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Report No: ICR00004686

ICR00004687

ICR00004688

ICR00004689

IMPLEMENTATION COMPLETION AND RESULTS REPORT

ON GRANTS FROM THE

BRAZIL CERRADO CLIMATE CHANGE MITIGATION TRUST FUND

(TF071814)

IN THE AMOUNT OF

US$4.4 MILLIONTO THE AGENT FOUNDATION FOR AGRIBUSINESS AND ENVIRONMENT DEVELOPMENT (FUNDAÇÃO AGENTE) (TF06192)

US$4.4 MILLION TO THE LUÍS EDUARDO MAGALHÃES FOUNDATION (FLEM) (TF015228)

US$ 4.3 MILLION TO THE FUNDAÇÃO PRÓ-NATUREZA (FUNATURA) (TF0A0093)

US$1.0 MILLION TO THE FOUNDATION FOR SPACE RESEARCH, APPLICATIONS AND TECHNOLOGY (FUNCATE) (TF18566)

IN THE

FEDERATIVE REPUBLIC OF BRAZIL

FOR THE

BRAZIL CERRADO CLIMATE CHANGE MITIGATION PROGRAM

RURAL ENVIRONMENTAL CADASTRE AND FIRE PREVENTION IN PIAUÍ STATE PROJECT (P143362)

RURAL ENVIRONMENTAL CADASTRE AND FIRE PREVENTION IN BAHIA STATE PROJECT (P143376)

PLATFORM OF MONITORING AND WARNING OF FOREST FIRES IN THE CERRADO (P149189)

PROCERRADO FEDERAL PROJECT (P150892)

FOR A TOTAL AMOUNT OF U$ 14.1 MILLION

November 28, 2018

Environment & Natural Resources Global Practice

Latin America And Caribbean Region

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| CURRENCY EQUIVALENTS |
| (Exchange Rate Effective September 28, 2018) |
|  |
| |  |  | | --- | --- | | Currency Unit = | Brazilian Real | | BRL1.0= | US$0.25 | | US$1.00 = | BRL$4.01 | |
| FISCAL YEAR |
| January 1 – December 31 |

|  |  |
| --- | --- |
| Regional Vice President: | Jorge Familiar |
| Country Director: | Martin Raiser |
| Senior Global Practice Director: | Karin Erika Kemper |
| Practice Manager: | Valerie Hickey |
| Task Team Leader: | Bernadete Lange |
| ICR Main Contributors: | Christoph Diewald, Bernadete Lange |

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| **ABBREVIATIONS AND ACRONYMS** |

|  |  |
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| APP | Permanent Preservation Areas  *Áreas de Preservação Permanente* |
| BA | Bahia State |
| BCCCMTF | Brazil Cerrado Climate Change Mitigation Single Donor Trust Fund |
| BR | Brazil |
| CAR | Rural Environmental Cadaster  *Cadastro Ambiental Rural* |
| CEFIR | State Forest Cadaster of Rural Landholdings  *Cadastro Estadual Florestal de Imóveis Rurais* |
| CIF | Climate Investment Funds |
| CO2 | Carbon dioxide |
| CPF | Country Partnership Framework |
| CRA | Environmental Reserve Quotas  *Cotas de Reserva Ambiental* |
| DEFRA | Department for Environment, Food and Rural Affairs |
| DGP | Gross Domestic Product |
| FAP | Forest Action Plan |
| FCPF | Forest Carbon Partnership Facility |
| FIP | Forest Investment Program |
| FLEM | Luiz Eduardo Magalhães Foundation  *Fundação Luiz Eduardo Magalhães* |
| FM | Financial Management |
| FRELs | Forest Reference Emissions Levels |
| FUNATURA | Pro-Nature Foundation  *Fundação Pró-Natureza* |
| FUNCATE | Foundation for Space Science, Applications and Technology  *Fundação de Ciência, Aplicações e Tecnologia Espaciais* |
| GHG | Greenhouse Gases |
| GoB | Government of Brazil |
| ha | Hectare(s) |
| IBAMA | National Environmental Institute, linked to the MMA  *Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis* |
| ICF | International Climate Fund |
| ICM | Implementation Completion Report |
| ICMBio | Chico Mendes Institute for Biodiversity Conservation  *Instituto Chico Mendes de Conservação da Biodiversidade* |
| IFR | Interim Financial Report |
| INCRA | National Institute of Colonization and Agrarian Reform  *Instituto Nacional de Colonização e Reforma Agrária* |
| INEMA-BA | Institute of Environment and Water Resources of Bahia  ***Instituto do Meio Ambiente e Recursos Hídricos da Bahia*** |
| INPE | National Institute for Space Research  *Instituto Nacional de Pesquisas Espaciais* |
| LUCF | Land Use Change and Forestry |
| MA | Maranhão State |
| MATOPIBA | States of Maranhão, Tocantins, Piauí and Bahia |
| M&E | Monitoring and Evaluation |
| MIF | Integrated Fire Management Plan  *Manejo Integrado do Fogo* |
| MMA | Ministry of Environment  *Ministério do Meio Ambiente* |
| N2O | Nitrous Oxide |
| NDC | Nationally Determined Contribution |
| NGO | Nongovernmental Organization |
| NLTA | Non-lending Technical Assistance |
| NPV | Net Present Value |
| OEMA | State Environmental Agency  *Órgão Estadual do Meio Ambiente* |
| PA | Protected Areas |
| PDO | Project Development Objective |
| PI | Piauí State |
| PIU(s) | Project Implementation Unit(s)  *Unidade(s) de Implementação do(s) Projeto(s)* |
| PPCerrado | Action Plans for Prevention and Control of Deforestation and Forest Fire in the Cerrado  *Plano de Ação para Prevenção e Controle do Desmatamento e das Queimadas no Cerrado* |
| PRA | Environmental Regularization Program  *Programa de Regularização Ambiental* |
| PRADA | Plan to Rehabilitate Degraded Areas  *Plano de Recuperação de Áreas Degradadas* |
| PROVEG | National Policy for the Recovery of Native Vegetation  *Política Nacional de Recuperação da Vegetação Nativa* |
| REDD+ | Reducing Emissions from Deforestation and Forest Degradation; and the role of conservation, sustainable forest management and enhancement of forest carbon stocks |
| RETF | Recipient-executed Trust Fund |
| RL | Legal Reserve  *Reserva Legal* |
| SCD | Strategic Country Diagnostic |
| SEMA-BA | Secretariat of Environment of Bahia  *Secretaria do Meio Ambiente do Estado da Bahia* |
| SEMA-MA | State Secretariat of Environment and Natural Resources of Maranhão  *Secretaria de Estado do Meio Ambiente e Recursos Naturais do Maranhão* |
| SEMAR-PI | Secretariat of Environment and Water Resources of Piauí  *Secretaria Estadual do Meio Ambiente e Recursos Hídricos do Piauí* |
| SFB | Brazilian Forest Service  *Serviço Florestal Brasileiro* |
| SICAR | Rural Environmental Cadaster System  *Sistema Nacional de Cadastro Ambiental Rural* |
| SISNAMA | National Environmental System  *Sistema Nacional do Meio Ambiente* |
| TA | Technical Assistance |
| tCO2eq | Tons of Carbon Dioxide equivalent |
| TF | Trust Fund |
| TO | Tocantins Sate |
| UK | United Kingdom of Great Britain and Northern Ireland |
| UNFCCC | United Nations Framework Convention on Climate Change |
| WB | The World Bank |
| WBG | World Bank Group |

**TABLE OF CONTENTS**

[DATA SHEET 7](#_Toc531167653)

[ICR INTRODUCTION 11](#_Toc531167654)

[I. PROJECT CONTEXT AND DEVELOPMENT OBJECTIVES 11](#_Toc531167655)

[A. CONTEXT AT APPRAISAL 11](#_Toc531167656)

[B. SIGNIFICANT CHANGES DURING IMPLEMENTATION 20](#_Toc531167657)

[II. OUTCOME 21](#_Toc531167658)

[A. RELEVANCE OF PDOs 21](#_Toc531167659)

[B. ACHIEVEMENT OF PDOs (EFFICACY) 22](#_Toc531167660)

[C. EFFICIENCY 30](#_Toc531167661)

[D. JUSTIFICATION OF OVERALL OUTCOME RATING 33](#_Toc531167662)

[E. OTHER OUTCOMES AND IMPACTS 34](#_Toc531167663)

[III. KEY FACTORS THAT AFFECTED IMPLEMENTATION AND OUTCOME 36](#_Toc531167664)

[A. KEY FACTORS DURING PREPARATION 36](#_Toc531167665)

[B. KEY FACTORS DURING IMPLEMENTATION 37](#_Toc531167666)

[IV. BANK PERFORMANCE, COMPLIANCE ISSUES, AND RISK TO DEVELOPMENT OUTCOME 38](#_Toc531167667)

[A. QUALITY OF MONITORING AND EVALUATION (M&E) 38](#_Toc531167668)

[B. ENVIRONMENTAL, SOCIAL AND FIDUCIARY COMPLIANCE 39](#_Toc531167669)

[C. BANK PERFORMANCE 41](#_Toc531167670)

[D. RISK TO DEVELOPMENT OUTCOME 42](#_Toc531167671)

[V. LESSONS AND RECOMMENDATIONS 42](#_Toc531167672)

[ANNEX 1. RESULTS FRAMEWORK AND KEY OUTPUTS 46](#_Toc531167673)

[ANNEX 2. BANK LENDING AND IMPLEMENTATION SUPPORT/SUPERVISION 70](#_Toc531167674)

[ANNEX 3. PROJECT COST BY COMPONENT 73](#_Toc531167675)

[ANNEX 4. EFFICIENCY ANALYSIS 75](#_Toc531167676)

[ANNEX 5. BORROWER, CO-FINANCIER AND OTHER PARTNER/STAKEHOLDER COMMENTS 81](#_Toc531167677)

[ANNEX 6. SUPPORTING DOCUMENTS 82](#_Toc531167678)

[ANNEX 7. STAKEHOLDERS WORKSHOP 85](#_Toc531167679)

[ANNEX 8. CERRADO PROGRAM MAP 89](#_Toc531167680)

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| **DATA SHEET** |

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| **BASIC INFORMATION** | |
| **Product Information** | |

