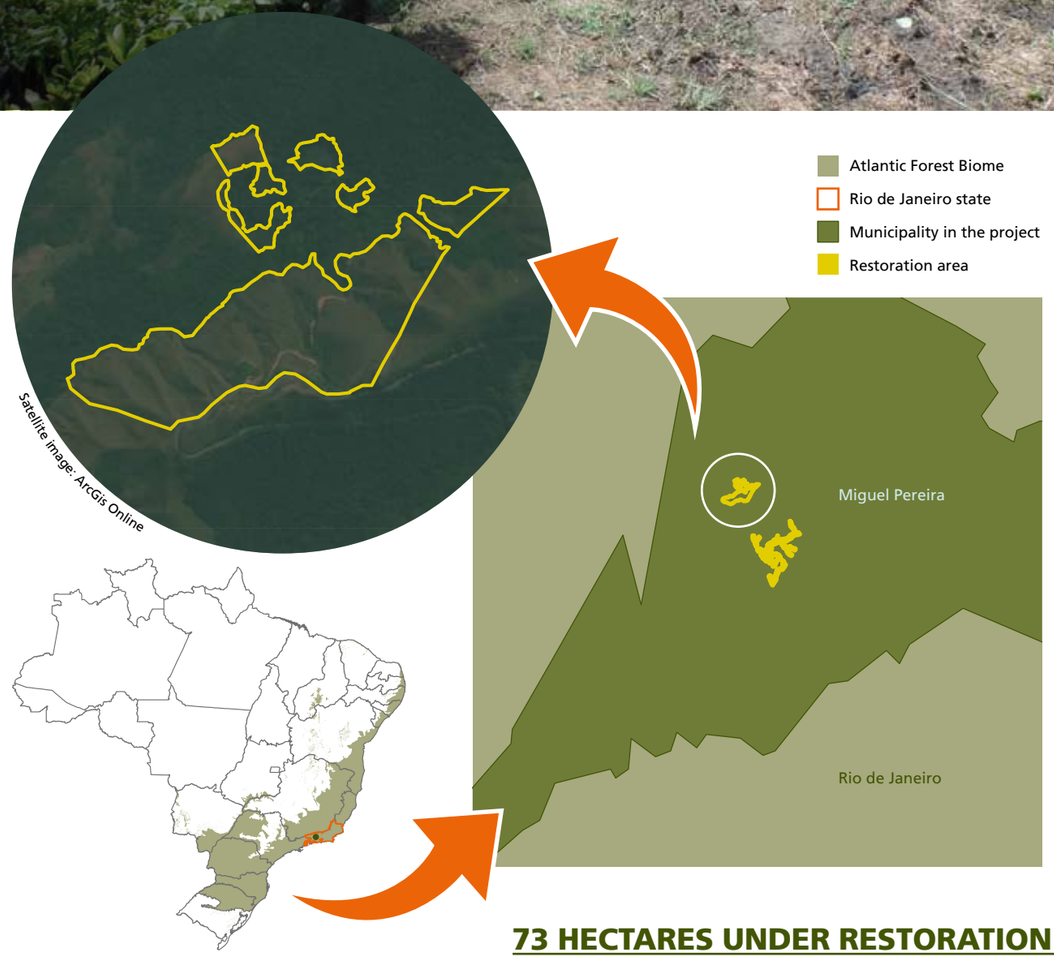
LAND COVERAGE
Municipality of Miguel Pereira (Rio de Janeiro state)

OBJECTIVE
Restoring 73 hectares of Atlantic Forest in the Tinguá-Bocaina Biodiversity Corridor, in the Natural Rocha Negra Municipal Park, and in permanent preservation riparian areas on private property in this municipality

TOTAL AMOUNT OF THE PROJECT
R$ 1,270,000.00

DATE AWARDED
6.12.2012

Photo: Abilio Vilela



73 HECTARES UNDER RESTORATION

CORES DA SERRA

ITPA

Restoring 73 hectares of forests in the municipality of Miguel Pereira, state of Rio de Janeiro, to form an important forest line in the Tinguá-Bocaina Biodiversity Corridor (CBTB). Of the 73 hectares, some 31 are located in the Natural Rocha Negra Municipal Park and 40 in degraded areas at the Conceição Farm, where there is a continuous forest near the park on the banks of Santana River.

Guandu River Basin

The project's operational area has a high biological diversity index and a large number of endemic species (which only exist there), and houses the Guandu River Basin, whose waters supply and generate energy for approximately seven to ten million people in the metropolitan region in the state of Rio de Janeiro.

Restoration techniques

In selected areas, the following restoration techniques are being implemented:

- Total Area Planting – recommended for deforested areas covered by pastures, or in some cases, herbaceous vegetation.
- Forest Enrichment Planting – used on lands that, historically, have been cleared, but have tree, shrub or semi shrub vegetation cover in natural growth.
- Natural Recovery Planting – used in areas where the level of natural regeneration is high and ecological processes are still active and able to maintain themselves; if degradation is stopped, it is only necessary to isolate the ground from risk factors (such as fire, cattle, rainwater etc.) and then apply management efforts that increase the chances of self-regeneration.

"The properties we are working on are very difficult. Access is quite complicated because of the slope, land relief and degraded soil with eroded areas. Nothing is mechanized in that area, only the plantation areas, where air drills and rotary cutters are used. But other than that, it is all on the mule's back and the workers carrying around materials, seedlings and everything else that is needed."