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| --- | --- | --- |
| Project ID | | Project Name |
| P143362; P143376; P149189; P150892 | | Brazil Cerrado Climate Change Mitigation Program.  Rural Environmental Cadastre and Fire Prevention In Piauí State Project.  Rural Environmental Cadastre And Fire Prevention In Bahia State Project.  Platform of Monitoring and Warning of Forest Fires in the Cerrado.  ProCerrado Federal Project. |
| Country | | Financing Instrument |
| Brazil | | Investment Project Financing |
| Original EA Category | | Revised EA Category |
| Partial Assessment (B) | | Not applicable |
| **Organizations** | | | |
| Beneficiary  Federative Republic of Brazil | | Implementing Agency  SEMAR-Piauí; SEMA-Bahia; INPE; Ministry of Environment | |
| Recipients  Agent Foundation for Agribusiness and Environment Development (Fundação Agente)  Luís Eduardo Magalhães Foundation (FLEM)  Foundation for Space Research, Applications and Technology (FUNCATE)  Fundação Pró-Natureza (FUNATURA) | |  | |
| **Project Development Objective (PDO)** | |

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| Original PDO  The objective of the CerradoProgram is to assist Brazil in mitigating climate change in the Cerrado biome and in improving environment and natural resource management in that biome through appropriate policies and practices. The individual projects’ PDOs were:  **Piauí Project**: “to promote the reduction of climate change impacts in the Cerrado of southern Piauí by: (a) promoting the environmental regularization of landholdings in the targeted municipalities; and (b) preventing and combatting forest fires through the integration of local actors and promoting the adoption of sustainable production practices in the targeted municipalities.”  **Bahia Project**: “to promote the reduction of climate change impacts in the Cerrado of the west of Bahia State by: (a) promoting the environmental regularization of landholdings in the targeted municipalities and support actions to promote recovery of environmental liabilities; and (b) strengthening the State’s capacity to prevent and combat forest fires through the integration of local actors and promoting the adoption of sustainable production practices in the targeted municipalities.”  **Federal Project**: “to enhance the capacity of the Ministry of Environment to establish integrated forest-fire management and landholdings’ registrations in selected rural areas of the Cerrado Biome.”  **INPE Project:** “to facilitate the monitoring, analysis and early detection of forest fires by using the TERRA-MA2-Queimadas to support decision making among environmental managers in the Cerrado Biome.” |
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| **FINANCING** |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  |  |  | | --- | --- | --- | --- | |  | **Original Amount (US$)** | **Revised Amount (US$)** | **Actual Disbursed (US$)** | | **World Bank Financing** | **14,100,000** | **14,100,000** | **13,746,945** | | P143362- TF16192 | 4,400,000 | 4,400,000 | 4,396,217 | | P143376 - TF15228 | 4,400,000 | 4,400,000 | 4,284,197 | | P150892 – TFA0093 | 4,300,000 | 4,300,000 | 4,139,270 | | P149189 – TF18566 | 1,053,000 | 1,053,000 | 927,261 | | **Non-World Bank Financing** |  |  |  | | Borrower | 00.00 | 00.00 | 00.00 | | **Total** | 14,100,000 | 14,100,000 | 13,746,945 | | **Total Project Cost** | 14,100,000 | 14,100,000 | 13,746,945 | |
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| |  | | --- | | **KEY DATES** | |

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| FIN\_TABLE\_DATA |  |  |  |  |  |

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| --- | --- | --- | --- | --- | --- |
| **Projects** | **Approval** | **Effectiveness** | **MTR Review** | **Original Closing** | **Actual Closing** |
| P143362 | 08-Apr-2014 | 14-Apr-2014 | 12-May-2017 | 30-Jun-2016 | 31-Dec-2017 |
| P143376 | 12-Sep-2014 | 14-Sep-2014 | 12-May-2017 | 30-Jun-2016 | 31-Dec-2017 |
| P150892 | 27-Apr-2015 | 28-Apr-2015 | 12-May-2017 | 29-Dec-2017 | 30-May-2018 |
| P149189 | 15-Dec-2014 | 09-Mar-2015 | 12-May-2017 | 31-Dec-2017 | 31-Dec-2017 |

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| |  | | --- | | **RESTRUCTURING AND/OR ADDITIONAL FINANCING** | |

|  |  |  |  |
| --- | --- | --- | --- |
| **Projects** | **Restructuring Dates** | **Amount Disbursed (US$M)** | **Key Revisions** |
| P143362 | 26-Jan-2016 | 0.44 | Level-Two Restructuring: to extend the Closing Date by 18 months and to revise the Results Framework of the Project |
| P143376 | 27-Jan-2016 | 1.03 | Level-Two Restructuring: to extend the Closing Date by 18 months and to revise the Results Framework of the Project |
| P150892 | 30-Nov-2017 | 2.70 | Level-Two Restructuring: to extend the Closing Date by 5 months and to revise the Results Framework of the Project |

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| |  | | --- | | **KEY RATINGS** | | | | |
| **Cerrado Program/Projects** | | **Outcome** | **Bank Performance** | **M&E Quality** |
| CERRADO PROGRAM | | Satisfactory | Satisfactory | Modest |
| P143362 - PIAUÍ PROJECT | | Moderately Satisfactory | Satisfactory | Modest |
| P143376 - BAHIA PROJECT | | Moderately Satisfactory | Satisfactory | Modest |
| P149189 – FEDERAL PROJECT | | Satisfactory | Satisfactory | Modest |
| P150892 – INPE PROJECT | | Highly Satisfactory | Satisfactory | Modest |

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| |  | | --- | | **RATINGS OF PROJECT PERFORMANCE IN ISRs** | | | | | |
| **No.** | | **Date ISR Archived** | **DO Rating** | **IP Rating** | **Actual Disbursements (US$M)** |
| P143362 | | 23-Dec-2014 | Satisfactory | Satisfactory | 0.44 |
|  | | 05-Nov-2015 | Satisfactory | Moderately Satisfactory | 0.44 |
|  | | 05-Sep-2016 | Moderately Unsatisfactory | Moderately Unsatisfactory | 1.13 |
|  | | 06-Oct-2017 | Moderately Satisfactory | Moderately Unsatisfactory | 3.59 |
| P143376 | | 23-Dec-2014 | Satisfactory | Satisfactory | 0.00 |
|  | | 14-Sep-2015 | Satisfactory | Satisfactory | 0.58 |
|  | | 11-Ago-2016 | Satisfactory | Satisfactory | 1.51 |
|  | | 08-Aug-2017 | Satisfactory | Satisfactory | 2.70 |
| P150892 | | 29-Dec-2015 | Moderately Satisfactory | Moderately Satisfactory | 0.30 |
|  | | 16-Dec-2016 | Moderately Satisfactory | Moderately Satisfactory | 1.23 |
|  | | 24-Sep-2017 | Moderately Satisfactory | Moderately Satisfactory | 2.70 |
|  | | 04-Oct-2017 | Moderately Satisfactory | Moderately Satisfactory | 2.70 |
| P149189 | | 01 Mar 2016 | Satisfactory | Satisfactory | 0.21 |
|  | | 18 Aug 2017 | Satisfactory | Satisfactory | 0.59 |

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| --- | --- | --- | --- | --- |
| |  | | --- | | **SECTORS AND THEMES** | | | | |
| **Sectors** | | | |
| **Major Sector/Sector** | | **(%)** | |
| **Agriculture, Fishing and Forestry** | | |  |
| Public Administration–Agriculture, Fishing & Forestry | | | 50 |
| Forestry | | | 50 |
| **Themes** | | |  |
| **Major Theme/ Theme (Level 2)/ Theme (Level 3)** | | | **(%)** |

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| **Urban and Rural Development** |  |
| |  |  | | --- | --- | | Rural Development | 25 | | |  |  | | --- | --- | | Land Administration and Management |  | | | | |

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| **Environment and Natural Resource Management** |  |
| |  |  | | --- | --- | | Climate change |  | | |  |  | | --- | --- | | Mitigation | 50 | | |  |  |  | | --- | --- | | Environmental policies and institutions | 25 | |  | | | |

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| |  | | --- | | **ADM STAFF** | |

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| --- | --- | --- |
| **Role** | **At Approval** | **At ICR** |
| Regional Vice President: | Hasan Tuluy | Jorge Familiar |
| Country Director: | Deborah L. Wetzel | Martin Raiser |
| Senior Global Practice Director: | Paula Caballero | Karin E. Kemper |
| Practice Manager: | Emilia Battaglini, Acting LCSEN | Valerie Hickey |
| Task Team Leader(s): | Maria Bernadete Ribas Lange | Maria Bernadete Ribas Lange |
| ICR Contributing Author: |  | Christoph Diewald |

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| ICR INTRODUCTION   1. The Cerrado Program aimed to assist Brazil in mitigating climate change in the Cerrado Biome and in improving its environmental and natural resources management through appropriate policies and practices. The program was an umbrella initiative, with four recipient-executed projects, each with its own recipient-executed trust fund (RETF) agreement, funded under the Brazil Cerrado Climate Change Mitigation Trust Fund (BCCCMTF) established and administered by the Bank, with funds from the United Kingdom. 2. For this program, one ICR has been prepared using the full ICR template to provide an assessment of the individual small-grant RETFs and their contribution to the overall objectives of the Cerrado Program. 3. The Cerrado Program arrangement was complex, involving individual projects, each with their Project Development Objectives (PDOs), intermediate indicators, and implementing agencies. In spite of this, the Cerrado Program’s outcome achievements can be assessed by combining the contribution of the recipient-executed projects to the Program objectives. |
| 1. PROJECT CONTEXT AND DEVELOPMENT OBJECTIVES  CONTEXT AT APPRAISAL ***The Cerrado Biome and its Significance***   1. The Cerrado Biome, located in central Brazil, south of the Amazon region, covers nearly one quarter, or 2.04 million km2, of the country. It includes a mosaic of ecosystems with 23 types of vegetation consisting mostly of tropical savannas, woodlands, grasslands and forests. The Cerrado has been the stage for an unprecedented expansion of agricultural production in Brazil, through cattle ranching on natural and planted pastures since the 1940s, and, since the 1970s, through mechanized, high-yield commercial production of crops such as soybeans, maize and cotton. There are about 50 million head of cattle in the Cerrado: one third of the national herd. This increase required expansion of planted pastures, as the carrying capacity of the native savanna is less than one animal per hectare. Pastures are subject to deterioration and eventual abandonment in the absence of sustainable management practices, leading to occupation or clearing of new land.   ***Deforestation, Fires, and Carbon Dioxide (CO2) Emissions***   1. The largest share of Brazil´s net CO2 emissions come from land-use change, especially the conversion of forests to cropland and pasture (77 percent of total CO2 net emissions in 2005). The Cerrado is important not only as the savanna biome with the greatest biodiversity, but also for the large amount of carbon stored in its biomass and soils, with only 30 percent of carbon occurring above ground and the remainder in the soil and underground biomass. The Cerrado has become Brazil’s major producer and exporter of important cash crops and beef. The expansion of agriculture in the Cerrado caused the conversion of natural vegetation to alternative land uses (“deforestation”) and use of fire. This resulted not only in loss of biodiversity, soil and pasture degradation, and changes to water and sedimentation regimes, but also in large carbon emissions, in addition to the methane releases from cattle ranching. 2. Land-use data[[1]](#footnote-1) indicate that only 54.5 percent of the Cerrado Biome has maintained its natural vegetation. Agricultural activity is likely to continue in the Cerrado because it still has large areas with agricultural potential. 3. The Cerrado is a fire-adapted ecosystem, and wildfires occur naturally from lightning at the end of the dry and the beginning of the rainy season. With agricultural development, the use of fire as an agricultural practice has become widespread, less so for land clearing (as in the Amazon region), but for periodic regeneration of pastures, and for burning of sugarcane before harvesting. While pasture burning has agronomic advantages, it is not sustainable, as it does not maintain a productive pasture for a long time. Moreover, fire leaps into nearby areas with native vegetation. Wildfires change the vegetation structure and composition, bring wildlife death, reduce nutrient cycling, cause erosion and soil depletion, change the water regime, damage crops, tree plantations and rural property, and affect to human health. Fire releases large amounts of greenhouse gases (GHG) and reduces organic matter and carbon in the soils. Some 75 percent of fire hotspots detected in the Cerrado were in areas with remnant native vegetation.   ***Relevant Government Policy***   1. Brazil’s Forest Code of 1965 was amended in 2012 (Law 12.651, now called “Law for the Protection of Native Vegetation”). This law contains crucial rules governing rural land use. Each holding is obliged to keep a certain percentage of its area under native vegetation cover as “Legal Reserve” (Reserva Legal, RL) [[2]](#footnote-2). It also requires the protection of natural vegetation in “permanent preservation areas” (Áreas de Preservação Permanente, APPs), such as on steep slopes, along watercourses and around springs. It obliges landholders to register their landholdings in the Rural Environmental Cadaster (Cadastro Ambiental Rural, CAR). CAR is an electronic register of rural landholdings maintained by the federal and state governments for the purpose of effectively monitoring, enforcing and planning compliance of landholdings with the Forest Code. It contains details of the size and location of farms, of the areas earmarked for production, APPs and RLs. CAR data facilitate land-use planning. Without the CAR certificate, a rural holding cannot obtain a license for economic activities from state environmental agencies, and no rural credit may be provided. Clearing of native vegetation is still allowed under the law, except in RLs and APPs. The Forest Code also requires that the vegetation cover of APP and RL areas illegally cleared after July 22, 2008 be restored within 20 years. Landholders who cleared APP and RL areas illegally prior to that date must still comply with the law but are entitled to certain benefits by enrolling in an Environmental Regularization Program[[3]](#footnote-3) , signing a commitment, and submitting a Plan to Rehabilitate Degraded Areas that details how and when the areas will be restored. 2. At the Copenhagen Conference of the Parties to the United Nations Framework Convention on Climate Change (UNFCCC) in 2009, Brazil committed itself to substantial reductions in GHG emissions by 2020, and codified this in the National Climate Change Policy, a law that defines several policy instruments, such as Action Plans for Prevention and Control of Deforestation in each major biome. In September 2010, the Federal Government launched the Action Plan for Prevention and Control of Deforestation and Forest Fires in the Cerrado (PPCerrado), with three components: (a) control and monitoring; (b) protected areas and landscape planning; and (c) promotion of sustainable productive activities[[4]](#footnote-4).   ***Rationale for Bank Involvement***   1. Brazil’s long-term vision calls for greater equity, sustainability, and competitiveness. These are the three pillars of the World Bank Group’s Country Partnership Strategy, discussed by the Executive Directors on November 1, 2011 (CPS 2012–2015; Report No. 63731 BR), under Strategic Objective 4: Improving sustainable natural resource management and climate resilience. The engagement in the Cerrado biome seeks to: (a) support the mapping of degraded areas across all Brazilian biomes and help develop financial incentives to promote their rehabilitation; (b) support increased sustainability of agricultural production and forestry in the Cerrado; (c) support efforts by the federal and selected subnational governments to further strengthen and integrate their environmental management systems, including those at the metropolitan level, and ensure environmental compliance in rural areas; (d) help improve the efficiency and effectiveness of environmental licensing and monitoring systems; and (e) help the Federal Government and the private sector to implement Brazil’s National Climate Change Plan. 2. The Cerrado Program uses the CPS’s recommended approach of developing new partnerships at national and subnational level, focusing on pending environmental and poverty reduction challenges.   ***The Cerrado Program***   1. The Cerrado Program was established to contribute to reduced biodiversity loss, poverty reduction, and reduced GHG emissions in the Cerrado Biome through reduced deforestation, restoration of natural forests, reduced pressure on remaining natural vegetation, and support to fire prevention and control of burning. 2. The Cerrado Program was built, in part, on experiences and lessons learned over the last 15 years in the Brazilian Amazon, on environmental management and governance, reduced use of forest and pasture burning, and fire prevention and firefighting. It follows a three-pronged approach:  * Promotion of farmers’ compliance with the Forest Code, based on strengthening the monitoring and enforcement of mandatory reserve requirements through environmental registration of rural holdings. Better compliance is expected to result both in the avoidance of illegal deforestation and the restoration of already cleared natural reserve areas on private land. * Promotion of controlled burning, prevention of forest fires, replacement of burning by more sustainable agricultural practices, and strengthening of firefighting capacity. * Strengthening the institutional capacity for natural resources management in the Cerrado.  1. The Program was focused on selected municipalities in four of the Cerrado states: Maranhão (MA), Tocantins (TO), Piauí (PI) and Bahia (BA), known as the MATOPIBA region. As the country’s last agricultural frontier, MATOPIBA is seen as strategic to increase Brazil’s agricultural production and exports. In 2011, it accounted for some 60 percent of deforestation in the biome. 