MAURÍCIO RUIZ | *AGRICULTURAL TECHNICIAN, EXECUTIVE SECRETARIAT OF THE ITPA*

With 104,000 hectares, the Serra da Bocaina National Park (PNSB) is one of the largest protected areas of Atlantic Forest. It is located along a stretch known as the Serra do Mar, on the border between the states of Rio de Janeiro and São Paulo. Since it extends from altitudes above 2,000 meters, in the mountainous region, to sea level, on the coast, the PNSB has diverse landscapes as well as a rich fauna and flora, including endemic and endangered species.

HIGHLIGHTS

Operations at the breaking point at the Central Corridor of the Atlantic Forest, which prevents movement of species between two remaining important parts of this biodiversity corridor: the Serra da Bocaina National Park and the Tinguá Biological Reserve.

Selected area for restoration meaning 100% of the area in the Natural Rocha Negra Municipal Park can be restored.

Unmechanized restoration, since it is held in a place with difficult access in areas due to steep slopes.

Using differentiated restoration techniques, in accordance with the features in each of the degraded areas.

Photo: Vicente Carvalho

PROJECT
Corredores de Vida: Restauração de Paisagens e Geração de Renda na Mata Atlântica do Oeste Paulista (Life Corridors: Restoration of Landscapes and Generation of Income in the Atlantic Forest of Western São Paulo)

PROJECT MANAGEMENT
Institute for Ecological Research (IPÊ)

TERRITORIAL SCOPE
Municipalities of Mirante do Paranapanema and Teodoro Sampaio (São Paulo state)

OBJECTIVE
Restoring forests on 200 hectares in permanent preservation riparian areas on rural properties in Pontal do Paranapanema

TOTAL AMOUNT OF THE PROJECT
R$ 3,600,620.00

DATE AWARDED
2.25.2011

Satellite image: ArcGis Online

200 HECTARES UNDER RESTORATION

CORREDORES DE VIDA

IPÊ

Forest restoration of Atlantic Forest on 200 hectares of permanent preservation areas (APP) on rural properties located on the banks of the offshoots along the Paranapanema River, in the surrounding areas in the Morro do Diabo State Park and the Mico-Leão-Preto Ecological Station, in the region known as Pontal do Paranapanema, in the far west region of the state of São Paulo.

The project aims to reestablish forest connections in the region by adopting agroecological and participatory technologies to restore and protect springs and riparian forests on rural properties, and to foster, train and raise environmental awareness on agroecology and the rational use of water and forest resources. The selected areas are:

Rosanela Farm, municipality of Teodoro Sampaio

Restoring 150 hectares on the Rosanela Farm – located in the surrounding areas in the Morro do Diabo State Park and the Mico-Leão-Preto Ecological Station – is a part of the effort to implement ecological corridors between the two protected areas.

Arco Íris and Santo Antonio Settlements, Pontal do Paranapanema

Restoring 22 hectares on the Arco Íris Settlement and 28 hectares on the Santo Antonio Settlement, properties used by families conducting subsistence farming and small-scale dairy farming. Due to the poor conservation of soil, the forest and water resources along with the lack of quality assistance, agriculture and cattle production is low. The APPs are used by the settlers on a daily basis, which hampers the conservation of water resources.

With almost 35,000 hectares, the Morro do Diabo State Park preserves one of the last plateau forest areas in the country, with original ecosystems of the region. In turn, the Mico-Leão-Preto Ecological Station is an integral federal protected area with 6,700 hectares spread across the four largest forest sections of the Atlantic Forest in the Pontal do Paranapanema region. Together, they are home to important wildlife species, such as the tapir (*Tapirus terrestris*), the ocelot (*Felis pardalis*), the otter (*Lutra longicaudis*), the jaguar (*Panthera onca*), and one of the most endangered primate species in the world, the black-lion tamarin (*Leontopithecus chrysopygus*).

HIGHLIGHTS

Establishing the ecological corridor between the Morro do Diabo State Park and the Mico-Leão-Preto Ecological Station.

Implementing agroforestry modules while restoring the settlements.

Producing 400,000 seedlings of native Atlantic Forest species.

Some 80% of the seedlings used come from community agroforestry nurseries run by settlers in the surrounding areas.

"In the area covered by the project, we have almost 6,000 families in family farming. We cannot talk about restoration without focusing on the social aspects. Therefore, our project is implemented by almost 100% of the community itself. This is because the forest that will remain in the long run is more important than the forest that we are planting now.

And the permanently changing landscape depends on community engagement. People are key to this process."

LAURY CULLEN JUNIOR | *FORESTRY ENGINEER, PROJECT COORDINATOR*

Photo: Amilcar Marcel de Souza

PROJECT
Cílios do Rio (Cilia of the River)*

PROJECT MANAGEMENT
Pró-Terra Institute

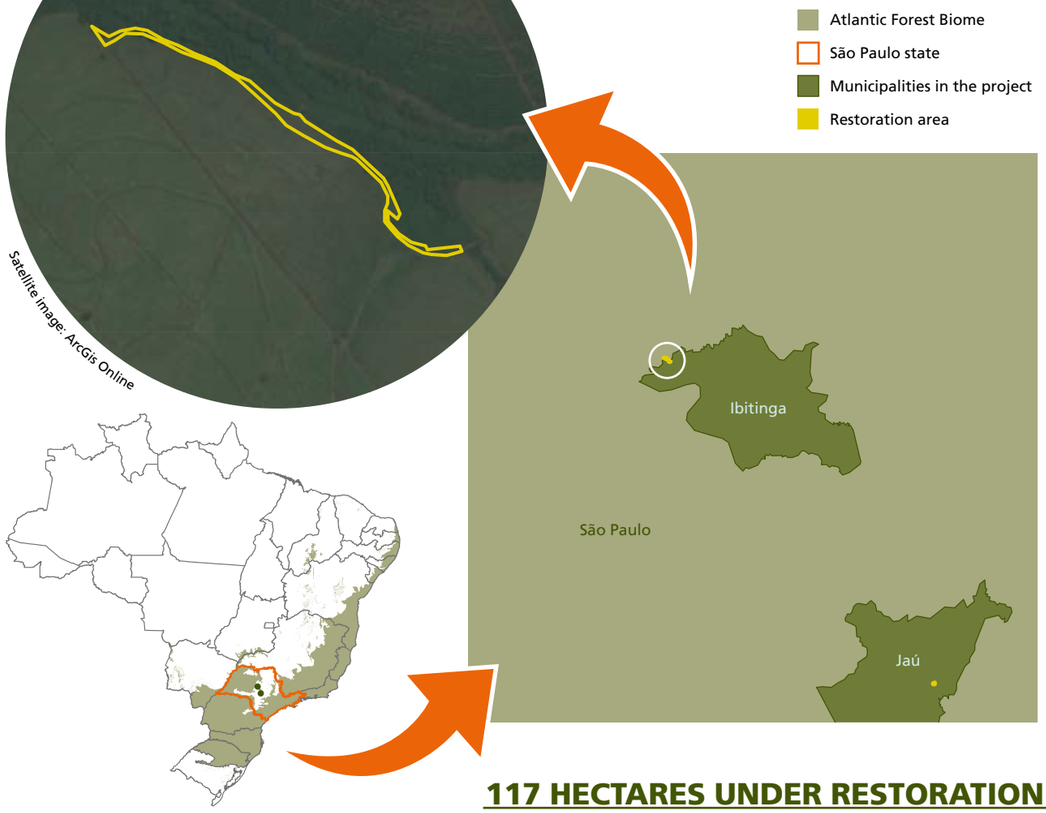
TERRITORIAL SCOPE
Municipalities of Jaú and Ibitinga (São Paulo state)

OBJECTIVE
Restoration of 117 hectares of Atlantic Forest in permanent preservation riparian areas on rural properties focusing on water resource management units Tietê/Batalha and Tietê/Jacaré

TOTAL AMOUNT OF THE PROJECT
R$ 2,055,000.00

DATE AWARDED
5.3.2012

* The name of the project, in Portuguese, makes a comparison between 'cilia', which protect human eyeballs, and the riparian forest, that lines the river banks and protect the rivers and streams.



117 HECTARES UNDER RESTORATION

CÍLIOS DO RIO

PRÓ-TERRA INSTITUTE

Restoring 117 hectares of Atlantic Forest in permanent preservation riparian areas (APP) on 30 rural properties in the state of São Paulo, spread across the municipalities of Jaú and Ibitinga and in a protected area, the Ibitinga State Environmental Preservation Area (APA).

Restoration is expected to mitigate the risk of water shortages for public supply, crop irrigation and power generation. There is also the advantage of minimizing the increasing loss of biodiversity in the state, avoiding the disappearance of numerous species even before they are known to science.

The project will also provide an ecological connection between various seasonal forest sections, including the Amadeu Botelho Private Natural Heritage Reserve (RPPN) and areas restored by the Riparian Forests Restoration Project run by the São Paulo State Department.

Forest planters

Among the activities within the project, it is worth highlighting the course "Forest Planters: Training in Degraded Areas and Socio-environmentalism," dedicated to teaching not only restoration methodology, but to presenting the general context of issues, such as environmental education, sustainability, socio-environmentalism, rural development, cultural revival, among others.

In addition, raising awareness and environmental education workshops will be held, as well as disseminating the project in the surrounding communities, covering eight municipalities in the basin of the Jaú and Jacaré Rivers, representing approximately 220,000 inhabitants. The focus of these workshops is to report on the restoration of the Atlantic Forest Biome with leaders, government agencies and environmental agents to train regional multipliers.

"It is an ecological effort, no doubt, but it is a social effort, as well. Because we want to offer new income opportunities to the community, reintegrating people.

Take sugarcane, for instance. Mechanizing sugarcane, plantations covering about 90% of the region, triggered a high unemployment rate. Currently, we are creating a new identity for these sugarcane workers. They are the forest planters, that is, they have a job and a sense of belonging to the environment. And this is essential not to lose this restoration effort over time."

GUILHERME MOYA | *BIOLOGIST*

One of the areas to benefit from the increasing ecological connections within the region is located in the surrounding areas of the wildlife refuge at the mouth of Jaú River, where the waters of the Jaú and Tietê Rivers and the Prata stream meet, forming the mouth of the entire hydrographic complex of this basin. The predominant landscape has many wetlands near the Jaú riverbed, surrounded by sugarcane crops, small pasture areas with scattered trees and a restricted area for native forest regeneration.

HIGHLIGHTS

The significant environmental impact from restoring vital ecological processes in extremely important locations for environmental conservation and restoration in the state of São Paulo, with direct benefits for approximately 220,000 inhabitants in the three towns.