2. The Program was funded by a trust fund established in December 2011 with resources from the United Kingdom (BCCMTF, £10.0 million (British Pounds), under the International Climate Fund of the UK. The Bank and MMA opted to prepare and implement four separate projects with recipient-executed grants to ensure ownership by the implementing agencies. The total amount of grants for the four projects is about US$14 million. Remaining resources from the BCCCMTF (about US$1.3 million) were executed directly by the Bank for technical assistance (TA) and training activities. The four recipient-executed projects are:  * Rural Environmental Cadaster and Fire Prevention Project in Bahia State (P143376) (Bahia Project). Grant: US$4.4 million. To be implemented by the Secretariat of Environment of Bahia (Secretaria do Meio Ambiente do Estado da Bahia, SEMA-BA), the Institute of Environment and Water Resources of Bahia (Instituto do Meio Ambiente e Recursos Hídricos da Bahia, INEMA-BA) and the Luíz Eduardo Magalhães Foundation (Fundação Luiz Eduardo Magalhães, FLEM). * Rural Environmental Cadaster and Fire Prevention Project in Piauí State (P143362) (Piauí Project). Grant: US$4.4 million. To be implemented by the Secretariat of Environment and Water Resources of Piauí (Secretaria Estadual do Meio Ambiente e Recursos Hídricos do Piauí, SEMAR-PI) and the Agent Foundation for Agribusiness and Environment Development (Fundação Agente). * ProCerrado Federal Project (P150892) (Federal Project). Grant: US$4.3 million. To be implemented by the MMA, the Brazilian Forest Service (Serviço Florestal Brasileiro, SFB), the Chico Mendes Institute for Biodiversity Conservation (Instituto Chico Mendes de Conservação da Biodiversidade, ICMBio), and the Pro-Nature Foundation (Fundação Pró-Natureza, FUNATURA). * Platform of Forest Fire Monitoring and Warning in the Brazilian Cerrado Project (P149189) (INPE Project). Grant: US$1.053 million. Coordinated by the National Institute for Space Research (Instituto Nacional de Pesquisas Espaciais, INPE) and the Foundation for Space Research, Applications and Technology (Fundação de Ciência, Aplicações e Tecnologias Espaciais, FUNCATE).   ***Theory of Change (Results Chain)***  Figure 1: Results Chain of the Cerrado Program and its Projects.    Legend: critical assumptions: (1) Small landholders in the Cerrado Biome have shown a high level of interest in receiving more intensive TA on CAR and restoration practices, but the government lacks the required funds to provide it; (2) widespread use of fire in pasture management and crop agriculture, as well as for hunting, contributes to GHG emissions and, as such, needs better control; and (3) implementation of and compliance with the Forest Code are critical to slowing the illegal taking of land for agriculture in the Cerrado Biome. | |
| 1. The objective of the Cerrado Program (“to assist Brazil in mitigating climate change in the Cerrado Biome and improving environmental and natural resources management in that biome through appropriate policies and practices”) is considered a higher-level objective and long-term outcome of the program. The ultimate goal of the Cerrado Program is to contribute to mitigating climate change and to improving environmental and natural resources management in the Cerrado Biome. Mitigating climate change implies reducing net emissions from land use and land-use change. In the case of this program, the aim is to reduce the clearing of native Cerrado vegetation for cattle grazing and crops to that which is permitted by law, and to promote the restoration of degraded areas that were illegally cleared. It aimed to support the implementation of public policies to reduce the illegal clearing of native vegetation for cattle grazing and crops and to promote the restoration of “degraded” areas that were irregularly cleared. 2. The Program outcomes were to be achieved by: (a) the enforcement of compliance with the Brazilian Forest Code, which requires registration of all landholdings in CAR, so that compliance with the law can be monitored and enforced, as well as commitments to restoration of illegally cleared vegetation, and (b) helping to prevent, fight, monitor and detect wildfires early. Compliance with the Forest Code restricts land clearing to those areas not within RL and APP. Reduction of burning for land clearing and for pasture renovation and reduction of frequency and extent of accidental wildfires has immediate and obvious benefits in terms of climate change mitigation. 3. For purposes of the theory of change of the Cerrado Program and its four-related recipient-executed projects, the key expected outcomes are defined on the basis of the stated PDOs of the four projects and their associated indicators. The four RETF projects’ PDOs were similar, with differences regarding area of influence and supported activities. In summary, the four projects’ targeted results can be combined to assess the program’s overall goal. The PDO statements of these RETFs articulate objectives and expected outcomes, but also include components, activities and outputs that contribute to those objectives in the respective parts of the PDO statements. Therefore, the PDO statements will need to be “unpacked” and reorganized in order to articulate the expected outcomes. 4. The key outcomes from the PDO statements of the individual RETFs are to: (a) promotion of the reduction of climate-change impacts in the Cerrado by promoting environmental regularization of landholdings; (b) promotion of the reduction of climate-change impacts in the Cerrado by preventing, combating, monitoring and early detection of forest fires; and (c) enhanced capacity of the MMA and States to establish integrated forest-fire management and landholding registration in selected rural areas of the Cerrado Biome. The PDO reference to “reduction of climate-change impacts” in the first two outcomes is a higher-level objective to which the program will contribute, but which is not expected to realistically achieve; thus, the qualification with the addition of the word “promotion,” which pitches this at a lower level. Therefore, the project outcomes will be assessed on the achievement of the promotion of the reduction of climate-change impacts and not on the actual reduction of climate-change impacts which would not be measurable or realistic because it is not possible to measure the results during the project’s lifetime or to fully attribute the changes to a specific project. 5. Promotion of Environmental regularization of a landholding means making it conform to the Forest Code, including its effective registration in the CAR system, and, in the case of “environmental liabilities”, the written commitment to carry out a program of restoration, re-composition or regeneration of native vegetation to comply with the stipulations of the Forest Code. Environmental liabilities include areas of RLs and APPs that were illegally cleared after 2008 and must be recovered. Private landholders’ compliance with legal requirements is at the heart of monitoring and control of forest cover by environmental agencies. Registering rural properties in CAR is a first step toward compliance with the Forest Code and the implementation of CAR is expected to lead to the promotion of recovery of “degraded” areas, and therefore reduction (or avoidance) of emissions. 6. Promotion of reduction of climate change impacts from forest fires is expected to be achieved by strengthening institutional arrangements for fire authorization and firefighting; adoption of sustainable production practices and training farmers and ranchers in alternatives to the use of fire; electronic applications to facilitate drought prediction and monitoring of fire risks; and the formulation of a national policy on prevention of wildfires, firefighting and fire management. All of these activities are expected to contribute to the reduction of climate change impacts and improving environmental and natural resources management in the Cerrado. 7. Critical assumptions in the theory of change are that after registration in CAR, farmers will comply with the stipulations of the Forest Code, knowing that they can now be easily caught and held responsible for violations of the law, and that government will effectively monitor land use and enforce the law. As to fire management, the assumption is that state and local governments respond to training, better equipment and availability of an improved monitoring and alert system with more effective monitoring, prevention, control and fighting of fires, and that farmers are willing to adopt practices that do not use burning and avoid fire escaping into native vegetation. | |
| Project Development Objectives (PDOs) | |
| 1. The objective of the CerradoProgram is “to assist Brazil in mitigating climate change in the Cerrado Biome and improving environmental and natural resources management in that biome through appropriate policies and practices.” The four recipient-executed projects have the following PDOs:   **Piauí Project**: “to promote the reduction of climate-change impacts in the Cerrado of southern Piauí by: (a) promoting the environmental regularization of landholdings in the targeted municipalities; and (b) preventing and combatting forest fires through the integration of local actors and promoting the adoption of sustainable production practices in the targeted municipalities.”  **Bahia Project**: “to promote the reduction of climate-change impacts in the Cerrado of western Bahia by: (a) promoting the environmental regularization of landholdings in the targeted municipalities and supporting actions to promote recovery of environmental liabilities; and (b) strengthening the state’s capacity to prevent and combat forest fires through the integration of local actors and promoting the adoption of sustainable production practices in the targeted municipalities.”  **Federal Project**: “to enhance the capacity of the Ministry of Environment to establish integrated forest-fire management and landholding registration in selected rural areas of the Cerrado Biome.”  **INPE Project:** “to facilitate the monitoring, analysis and early detection of forest fires by using the TERRA-MA2-Queimadas to support decision making among environmental managers in the Cerrado Biome.” | |
| Key Expected Outcomes and Outcome Indicators  1. The objective of the Cerrado Program, “to assist the Federative Republic of Brazil in mitigating climate change in the Cerrado biome and improving environmental and natural resources management of the biome through appropriate policies and practices,” is a higher-level objective to which the four recipient-executed projects contribute. As mentioned above in the theory-of-change section, table 1 below shows the key expected outcomes from “unpacking” the PDO statements of the individual projects and the associated indicators to measure them[[5]](#footnote-5). | |