Water resources included: São Joaquim, João da Velha, São Pedro, Antunes, Pau d'Alho streams, the Jaú River and the Porcos stream.

The area the project covers an RPPN, springs for public water supply and with ecological connections between sections of Atlantic Forest and rural properties classified as "wildlife refuges".

Some 20% of the workforce employed on plantations are members of the communities.

Photo: Pollyana Born

PROJECT
Cultivando Esperança: Recuperar a Floresta para Colher Benefícios (Cultivating Hope: Restoring the Forest to Reap Benefits)

PROJECT MANAGEMENT
Mater Natura – Environmental Studies Institute

TERRITORIAL SCOPE
Municipalities of Guarapuava and Inácio Martins (Paraná state)

OBJECTIVE
Restoration of 95 hectares of Atlantic Forest in permanent preservation riparian areas on small rural properties located in the Serra da Esperança Environmental Protection Area

TOTAL AMOUNT OF THE PROJECT
R$ 1,418,000.00

DATE AWARDED
12.13.2011

95 HECTARES UNDER RESTORATION

CULTIVANDO ESPERANÇA

MATER NATURA

Restoring 95 hectares of Atlantic Forest in permanent preservation riparian areas (APP) on small rural properties in the Serra da Esperança Environmental Protection Area (APA), in the south-central region of the state of Paraná, which houses one of the last significant remaining araucaria moist forest, and is indicated, both at federal and state levels, as a priority area for conservation.

These areas were selected to maintain riparian forests along small mini-basins to ensure the quality of the springs, to contain erosion and to enhance its biological feature in order to restore and conserve biodiversity, with direct impacts on water supplies, on maintaining the microclimate, on containing riparian erosion and other ecosystem services.

Araucaria forests

For several decades, the araucaria forests were exploited in an uncontrolled manner, with the extraction of trees with high-value timber, such as walnut (*Ocotea porosa*) and araucaria (*Araucaria angustifolia*). Even today, the forests that remain play an important role in the lives of small farmers, providing timber, yerba mate herb and pine nuts, among other products.

The main cause of deforestation in the area covered by the project, however, is extensive agriculture, since these farmers make a living from cultivating grain, such as corn, beans and vegetables, as well as dairy farming.

The national forest inventory conducted in 1984 by the Brazilian Institute of Forest Development (IBDF) registered only 0.7% of the araucaria forest as untouched or at a primary stage. The mapping carried out by the Forest Research Foundation of Paraná (FUPEF), in 2001 and 2004, found that 0.8% of forests are in advanced stage of regeneration. The historical reduction of forest coverage in the state of Paraná did not leave significant remaining primary araucaria forest, and the few and scattered forest fragments at an advanced stage of regeneration are disappearing.

"We are applying a slightly different methodology for restoration, enriching the locations with yerba mate herb seedlings. After all, they are family farms, and it is not always possible to maintain an area solely for conservation, without farming it. So, we want to show the community that it is possible to restore a particular area and, at the same time, use it economically. This helped us call the owners to participate and help them to restore a range of riparian forests larger than those determined by the Forest Code."

POLLYANA BORN | *BIOLOGIST, PROJECT COORDINATOR*

HIGHLIGHTS

Training and generating income for ninety family farmers to professionalize the production of seedlings and seeds.

Implementing sustainable use activities that are legally allowed in APPs to generate income for families and involving them in maintaining restored areas.

Seedlings provided by the Forest Nursery of Tracbel Energia and the Paraná state government, through the Riparian Forest Program, which has a network of nurseries maintained by the regional offices of the Environmental Institute of Paraná, as well as local governments and several independent entities.

The Rural Environmental Registration (CAR) of properties participating in the project, helping adapt to meet forest legislation.

PROJECT
Corredor Ecológico Monte Pascoal-Pau Brasil: Mata Atlântica, Biodiversidade e Comunidade (Monte Pascoal-Pau Brasil Ecological Corridor: Atlantic Forest, Biodiversity and Community)

PROJECT MANAGEMENT
Natureza Bela

TERRITORIAL SCOPE
Municipality of Porto Seguro (Bahia state)

OBJECTIVE
Restoring 220 hectares of Atlantic Forest in the Monte Pascoal National Park

TOTAL AMOUNT OF THE PROJECT
R$ 3,061,000.00

DATE AWARDED
6.13.2011

Photo: Alex Gonçalves

220 HECTARES UNDER RESTORATION

CORREDOR ECOLÓGICO MONTE PASCOAL-PAU BRASIL

NATUREZA BELA

Restoring 220 hectares of areas in the Monte Pascoal National and Historical Park, protected area located in the municipality of Porto Seguro (Bahia state). The areas are near indigenous Pataxó communities and present different stages of degradation caused by forest fires and other man-made activities.

Monte Pascoal-Pau Brasil Ecological Corridor

The project is carried out in two areas of the park. The first covers 150 hectares and is close to the indigenous community in Boca da Mata. The second, some 70 hectares, is close to the indigenous community in Meio da Mata.

These sites are included in the Monte Pascoal-Pau Brasil Ecological Corridor, which is one of the priority focus areas of the Ecological Corridors project, run by the Ministry of the Environment. This is because they are near the largest concentration of protected areas in the Central Corridor in the Atlantic Forest, considered a global biodiversity hotspot.