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| Table 1: Key outcomes, projects and outcome indicators   |  |  |  |  | | --- | --- | --- | --- | | **Key Outcomes** | **Projects** | | **Outcome Indicators (PDO)** | | Promotion of the reduction of climate-change impacts in the Cerrado by promoting environmental regularization of landholdings | Piauí | Land users adopting sustainable land management practices as a result of the project (Number) (Core indicator)  Land area where sustainable practices have been adopted as result of the project. (Hectares) (Core indicator) | | | Bahia | Land users adopting sustainable land management practices as a result of the project (Number) (Core indicator)  Land area where sustainable practices have been adopted as result of the project (Hectares) (Core indicator) | | | Federal | Land area under sustainable landscape management practices in hectares (Hectares) (Core indicator) | | | Promotion of the reduction of climate-change impacts in the Cerrado by preventing, combating monitoring and early detection of forest fires | Piauí | Number of fires observed in the targeted municipalities. (Number, Custom)  Number of actions to combat forest fires in the targeted municipalities (Number, Custom) | | | Bahia | Reduction of forest-fired area observed in each targeted municipality as a result of the project (Percentage)  Number of actions to combat forest fires in the targeted municipalities as a result of the project (Number) | | | Federal | Protected Areas brought under integrated forest-fire management plans (Number) | | | INPE | Government institutions provided with capacity-building support to improve management of forest resources (Number) (Core Indicator)  Number of users of the new platform (Number)  Number of monthly accesses to the system (Number) | | | Enhanced capacity of the MMA and States to establish integrated forest-fire management and landholding registration | Federal | Reforms in forest policy, legislation or other regulations supported (Yes/No) | |  Components  1. The relationship between Program outcomes and the individual project components is shown in the following matrix:   Table 2: Key Outcomes and Project Components of Cerrado Program   | Outcomes | Piauí Project  Components | Bahia Project Components | Federal Project Components | INPE Project Components | | --- | --- | --- | --- | --- | | Promotion of the reduction of climate-change impacts in the Cerrado by promoting environmental regularization of landholdings | 1. Rural Environmental Regularization | 1. Rural Environmental Regularization | 2. Rural Environmental Cadastre | - | | Promotion of the reduction of climate-change impacts in the Cerrado by preventing, combating monitoring and early detection of forest fires | 2. Prevention and Control of Forest Fires | 2. Prevention and Control of Forest Fires | 3. Preventing and Fighting Forest Fires in Protected Areas | 1. Development of a Platform to monitor, analyze, and early detection of forest fires | | Enhanced capacity of the MMA and States to establish integrated forest-fire management and landholding registration in selected rural areas of the Cerrado Biome | (supported also under components 1 and 2) | (supported also under components 1 and 2) | 1. Support to the Action Plan for Prevention and Control of Deforestation and Forest Fires in the Cerrado (PPCerrado) |  |  1. **Piauí and Bahia Projects**. The environmental regularization or cadaster components in the Piaui and Bahia projects are similar and aimed at the registration of small rural holdings in the CAR system. In Piaui, it also supported institutional strengthening in the state government agencies to conduct CAR (training, equipment, etc.). 2. The fire-related components of the Piaui and Bahia projects aimed at reduce the use of fire as an agricultural practice (pasture burning) and accidental forest or bush fires, and to increase the capacity to prevent, control and fight fires that might still occur in selected municipalities, to build up a collective willingness among relevant stakeholders to prevent and fight fires as well as the necessary capacity to do so. Annex 2 lists the envisaged activities. 3. Piauí and Bahia projects had a third component to support effective and efficient management, administration, monitoring and evaluation (M&E) of each project, including project coordination and reporting, adequate financial management (FM), and procurement. 4. **Federal Project.** The ProCerrado Federal Project operates at the federal level. Two of its components are similar to the CAR and fire components in Piauí and Bahia. Component 1 supports the federal Action to Plan to Prevent and Control Deforestation and Burning (PPCerrado) through activities aimed at reducing deforestation and promoting landholders’ compliance with the Forest Code by monitoring and evaluating the PPCerrado in light of changes introduced by the 2012 Forest Code, including developing the governance capacity to implement the PPCerrado and supporting forest policy reforms, focusing on a National Policy of Management of Forest Fires. 5. Component 2 supports the implementation of CAR in the States of Tocantins and Maranhão, implemented by the National Forest Service (SFB). Small rural landholdings were to be registered in six selected municipalities, while CAR communication actions will be implemented in 58 municipalities. 6. Component 3 is to prevent and fight forest fires in three federal protected areas, and to strengthen the capacity of ICMBio (the national park service) to do so[[6]](#footnote-6). 7. The aim of Component 4 is to support overall management, financial management, procurement, accounting and audits for the project. 8. The **INPE Project** is to facilitate the monitoring, analysis and early detection of forest fires by using a new computing platform, TERRA-MA²-Queimadas, to support decision making by environmental managers in the Cerrado Biome. The first component of this project comprises the development of a platform for monitoring, analysis and early detection of forest fires, the formulation of a communication strategy to disseminate the platform’s benefits and functions to the selected states and federal government institutions, and the provision of training and TA to state and federal government users. The second component supports effective and efficient management, administration, and M&E of the project, including adequate FM and procurement.   Table 3: Estimated and Actual Cost by Component   |  |  |  |  | | --- | --- | --- | --- | | **Projects** | **Components** | **Estimated**  **US$ M** | **Actual**  **US$ M** | | Piaui Project | 1. Rural Environmental Regularization | 2.42 | 2.38 | | 2. Prevention and Control of Forest Fires | 1.54 | 1.56 | | 3. Project Administrative and Financial Management | 0.44 | 0.45 | | **Total** | **4.40** | **3.39** | | Bahia Project | 1. Rural Environmental Regularization | 2.42 | 2.12 | | 2. Prevention and Control of Forest Fires | 1.54 | 1.72 | | 3. Project Administrative and Financial Management | 0.44 | 0.44 | | **Total** | **4.40** | **4.28** | | Federal  Project | 1. Support to the Action Plan for Prevention and Control of Deforestation and Forest Fires in the Cerrado (PPCerrado) | 0.16 | 0.17 | | 2. Rural Environmental Cadaster | 1.42 | 1.38 | | 3. Preventing and Fighting Forest Fires in Protected Areas | 1.90 | 1.81 | | 4. Project Management and Administration | 0.82 | 0.78 | | **Total** | **4.30** | **4.14** | | INPE Project | 1. Development of a Platform to monitor, analyze, and early detection of forest fires | 0.93 | 0.92 | | 2. Administrative and Financial Management | 0.12 | 0.11 | | **Total** | **1.05** | **0.93** | |  | **Grand Total** | **14.15** | **12.66** | |
| SIGNIFICANT CHANGES DURING IMPLEMENTATIONRevised PDOs and Outcome Targets  1. None of the PDOs for the four recipient-executed projects was revised.  Revised PDO Indicators  1. The Piauí Project had two of its PDO indicators revised. Determining the results Indicators for Component 2 (Prevention and Control of Forest Fires) during preparation had proved difficult. Once implementation started, some of the foreseen indicators were deemed not appropriate or amenable to accurate measurement. The project entity SEMAR-PI reviewed alternative indicators and their feasibility and proposed revised indicators. These revisions were approved through a level 2 restructuring on January 26, 2016. A summary of the changes are: (a) PDO Indicator “hotspots observed in the targeted municipalities” was revised to “hotspots in APPs and RLs observed in the targeted municipalities”; and (b) PDO Indicator “Number of actions to combat forest fires in the targeted municipalities” was replaced by “number of controlled fire authorizations issued in the four selected municipalities”.   In the Bahia Project, SEMA-BA identified after start of implementation that some of the foreseen indicators were not fully appropriate, could not be accurately measured, or could not be adequately linked to the PDO. SEMA-BA reviewed alternative indicators and their feasibility and proposed revised indicators. These were also approved through a level 2 restructuring on January 27, 2016. A summary of the changes are: the PDO indicator “reduction of forest-fire area observed in each targeted municipality” was replaced by a new PDO indicator to better reflect direct results of project: “hotspots observed in APPs and RLs registered in the CEFIR in the targeted municipalities, as a result of the Project”. Revised Components | |
| 1. None of the components of the four recipient-executed projects was revised. | |
| Other Changes | |
| 1. In January 26 and 27 2016, the closing dates for the Piauí and Bahia Projects were extended by 18 months, from June 30, 2016 to December 31, 2017, to ensure that both projects had three full years of implementation, as originally planned. 2. On November 30, 2017, the closing date for the Federal Project was extended by five months, from December 29, 2017 to May 30, 2018. Also, as part of the restructuring, an intermediate indicator “Medium and larger landholding applications to enroll in CAR system” was dropped. After project implementation began and the CARs began to be implemented in the various municipalities, it was clear that the project would not be able to correctly identify the medium and large landholdings that were registered as a result of the project, considering that various actions were taken in the area to implement the CAR, and it was not possible to affirm that a medium or large landholding had been registered as a result of this project’s actions. 3. Two political events affected the Program: the municipal elections in 2016, during program implementation; and the replacement of the country’s president in the same year. Both events generated disruptions in the federal and local governments which, among other things, resulted in redeployment of personnel and reassessment of priorities. 4. The responsibility for CAR implementation in Brazil migrated from the MMA to the affiliated SFB in December 2014, so that the implementation arrangements had to be adjusted and a new partner added to the Program. In the face of slow startup and the need to coordinate project activities with various partners, the remaining implementation periods were deemed insufficient. Moreover, because the actual costs for registration in CAR were less than originally estimated, giving all three projects a chance to expand CAR coverage, additional time was needed for such expansion. The extension of the Federal Project to 2018 made it possible to successfully complete CAR registration contracts, using virtually all allocated funds.  Rationale for Changes and Their Implication on the Original Theory of Change  1. The change in PDO indicators for the fire prevention and control component of the Piauí and Bahia Projects was a refinement of indicators to better monitor and measure results. The changes had no implications for the theory of change. | |