The area is also part of the Protected Areas Mosaic of Southern Bahia (MAPES) and is on a site declared heritage of humanity in two situations: as an Atlantic Forest Biosphere Reserve and as a Site of World Natural Discovery Heritage. Adjacent to the park is the Indigenous Land of Barra Velha, which has an area of approximately 8,600 hectares, home to approximately 1,650 Pataxó residents.

Native seedlings

The techniques adopted to restore the forest, which links planting native seedlings to fostering natural regeneration, follow the methodology used by the Experimental Forest Restoration Laboratory of the Luiz de Queiroz School of Agriculture – University of São Paulo (LERF/ESALQ/USP), already implemented in some properties in that corridor.

The Monte Pascoal Natural and History Park – an icon marking the Discovery of Brazil, located in the extreme south of Bahia, in the municipality of Porto Seguro – it covers a total area of 22,383 hectares and is the first protected area created in Bahia (1961) to conserve a representative sample of Atlantic Forest ecosystems, especially the transition between the coast and the rainforest, and local genetic resources.

HIGHLIGHTS

Strong involvement with the indigenous community in the region, including organizing the Cooplanjé, a cooperative of Pataxós set up under the project to carry out restoration activities.

Capacity building and community training to work in planting and nursery activities.

Revitalizing the Pataxó nurseries, quadrupling their production capacity to 120,000 seedlings/year.

"We are in a region that has been devastated over the years, especially due to the exploitation of native timber to produce handicrafts. To have an idea, the Pataxó community had never heard of forest restoration; they did not even know what it was.

In fact, this is the first restoration project run together with the Pataxó community. So, for the whole community, it was quite new to rediscover the importance of the forest where they live. Hence, the focus on capacity building, training and mobilization. Our efforts are aimed at turning the people who were clearing forests into tree planters."

LUCAS JOSÉ DOS SANTOS | *FOREST ENGINEER, TECHNICAL MANAGER*

PROJECT
Floresta Rio d'Ouro (Rio d'Ouro Forest)

PROJECT MANAGEMENT
Onda Verde Environmental Organization

TERRITORIAL SCOPE
Municipality of Nova Iguaçu (Rio de Janeiro state)

OBJECTIVE
Restoring 130 hectares of Atlantic Forest in areas of the Tinguá Biological Reserve

TOTAL AMOUNT OF THE PROJECT
R$ 1,941,777.00

DATE AWARDED
12.3.2013

Photo: Júlio César da Costa

130 HECTARES UNDER RESTORATION

FLORESTA RIO D'OURO

ONDA VERDE

Forest restoration of native species in the Atlantic Forest on 130 hectares of the Tinguá Biological Reserve (REBIO), located in the municipality of Nova Iguaçu, in the state of Rio de Janeiro.

The Tinguá REBIO retains some of the most important stretches of biodiversity in the state, which is why it is inserted into the Atlantic Forest Biosphere Reserve (RBMA) in Rio de Janeiro, which was recognized by the United Nations Organization for Education, Science and Culture (UNESCO) in 1992. Its vegetation is classified as tropical rainforest, with large structural variations due to the slope.

The project area is adjacent to the D'Ouro River, a major contributor to the water basin in the Guandu River, which supplies about 80% of the population in the metropolitan region in Rio de Janeiro.

Monitoring and research

The project also includes monitoring restoration by carrying out work in the laboratory to technically qualify the implemented activities and foster scientific research. Activities such as physical analysis and soil chemistry will be conducted at the Onda Verde Laboratory of Ecology and Restoration of Degraded Areas (LERAD).

Training sessions have been scheduled for people who work in the field. Training will be conducted by Onda Verde in its Environmental Education Center. Among the courses offered are Introduction to Forest Restoration, Nurserymen, Equipment and Handtools for Planting and Maintenance, Occupational Safety Regulations and First Aid.

"The idea is not only to implement restoration and scientific research, but also to provide environmental education, in partnership with public schools in the surrounding areas, so there is a sense of the community belonging to the area the project affects. This is because the feeling of belonging somewhere is essential for people to realize the importance of the environment and, thereby, understand the environmental services provided by their forests, which are right there beside them."

HÉLIO VANDERLEI | *PUBLIC POLICY MANAGER*

Created by the Brazilian Institute of Environment and Renewable Natural Resources (IBAMA) through Federal Decree Nº. 97,780 of May 23, 1989, the Rebio Tinguá is a protected area located between Serra do Mar and the Baixada Fluminense, with an area of approximately 26,000 hectares encompassing parts of the municipalities of Nova Iguaçu (55.14%), Duque de Caxias (37.44%), Petrópolis (4.26%) and Miguel Pereira (3.16%).

HIGHLIGHTS

Promoting scientific research to monitor restoration and conduct laboratory work.

Planting approximately 329,000 seedlings with the use of the total area planting and enrichment techniques, in accordance with the area's degradation level.

Using species in planting methods in which seed distribution is conducted by animals (zoochoric plants), thus attracting fauna, and allowing seeds brought from other forest sections to be scattered, which assists in forest succession.

Training and including the surrounding communities in restoration activities.

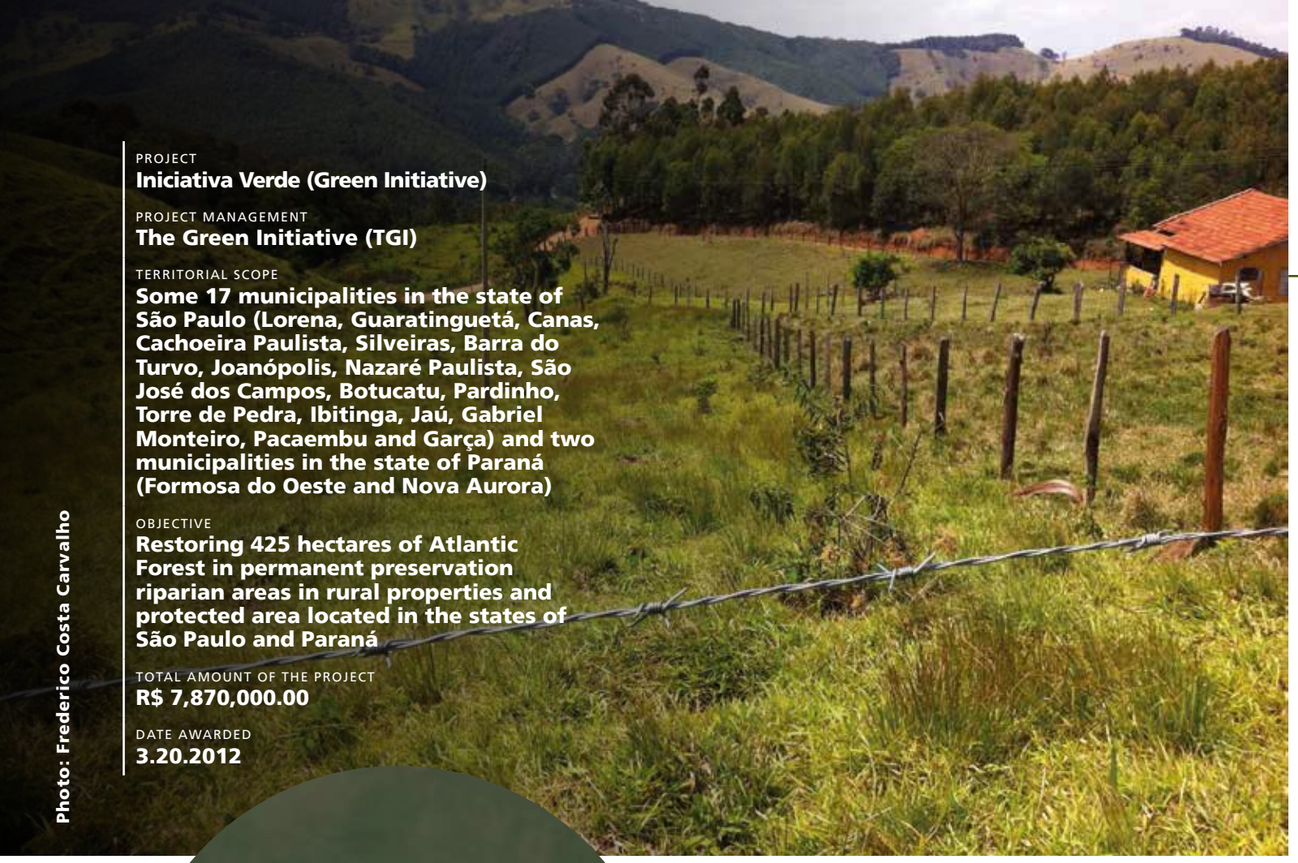


Photo: Frederico Costa Carvalho

PROJECT
Iniciativa Verde (Green Initiative)

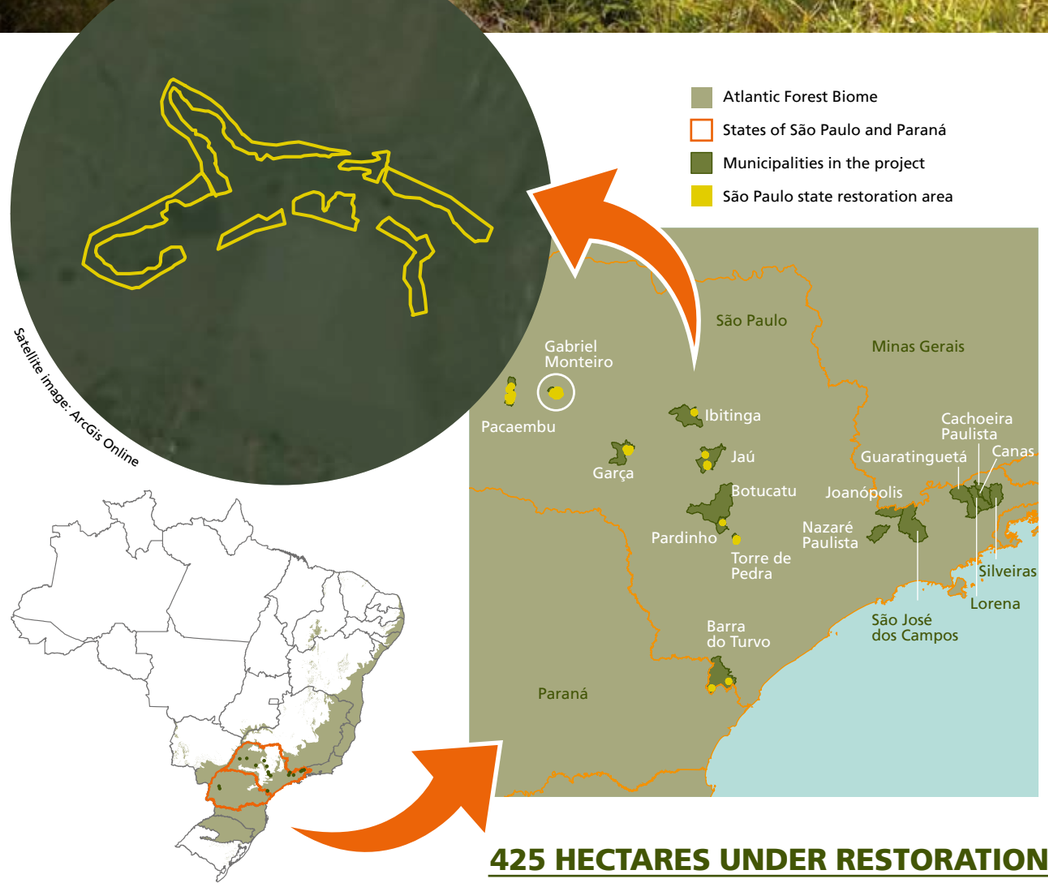
PROJECT MANAGEMENT
The Green Initiative (TGI)