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| 1. OUTCOME  RELEVANCE OF PDOs  1. Rating: **High**  Assessment of Relevance of PDOs and Rating  1. The objectives of the Cerrado Program and its individual projects were fully in line with the World Bank Group’s Country Partnership Framework (CPF) 2018–2023 for the Federative Republic of Brazil (Report N° 113259-BR), discussed by the Executive Directors on July 13, 2017. The projects specifically supported Focus Area 3: Inclusive and Sustainable Development, whose objective is to support the achievement of Brazil’s NDC by focusing particularly on land use. As mentioned in the CPF, Brazil committed to a 43 percent reduction in GHGs by 2030 at the Paris Climate Conference in 2015. Target results in this area reflect the importance of Brazil’s commitment to emission reductions as a result of land-use changes and landscape management. The CPF states support for Brazil in designing and implementing policies and investments to reach its COP21 NDC targets, including support in mobilizing external resources to complement domestic funding by mediating access to climate funds, such as the CIF and its Forest Investment Program (FIP). 2. The projects also supported a focus area identified in the Bank’s Forest Action Plan (FAP) FY16–20. Under the Focus Area: Sustainable Forestry, the projects seek to contribute to the recovery and sustainable management of forests and their associated value chains. 3. The Cerrado Program and its projects continue to be an important instrument to implement the CPF and to support Brazil in reaching its NDC goals. The PDOs are fully aligned with the reduction of (net) GHG emissions from land-use change (clearing of natural vegetation mitigated by restoration of degraded area) and land use (burnings and accidental wildfires).   Table 4: Cerrado Program and Relevance of Objectives   |  |  | | --- | --- | |  | **Relevance** | | Cerrado Program | High | | Piauí Project | High | | Bahia Project | High | | Federal Project | High | | INPE Project | High |  ACHIEVEMENT OF PDOs (EFFICACY)  1. Rating: Substantial  Assessment of Achievement of Each Objective/Outcome  1. The objective of the Cerrado Program to assist the Federative Republic of Brazil in mitigating climate change in the Cerrado biome, and improving its environmental and natural resources management, through appropriate policies and practices was substantially achieved. This is considered a higher-level objective or long-term outcome, to which the outcomes of the four individual projects that make up the program contribute. The outcomes to be assessed were formulated on the basis of the PDOs and results indicators of the four projects as already earlier. 2. The key cumulative outcomes of the Cerrado Program projects are summarized below.   Table 5: Key outcomes of the Cerrado Program.   |  | | --- | | **Outcome 1: *Promotion of the reduction of climate change impacts in the Cerrado by promoting environmental regularization of landholdings*** | | 38,017 Land users adopting sustainable land management practices as result of the project having their landholdings enrolled in the National CAR System: first step for environmental compliance.  861,143 hectaresof land area where sustainable practices have been adopted as result of the project. | | ***Outcome 2: Promotion of the reduction of climate change impacts in the Cerrado by preventing, combating, monitoring and early detection of forest fires*** | | 3 Protected Areas brought under integrated forest-fire management plans.  11 targeted municipalities equipped to combat forest fires.  88 Government institutions provided with capacity building support to improve management of forest resources.  10.1% reduction in the number of hotspots observed in APP and RL in the targeted municipalities in the State of Piauí.  1,877 Staff in State and Municipal environmental agencies trained to monitor hotspots under the Project; trained in techniques to prevent and control forest fires under the Project; and landholders trained in alternatives to the use of fire under the Project.  Platform for monitoring and warning of forest fires validated and functional. | | ***Outcome 3: Enhanced capacity of the MMA and States to establish integrated forest-fire management and landholding registration in selected rural areas of the Cerrado Biome*** | | Reforms in forest policy, legislation or other regulations supported – a proposal of National Policy on Forest Fire Management, Prevention and Control, mandated by the new Forest Code, including consultation process. The innovative concept of “integrated fire management,” which avoids the fallacy of avoiding fires at all cost in a biome such as the Cerrado, has been incorporated in proposed new legislation. |   ***Outcome 1: Promotion of the reduction of climate change impacts in the Cerrado by promoting environmental regularization of landholdings***   1. The table below summarizes the projects’ main results and outputs related to promoting farmers’ compliance with the Environmental Law/environmental regularization of landholdings which will also improve environmental management. The indicators used to assess the achievement of this outcome are ‘Land users adopting sustainable land management practices as a result of the projects’ and ‘Land area where sustainable practices have been adopted as a result of the projects’. The definition of these indicators as per the PAD is the number and land area of small rural landholdings enrolled in CEFIR as a result of the project.   Table 6: Key outcomes of the Cerrado Program and projects by promoting environmental regularization of landholdings   |  |  |  |  | | --- | --- | --- | --- | |  | **Indicator** | **Indicator** | **Achievement** | |  | **Land users adopting sustainable land management practices as a result of the projects** | **Land area where sustainable practices have been adopted as a result of the projects** | | Program cumulative | Target: 9,676  Actual: 38,017 (392%) | Target: 817,102  Actual: 861,143 ha (105%) | Exceeded | | Piauí Project | Target: 2,600  Actual: 4,565 (175%) | Target: 200,000 ha  Actual: 201,023 ha (100%) | Achieved | | Bahia Project | Target: 3,376  Actual: 25,342 (750%) | Target: 83,092 ha  Actual: 312,875 ha (376%) | Exceeded | | Federal Project | Target: not specified by the project  Actual: 5,604 landholdings and 32 Traditional Communities’ Territories (2,506 families) | Target: 533,200 ha  Actual: 347,245 ha[[7]](#footnote-7) (65%) | Partially achieved |  1. The CAR registration of smallholders was one of the most successful aspects of the Program. In three Cerrado states, the initial targets set by the program were greatly surpassed in terms of number of landowners registered and number of municipalities involved. In Bahia and Piauí, the targets for total area registered were also exceeded. In Maranhão, this target was not met as the average size of properties registered was very small, reducing the total area brought into the cadaster. Moreover, the original target of the Federal Project included also medium and large landholding registrations in the SICAR as a result of the project, which could not be verified and registered as a result of the project. The PDO indicator of that project measures the total area registered in CAR as a result of the project, regardless of holding size, whereas the intermediate indicators refer separately to the numbers of smallholdings and the numbers of medium and large holdings registered, but not to the areas. The outcome for medium and large landholders has likely been achieved, but it is not possible to attribute these CAR registrations of a medium or large landholder to the communication campaigns. 2. An innovative aspect of the program’s CAR registries was the inclusion of rural territories of traditional peoples and communities in Maranhão by the Federal Project. These communities, historically marginalized by federal government programs, include quilombos (rural Afro-descendant communities) and babassu coconut gatherers and processors, whose territories are collectively managed and recognized by Brazilian law. Thirty-two such territories, encompassing a total area of 94,897 hectares, were georeferenced, and 2,506 families there gained CAR registries, a majority of which granted to women. Meanwhile, the Bahia Project worked on the on the restoration of forest lands with a different set of traditional peoples and communities known as Fundo de Pasto (communities with collective grazing rights) and Geraizeiros (plateau dwellers with collective-use rights). 3. One of the main reasons for the remarkable success of CAR registry was a steep decrease in the cost of individual registries, which allowed the program to greatly expand its scope. This, in turn, was due to improvements in the SICAR which lowered its cost to users and competition among contractors who performed the registries. There was a devaluation of the Brazilian currency during the implementation period. Thus, it was possible to increase the number of municipalities where smallholders were registered from six to eleven in Piauí, from eight to twelve in Bahia, and from six to twenty in the Federal Project (215 percent), and, consequently, to increase the number of small landholdings registered by almost 400 percent. 4. Tocantins was meant to be the fourth state in the MATOPIBA region to benefit from the CAR registries under the Program, but experienced a series of problems, such as difficulties in obtaining the necessary documentation from landholders, maps and data on land tenure from relevant agencies, and in identifying a sufficient number of smallholders, and lack of interest in registering in CAR by landholders not already registered. Thus, CAR Tocantins was dropped as target state from the Federal Project, and its resources were reallocated to Maranhão, where the number of municipalities involved was increased. TA was provided to traditional peoples and communities to participate in CAR. 5. Apart from registering smallholders, the Federal Project disseminated information about CAR in 50 municipalities in the Cerrado through communication campaigns to promote CAR and mobilize key stakeholders in six states and the Federal District. The Federal Project also trained state and municipal officials on how to register holdings in CAR, validate its entries, and issue CAR certificates. 6. The intended outcome has been exceeded. Landowners know which part of their land is available for alternative (productive) land use and which part must be kept under natural vegetation or even strictly protected. They also know on which lands the vegetation cover must be restored. They are aware that their individual land use can now be monitored, and provisions of the law can be enforced. The Program made thus a contribution to reduce GHG emissions reduce and increase carbon sequestration in the Cerrado. Additional environmental benefits include nutrient cycling, regulation of rainfall, improved water quality and flows, habitat provision, and conservation of rivers. 7. The efficacy of the environmental regularization of landholdings outcome is rated as **Substantial**.   ***Outcome 2:*** ***Promotion of the reduction of climate-change impacts in the Cerrado by preventing, combating, monitoring and early detection of forest fires***  Table 7: Key results of the Cerrado program and projects by preventing, combating, monitoring and early detection of forest fires   |  | **Outcome Indicators** | **Targets/Actual** | **Achievement** | | --- | --- | --- | --- | | Cerrado Program | Protected areas brought under integrated forest-fire management plans | Target: 3  Actual: 3 (100%) | Achieved | | Reforms in forest policy, legislation or other regulations supported | Target: yes  Actual: yes (100%) | Achieved | | Target municipalities equipped to combat forest fires | Target: 14  Actual: 11 (75%) | Partially achieved | | Government institutions provided with capacity-building support to improve management of forest resources–fires | Target: 7  Actual: 37 (528%) (state agencies; municipalities; ICMBio; MMA; forest-fire agencies) | Exceeded | | Number of Staff in State and Municipal environmental agencies trained to monitor hotspots under the Project; trained in techniques to prevent and control forest fires under the Project; and landholders trained in alternatives to the use of fire under the Project | Target: 1,190  Actual: 1,877 (158%) | Exceeded | | Piauí Project | Number of hotspots observed in Areas of Permanent Preservation (APPs) and Legal Reserves (RLs) in the targeted municipalities | Target: -10.0% relative to 2010–2016 baseline (n=506)  Actual (2017) -10.1% (n=455) (100%) | Achieved | | Controlled fire authorizations issued in the four selected municipalities, as a result of the Project | Target: 400 authorizations  Actual: 90 (22%) | Not achieved |  |  |  |  |  | | --- | --- | --- | --- | | Bahia Project | Hotspots observed in Areas of Permanent Preservation (APPs) and Legal Reserves (RL) registered in the in CEFIR, in the targeted municipalities, as a result of the Project | Target: -7.0%  Actual: not reported | Not achieved | | Number of actions to combat forest fires in the targeted municipalities as a result of the project | Target: 150 actions  Actual: 85 actions (53%) | Partially achieved | | Federal Project | Protected Areas brought under integrated forest-fire management plans | An integrated forest-fire management plan was prepared and adopted for each of the three protected areas; they are being managed in accordance with these plans. Park management capacity was increased through training of staff and of neighboring farmers, and equipment for firefighting and radio communication. (100%) | Achieved | | INPE Project | Government institutions provided with capacity-building support to improve management of forest resources | Target: 7 institutions using the new platform  Actual: 88 institutions using the new platform (1,257%) | Exceeded | | Number of users of the new platform | Target: 500  Actual: 324 protected areas managers; 60 IBAMA technicians and managers; 11 State Environmental Agencies in the Cerrado; 27 state firefighting corporations (84%) | Partially achieved | | Number of accesses to the system monthly | Target: 7,000  Actual: 12,000 monthly in 2017 (171%) | Exceeded | | Environmental managers trained | Target: 90  Actual: 325 (361%) | Exceeded |  1. Capacity has been enhanced under the Cerrado program to combat and prevent forest fires, including through early detection. The Bahia Project administered a course on forest-fire expertise to 45 technicians. A fire-prevention workshop was held in two municipalities for 53 people, individual and collective protection kits were acquired, and 85 firefighting actions were carried out under the project. Six meteorological stations were also installed. Local municipal governments collaborated with the project, particularly with training and workshops. The project conducted training courses in eight different municipalities (in conjunction with the State Fire Department) for 217 volunteer firefighters on how to combat, prevent and avoid fires. It also promoted alternatives to the use of fire in agriculture, controlled burning and support to the Bahia Without Fire *(Bahia Sem Fogo)* campaign in the form of mobile workshops with the aim of promoting awareness of fires and their prevention among inhabitants of and visitors to the state’s western region. 