TERRITORIAL SCOPE
Some 17 municipalities in the state of São Paulo (Lorena, Guaratinguetá, Canas, Cachoeira Paulista, Silveiras, Barra do Turvo, Joanópolis, Nazaré Paulista, São José dos Campos, Botucatu, Pardinho, Torre de Pedra, Ibitinga, Jaú, Gabriel Monteiro, Pacaembu and Garça) and two municipalities in the state of Paraná (Formosa do Oeste and Nova Aurora)

OBJECTIVE
Restoring 425 hectares of Atlantic Forest in permanent preservation riparian areas in rural properties and protected area located in the states of São Paulo and Paraná

TOTAL AMOUNT OF THE PROJECT
R$ 7,870,000.00

DATE AWARDED
3.20.2012



425 HECTARES UNDER RESTORATION

INICIATIVA VERDE

TGI

Restoring 425 hectares of Atlantic Forest in permanent preservation areas (APP) on private properties in the states of São Paulo and Paraná. The restored area will seek to establish a continuum of riparian forests along micro basin to enhance biological restoration, conservation and protection of biodiversity, and help improve the landscape. It is noteworthy that, by ensuring the quality of water sources, the water supply, maintaining the microclimate, containing riparian erosion and other ecosystem services, there will be an indirect relationship with social aspects.

Paraná state

In Paraná, the restoration area is located in ecological corridors, a priority area for conservation, according to State Decree Nº. 3,320/2004. The Paraná ecological corridors feature a five-kilometer strip along the banks of the major rivers of the state. These corridors are intended to connect the remaining large fragments of native vegetation in the state's Atlantic Forest.

São Paulo state

Carried out in the most degraded regions of São Paulo, the project includes a total of 17 municipalities, of which two – Lorena and São José dos Campos – are in the Serra da Mantiqueira region, registered as a priority area for conservation, sustainable use and sharing benefits from Brazilian biodiversity through the Project for Conservation and Sustainable Use of Brazilian Biological Diversity (PROBIO), run by the Ministry of the Environment. This is because it is an important area for several amphibian and bird species, in addition to a wealth of springs and water sources.

"We are working on five different approaches in these two states. There are several places with very different environmental, social and economic realities. Some areas have mountains; others are flat. Some regions have sugarcane crops, based on family farming, focused on grain production, with livestock etc. A real mosaic.

So, to reach the farmer, stirring this mobilization, instilling this conviction, we need to network, you need to be articulated with local groups. Partnerships are key."

ROBERTO RESENDE | *AGRONOMIST*

We cataloged 359 bird species in the project area, where, in fact, five primate species live, two of which are on the list of the 25 most endangered primates in the world, according to the International Union for Conservation of Nature (IUCN): the titis (*Callicebus personatus*) and the southern muriqui, also known as spider monkeys (*Brachyteles arachnoids*).

HIGHLIGHTS

Hiring local workers: two hundred people will be employed in the various approaches and project activities, including stages of preparation, implementation, producing seeds and seedlings, maintenance and management.

Carbon: it is estimated that approximately 128,000 tons of atmospheric carbon dioxide will be maintained, helping mitigate global greenhouse gas emissions.

Planting: the project will plant approximately 700,000 seedlings of native tree species from the biome in ecological corridors and priority conservation areas. The original plants in the region are the deciduous and semi-deciduous forests.

Photo: Paulo Santana

PROJECT
Sustenta a Mata: Preservando Florestas, Desenvolvendo Comunidades (Support for the Forest: Preserving Forests, Developing Communities)