2. Under the federal Project, an Integrated Fire Management Plan (*Manejo Integrado do Fogo,* MIF) was developed and adopted for each protected area being managed in accordance with these plans. This includes equipping and providing training to volunteer brigades; providing training on environmental management and environmental education for adjacent communities; and acquiring equipment to strengthen actions aimed at forest-fire prevention and control. MIF planning and implementation require the involvement of and agreements with local communities, as well as information and training on fire prevention, fire control and firefighting. Burnings in those communities must follow a plan that specifies who can conduct them, and where and when these can take place. Park management capacity was increased through the training of staff and of neighboring farmers, and through necessary equipment for firefighting and radio communication. 3. Early detection and monitoring capacity has also been enhanced. The computational platform TerraMA2, an open computer software system based on service architecture, was launched in December 2017 by INPE, has been validated and is functional and accessible to the public at <http://www.inpe.br/queimadas/portal/terrama2q>. It permits the building of customized applications for monitoring, analysis and warnings in the matter of forest fires. It integrates geographic services and modeling with real-time access to geo-environmental data. BDQueimadas, the database of forest burnings and wildfires, was developed on the basis of the TerraMA2 platform. It permits Internet access to real-time data and visualizations of fire hotspots detected by satellites over Latin America and the Caribbean, and to information about fire risk, etc. (<http://www.inpe.br/queimadas/bdqueimadas>) 4. The computational platform provides a state-of-the-art, easily accessible and reliable tool to help agencies and people at all levels of government—federal, state and local—as well as private parties to use real-time online information on fire occurrences and fire risks, and to monitor hotspots, for the purpose of preventing, fighting and avoiding fires, enforcing laws and regulations on fire use, and planning burnings (as in integrated fire management). 5. The efficacy of preventing, combating, monitoring and early detection of forest fires outcome of the Cerrado Program is rated **Substantial**.   ***Outcome 3: Enhanced capacity of the MMA and States to establish integrated forest-fire management and landholding registration in selected rural areas of the Cerrado Biome***   1. The Cerrado Program focused on providing training for technical staff as well as equipment and durable goods for the agencies in charge of environmental management in the selected states. Projects had a strong focus on influencing policy and practice guidelines, which affect a broad number of stakeholders. Through support to the establishment of the regulatory framework, the program helped to put in place relevant policies, rules and institutional responsibilities to deliver better-quality government services related to environmental management in the Cerrado Biome. The proposed bill for a “National Policy on Integrated Fire Management” and the PPCerrado’s third phase for 2016–2020 are critical steps in this direction.   Table 8: Key outcomes of the Cerrado program in terms of Enhancing MMA’s and States’ capacity.   |  |  |  |  | | --- | --- | --- | --- | |  | **Outcome Indicators** | **Target and Actual** | **Achievement** | | Cerrado Program cumulative | Government institutions provided with capacity-building support to improve management of forest resources | Target: not defined  Actual: Seven government instructions and four NGOs directly supported (MMA; SFB; ICMBio; SEMAR-PI; SEMA-BA and INEMA-BA; INPE; FLEM; FUNATURA; FUNCATE; and Fundação Agente.) | Achieved | | Federal Project | Reforms in forest policy, legislation or other regulation supported | Target: Implementation of the Action Plan for Prevention and Control of Deforestation and Burnings in the Cerrado (PPCerrado) and official endorsement of its Phase 2.  Actual: The project supported the participatory discussion, revision and updating of the PPCerrado and the formal approval of its third phase for 2016–2020. The PPCerrado third phase is under implementation. | Achieved | |  | Reforms in forest policy, legislation or other regulation supported | Target: Design and formalization (through documented official endorsement) of the National Policy on Forest Fire Management, Prevention and Control.  Actual: A proposed bill for a “National Policy on Integrated Fire Management” was submitted to the Office of the President of Brazil for subsequent submission to the Brazilian Congress. The proposed law had the benefit of ample prior consultation with stakeholder groups. | Achieved |   ***Enhanced Capacity of the MMA and States to establish integrated forest-fire management***   1. The Piauí Cerrado Project established a Geoprocessing Center in the state environmental agency, to facilitate several state functions and activities related to land-use monitoring and enforcement, water resources management, environmental management (zoning), and land-tenure regularization. The Piauí State Committee for Fire Prevention and Firefighting has been reactivated. Local governments and municipal committees in Bahia and Piauí have been mobilized and made aware of the need for fire prevention, control and firefighting, including training and equipment for fire brigades in selected municipalities, as well as drawing up municipal plans to deal with fires. 2. The creation of the computational platform for fire monitoring, forecasting and warnings has given an enormous boost to federal, state and local agencies to develop their own tools and routines, using the platform to predict fire risks, plan their reactions to fire occurrences, and send and receive fire alerts. INPE has created substantial capacity through its training to interested platform users. 3. The formulation of a National Policy on Forest Fire Management, Prevention and Control, mandated by the new Forest Code, was another key element of the Federal Cerrado Project. In September 2016, the MMA instituted a working group to formulate this policy. Draft versions of the policy involved broad consultation with stakeholder groups, while a final version was validated by the MMA’s secretariats and its related agencies. A draft bill for a “National Policy on Integrated Fire Management” was submitted to the Office of the President of Brazil for subsequent submission to the Brazilian Congress. The innovative concept of “integrated fire management,” which avoids the fallacy of avoiding fires at all cost in a biome such as the Cerrado, has been incorporated in proposed new legislation.   ***Enhanced Capacity for Landholding Registration***   1. An important medium-term impact of the Cerrado Program can be seen in the strengthening of institutions, both governmental and non-governmental, that were responsible for carrying out various project activities. State environmental agencies in Piauí and Bahia and the SFB have mastered the process of registering small/family holdings in CAR, including the ability to hire professional services to this end. They have also learned to critically review CAR registers and reject those of insufficient quality. A large number of professionals have been trained to implement CAR. 2. The Federal Cerrado Project supported the PPCerrado through activities aimed at reducing deforestation and promoting landholders’ compliance with the Forest Code; monitoring and evaluating the PPCerrado in light of changes introduced by the 2012 Forest Code; and developing the governance capacity to implement the PPCerrado. The PPCerrado was first adopted in 2010 as an action plan to reduce deforestation in the Cerrado and has been under implementation since then. A second, revised version was adopted in January 2014 for 2014–2015 after having received support from the Federal Cerrado Project. The project supported four workshops in 2016 to revise the PPCerrado, resulting in the approval and publication of its third phase which runs from 2016 to 2020. 3. Twelve institutions were directly involved in the implementation of the Cerrado Program and have successfully coordinated actions, even though they operated at different levels of administrative authority: Federal entities (INPE, MMA, ICMBio, SFB); State entities (SEMA-BA, SEMAR-PI, SEMA-MA); civil society (FLEM, Fundação Agente, FUNCATE, FUNATURA); and international (World Bank). The experience gained in administering the Cerrado Program and in coordinating actions across administrative levels can serve as building block for an expansion of climate-change actions in the Cerrado. 4. The efficacy of strengthening MMA’s and states’ capacity to establish integrated forest-fire management and landholding registration in selected rural areas of the Cerrado Biome is rated High.   ***Mitigating climate change and improving environmental and natural resources management in the Cerrado biome***   1. The ultimate goal of the Cerrado Program is to contribute to mitigating climate change and to improving environmental and natural resources management in the Cerrado Biome. Although GoB does not consider it appropriate to attribute emission reduction results to specific programs, climate change is presumed to have been mitigated by avoiding net emissions from land use and land-use change of some 64 million tons of CO2. Reducing emissions in the Cerrado and other Brazilian biomes depends on a combination of ongoing efforts by the federal, state and local governments, the private sector, civil society organizations, and initiatives with support from international resources. In light of this, the GoB at the beginning of the project agreed there would be challenges with reporting the change in GHG emissions as a result of the Cerrado Program. 2. This notwithstanding, in the context of economic and financial assessment of the Program, the potential long-term GHG emissions reduction generated by the adoption of the CAR in the selected municipalities was estimated in a study commissioned for this ICR. The analysis took in account:  * The data on RLs and APPs reported by each Cerrado project. After rural environmental registration, it was assumed that farmers adhering to CAR would maintain and/or recover the gap between required legal reserves and actual native vegetation cover over a period of 20 years, considering native forest cover still present in 2006 in each municipality. They would re-plant one twentieth of the gap every year, for 20 years. * The total carbon stored in a hectare of remnant natural vegetation (forest) was taken as 1.40 to 1.72 tC/ha/year of potential sequestration of secondary forest in the Cerrado: 28 to 34.4[[8]](#footnote-8) tCO2/ha, using the carbon sequestration factor proposed by the IPCC and a time horizon of 20 years. Based on this assumption, the Cerrado Program has a total carbon capture/storage potential of 8.15 to 9.97 million tCO2/20 years. * The area of remnant forest in the APPs and RLs was assumed to be evenly distributed over all farms. It was assumed that this area would no longer be cleared within the adhering farm holdings, for an indefinite period of time. This resulted in a total area of avoided deforestation (REDD) of 289,833 ha. The avoided release of carbon from such areas was estimated as 221 tons of CO2 per hectare. This resulted in an estimate of 64 million tons of CO2 emissions avoided.  1. The tables below indicate the potential GHG emissions contributed by the projects through the environmental regularization process. It represents the potential contributions of the Cerrado Program to the GoB’s NDC objectives.   Table 9: Potential CO2 reduction/capture per hectare of Cerrado.   |  |  |  | | --- | --- | --- | | **Project** | **APP and LR area**  **(ha)** | **Potential factor of reduction/capture**  **28.00 to 34.4 tCO2/ha (tonCO2)** | | Bahia Project | 68,829.99 | 1.93–2.37 million | | Piauí Project | 79,874.06 | 2.24–2.75 million | | Federal Project | 141,129.36 | 3.95–4.8 million | | Cerrado Program, overall | 289,833.41 | 8.15–9.97 million |   Table 10: Potential avoided emission because of CAR.   |  |  |  | | --- | --- | --- | | **Project** | **APP and RL areas**  **(ha)** | **Potential avoided emmisions (221tonCO2/hectare[[9]](#footnote-9))** | | Bahia Project | 68,829.99 | 15.21 million | | Piauí Project | 79,874.06 | 17.65 million | | Federal Project | 141,129.36 | 64.05 million | | Cerrado Program, cumulative | 289,833.41 | 64.05 million |  1. In addition, when considering the hectares where deforestation and degradation have been avoided through CAR as a result of the Bahia and Piauí Projects, a preliminary analysis prepared by Ecometrica[[10]](#footnote-10), commissioned by DEFRA, indicates that CAR started to deliver avoided deforestation in 2016, which indicates that the CAR process can contribute toward decreasing the deforestation rate in the Cerrado Biome. |
| Justification of Overall Efficacy Rating | | |