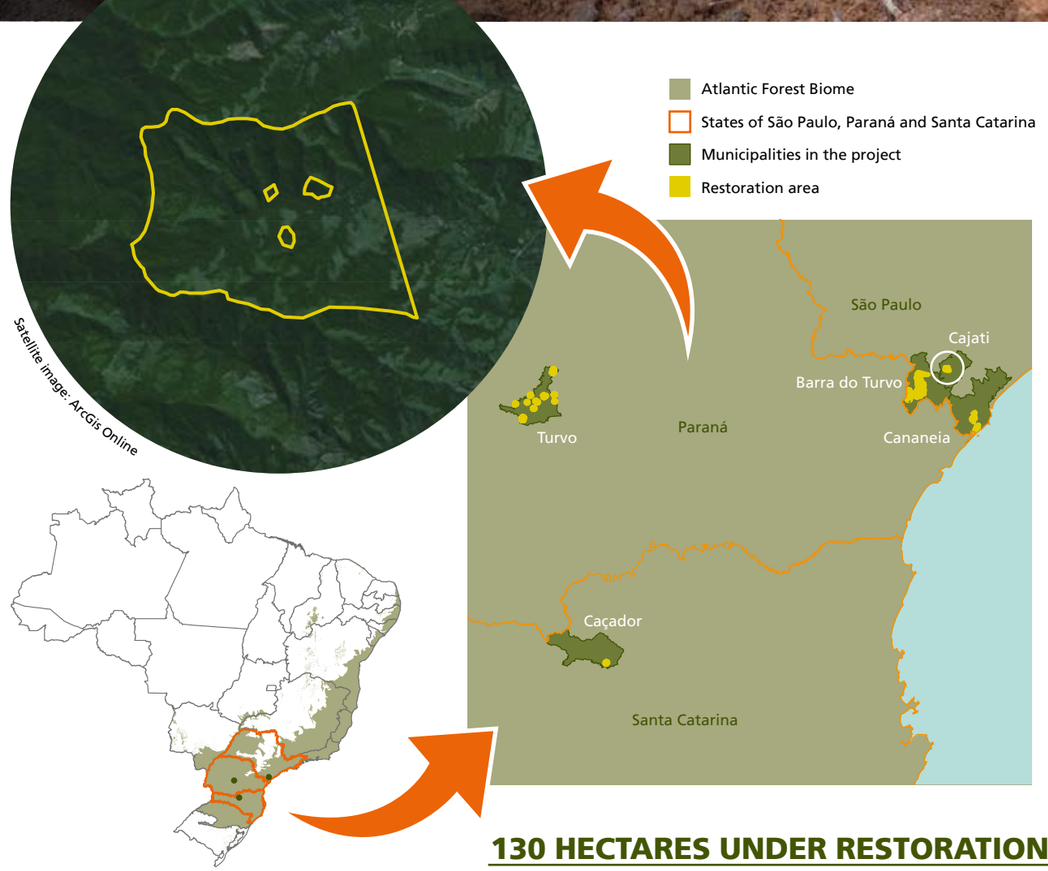
PROJECT MANAGEMENT
The Nature Conservancy of Brazil (TNC)

TERRITORIAL SCOPE
Municipalities of Cananeia, Cajati and Barra do Turvo (São Paulo state); Turvo (Paraná state); and Caçador (Santa Catarina state)

OBJECTIVE
Restoration of 130 hectares with native species in permanent preservation riparian areas from these three states

TOTAL AMOUNT OF THE PROJECT
R$ 1,705,000.00

DATE AWARDED
11.11.2011



130 HECTARES UNDER RESTORATION

SUSTENTA A MATA

TNC

Restoration of areas located in protected areas (PA) for sustainable use and in permanent preservation riparian areas (APP) located in three states: São Paulo (Jacupiranga Sustainable Development Reserve Mosaic, municipalities of Cananeia, Cajati and Barra do Turvo); Paraná (small rural properties, municipality of Turvo); and Santa Catarina (EMBRAPA Reserve, municipality of Caçador).

By working in these areas, the project aims to involve traditional communities associated with forest reserves, small farmers seeking ways to preserve the riparian forests on their properties, and the population in the region in general.

Restoration methods

In addition to complying with the legislation and regional standards, the project adopts the following premise as a technical guide, as it involves different economic models for APPs and PAs:

- in sites located in APPs, native tree species plantations that maximize carbon sequestration will be implemented; and
- in sustainable use PAs, native tree species with high economic potential for future sustainable forest management will be planted.

Considering that the main barrier to forest restoration is the high implementation cost, this project aims to implement planting models that enable restoration on a large scale in the biome through modules that, in addition to biodiversity conservation and water resources, provide economic and social benefits to the communities involved. The idea is to disseminate restoration techniques and knowledge acquired in efforts involving training as well as generating employment and income opportunities in the region.

"It is not conventional restoration; it is restoration using native species to generate income, either directly (sale of products) or indirectly (sustainable use of a natural resource).

In Cananeia, for example, artisanal canoes made using guapuruvu wood are a part of the community's culture and it is important to the main economic activity in the region, which is fishing. We realized this, and the solution was to implement a planting system in the restoration model with the presence of this tree."

AURELIO PADOVEZI | *COORDINATOR*

With a total area of almost 244,000 hectares, the Jacupiranga Mosaic – created by State Law Nº. 12,810/2008 – encompasses the last remaining Atlantic Forest in the Vale da Ribeira in the state of São Paulo. The main challenge is to reconcile environmental conservation not only with the activities, but also the way of life in the communities that are part of the mosaic coverage area.

HIGHLIGHTS

Seedlings from nurseries near the selected sites to ensure that they derive from plants adapted to regional environmental conditions.

Workshops and activities that include the participation of 43 trainees selected in the rural communities surrounding the project.

Hiring 25 people from local communities to implement restoration and monitor areas, while generating 75 jobs in other activities associated with the project (seed collection, producing seedlings, selling inputs etc.), helping establish people in the field.

Disseminating sustainable management technologies, preparing a publication in partnership with EMBRAPA Forests, to help disseminate data and techniques used.

Selecting species together with the community so that future exploration meets ecotourism needs associated with the region, such as honey production, timber for building enclosures (oyster production) and community needs.

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