| 1. The overall assessment of the efficacy of the Cerrado Program and its related projects is **Substantial**. The outcomes of the PDO segments were overall substantially achieved. Although two PDO indicators were revised for clarity, the project’s ambition or scope was not reduced. Therefore, no split evaluation is warranted. 2. The table below summarizes the efficacy rating of each outcome of the Cerrado Program.   Table 11: Cerrado Program outcomes–efficacy rating.   |  |  | | --- | --- | | **Cerrado Program Outcomes** | **Efficacy** | | Outcome 1: Promotion of the reduction of climate change impacts in the Cerrado by promoting environmental regularization of landholdings. | Substantial | | Outcome 2: Promotion of the reduction of climate change impacts in the Cerrado by preventing, combating monitoring and early detection of forest fires | Substantial | | Outcome 3: Enhanced capacity of the MMA and States to establish integrated forest-fire management and landholding registration in selected rural areas of the Cerrado Biome | High | | **Piauí Project** | Substantial | | Outcome 1: Promotion of the reduction of climate change impact in the Cerrado by promoting environmental regularization of landholdings. | High | | Outcome 2: Promotion of the reduction of climate change impacts in the Cerrado by preventing, combating monitoring and early detection of forest fires | Modest | | **Bahia Project** | Substantial | | Outcome 1: Promotion of the reduction of climate change impacts in the Cerrado by promoting environmental regularization of landholdings. | High | | Outcome 2: Promotion of the reduction of climate change impacts in the Cerrado by preventing, combating monitoring and early detection of forest fires | Modest | | **Federal Project** | Substantial | | Outcome 1: Promotion of the reduction of climate change impacts in the Cerrado by promoting environmental regularization of landholdings. | Substantial | | Outcome 2: Promotion of the reduction of climate change impacts in the Cerrado by preventing, combating monitoring and early detection of forest fires | Substantial | | Outcome 3: Enhanced capacity of the MMA and States to establish integrated forest-fire management and landholding registration in selected rural areas of the Cerrado Biome | High | | **INPE Project** | High | | Outcome 2: Promotion of the reduction of climate change impacts in the Cerrado by preventing, combating monitoring and early detection of forest fires | High | | | |
| EFFICIENCY |
| 1. Rating: Substantial |
| Assessment of Efficiency and Rating | |
| 1. At preparation, it was deemed difficult to estimate the economic value of control and prevention of deforestation and forest fires policies, and thus an economic rate of return for the program and its projects. Following guidance for small grant recipient-executed projects, economic/financial analysis was not carried out at appraisal to assess the potential efficiency of the recipient-executed projects. The Program closed with complete physical and financial execution. Despite initial challenges, the implementing agencies were able to deliver the agreed outcomes of the Program and individual projects, disbursing 97.5 percent of the available funds. By and large, the design and delivery mechanism has proven to be appropriate to achieve the projects’ results.   ***Outcome 1: Promotion of the reduction of climate change impacts in the Cerrado by promoting environmental regularization of landholdings***   |  |  |  |  | | --- | --- | --- | --- | | Table 12: Outcome 1, funds allocated and applied | | | | |  | **Allocated (US$ M)** | **Applied (US$ M)** | **%** | | Cerrado Program | *6.42* | *5.82* | *91* | | Piauí Project | *2.42* | *2.05* | *85* | | Bahia Project | *2.42* | *2.39* | *99* | | Federal Project | *1.42* | *1.38* | *97* |  1. The table on the left shows that the funds spent in the three projects represent 91 percent of the initial allocation for this outcome. As mentioned above, the Program exceeded the target number of registrations by 392 percent. It also exceeded the target for total area registered in the CAR by five percent, and the target of number of municipalities by 115 percent. 2. **Cost Effectiveness**. The actual costs of registration under the Bahia, Piauí and Federal Projects were much lower than the initial reference values used by the projects. They were the result of competitive selections of technical services providers (non-consulting services) and the improvement of the SICAR system, which made the enrollment process easier. The cost of a consultancy to process a CAR registration was previously R$211.60 in Bahia, R$234.17 in Piauí, and R$250.94 in Maranhão. The total cost savings of CAR processing in the Program, compared with current prices, was R$1.8 million. These numbers indicate substantial efficiency gains relative to prior experience. 3. **Cost–benefit analysis**. There are two ways to measure benefits of climate change mitigation: (a) by estimating the quantity of CO2 emissions avoided (or, in the case of restoration, of CO2 absorption) relative to a baseline scenario, or (b) by estimating the cost of restoring the vegetation cover of an (illegally) cleared area. The estimated net present value for Outcome 1 on the basis of avoided emissions (see Annex 4 for detailed assumptions and methodology), is positive even with a low assumed price of CO2 (US$4.55/ton) and if only 5% of holdings refrained from clearing their RL and APP relative to what they would clear without CAR registration. 4. A different approach of looking at efficiency is to compare the cost of restoring the vegetation cover that would have been removed in the absence of CAR registration, estimated at R$12,000 per hectare, with the actual cost of CAR. The net present value of environmental regularization of smallholder properties under the CAR system is positive if the rate of avoided land clearing after CAR registration exceeds 1 percent of what it would have been without CAR (Annex 4). 5. The efficiency of achieving Outcome 1 is rated High.   ***Outcome 2: Promotion of the reduction of climate change impacts in the Cerrado by preventing, combating, monitoring and early detection of forest fires***   |  |  |  |  | | --- | --- | --- | --- | | Table 13: Outcome 2, funds allocated and applied | | | | |  | **Allocated (US$ M)** | **Applied (US$ M)** | **%** | | Cerrado Program | *5.91* | *5.91* | *100* | | Piauí Project | *1.54* | *1.56* | *101* | | Bahia Project | *1.54* | *1.72* | *111* | | Federal Project | *1.90* | *1.81* | *95* | | INPE Project | *0.93* | *0.82* | *88* |  1. The table on the left shows that the Program spent 100 percent of the total allocation for this outcome. 2. The fire-prevention and control outcome of the program was substantially successful, and with good prospects for tackling this permanent challenge for the States. The positive outcomes of this component in the Federal and Bahia Projects were surpassed only by those reported by Piauí. The activities developed under the Federal Cerrado Project attracted the attention of other government agencies that were keen to learn about the activities and results with the aim of seeking similar actions and investments. The Bahia Project’s goal to introduce sustainable land management practices in 2,600 rural properties in an area of 200,000 ha was surpassed. Properties occupying 201,952 ha were reported to have adopted the recommended practices. Vehicles, meteorological stations and equipment (mainly electronic) were purchased to support the participating institutions. Individual and collective protective equipment (EPI and EPC) and educational materials were also supplied. Twelve municipalities (the original target was eight) benefited from training. Several municipalities outside the scope of the Program called for Forest Fire Brigades to be formed. Some municipalities were also keen on the idea of creating farmers’ associations. 3. The Integrated Fire Management Plans that were instituted in three federal protected areas offer an important template for addressing the challenges of fire control in protected areas and their respective buffer zones. This template can be used as a model for developing similar plans for federal, state and municipal protected areas throughout the country, thereby producing a positive multiplier effect. The National Policy for Integrated Fire Management bill, which was presented to the Office of the President, now needs to be debated and passed by the National Congress so that it can produce the desired results. This represents a major challenge, given the polarized political climate that currently exists in Brazil. Meanwhile, the difficulties experienced by the Bahia and Piauí Projects at both the state and municipal levels in promoting alternative fire-use models and fire-prevention actions indicate that a great deal of effort will be needed in the future for continued fire control and prevention. 4. The TERRA-MA²-Queimadas platform for fire monitoring and warning in the Cerrado, and its accompanying fire database, is a state-of-the-art system, fully compatible with international standards. 5. The efficiency of achieving Outcome 2 is rated Substantial.   ***Outcome 3: Enhanced capacity of the MMA and States to establish integrated forest-fire management and landholding registration in selected rural areas of the Cerrado Biome’***   |  |  |  |  | | --- | --- | --- | --- | | Table 14: Outcome 3, funds allocated and applied | | | | |  | **Allocated (US$ M)** | **Applied (US$ M)** | **%** | | Cerrado Program | *0.16* | *0.17* | *105* | | Federal Project | *0.16* | *0.17* | *105* |  1. The table on the left shows that the Program spent 105% of the total allocation for this outcome. 2. Reforms of Brazilian laws and regulations on Cerrado protection and the national fire-control policy were concluded and submitted for scrutiny by the legislative branch as part of the review and updating of the PPCerrado, to include the need to regulate Art. 40 of Law No. 12,651/2012 for establishing the National Policy on the Management and Control of Fires and the Prevention and Combatting of Forest Fires. 3. The Program also supported meetings of the technical working group on REDD+ to prepare FRELs. This group was formed in 2014 to conduct surveys of data and information on results and emission-reduction methodologies for Brazil’s land-use and land-use change sector, and to review the technical content to be used as the basis for Brazil’s submissions to the UNFCCC. 4. An important medium-term impact of the Cerrado Program can be seen in the strengthening of institutions—both governmental and non-governmental—that were responsible for carrying out various project actions. State environmental agencies in Piauí and Bahia and the SFB have mastered the process of registering small/family holdings in CAR, including the ability to hire professional services to this end. They have also learned to critically review CAR registries and reject those of insufficient quality. A large number of professionals have been trained to implement CAR. 5. The efficiency of achieving Outcome 3 is rated Substantial. | |
| ***Overall assessment of the efficiency of the Cerrado Program***   1. The overall efficiency of the Cerrado Program and its projects is rated Substantial. 2. A review of the key indicators of the Cerrado Program’s four projects shows that many of them were not only met but greatly exceeded. This is evidence of the Program’s overall success and efficient use of resources. The most striking result was the fact that the number of small landholdings registered in the CAR system nearly quadrupled the number in the original program targets. A variety of factors were responsible for this positive result and the three projects that were tasked with this activity were able to successfully harness these factors. 3. The Program had other benefits, not conducive to quantification: (a) an enhanced international image for Brazil, in view of the demonstration of political willingness to comply with the Paris Agreement commitments; (b) impact on the preservation of water quality and availability with direct and indirect effects on springs; (c) preservation of Cerrado biodiversity; (d) the “demonstration effect” of environmentally correct and clearly profitable farming practices; and (e) the spread of conservation-oriented awareness among farmers, including those not eligible for incorporation in the Program.   Table 15: Cerrado Program and projects efficiency rating.   |  |  | | --- | --- | | **Program Outcomes** | **Efficiency** | | Outcome 1: Promotion of the reduction of climate change impacts in the Cerrado by promoting environmental regularization of landholdings | High | | Outcome 2: Promotion of the reduction of climate change impacts in the Cerrado by preventing, combating monitoring and early detection of forest fires | Substantial | | Outcome 3: Enhanced capacity of the MMA and States to establish integrated forest-fire management and landholding registration in selected rural areas of the Cerrado Biome | Substantial | | **Piauí Project** |  | | Outcome 1: Promotion of the reduction of climate change impacts in the Cerrado by promoting environmental regularization of landholdings | High | | Outcome 2: Promotion of the reduction of climate change impacts in the Cerrado by preventing, combating monitoring and early detection of forest fires | Modest | | **Bahia Project** |  | | Outcome 1: Promotion of the reduction of climate change impacts in the Cerrado by promoting environmental regularization of landholdings | High | | Outcome 2: Promotion of the reduction of climate change impacts in the Cerrado by preventing, combating monitoring and early detection of forest fires | Modest | | **Federal Project** |  | | Outcome 1: Promotion of the reduction of climate change impacts in the Cerrado by promoting environmental regularization of landholdings | High | | Outcome 2: Promotion of the reduction of climate change impacts in the Cerrado by preventing, combating monitoring and early detection of forest fires | Substantial | | Outcome 3: Enhanced capacity of the MMA and States to establish integrated forest-fire management and landholding registration in selected rural areas of the Cerrado Biome | Substantial | | **INPE Project** |  | | Outcome 2: To promote the reduction of climate change impacts in the Cerrado by preventing, combating monitoring and early detection of forest fires | High |  JUSTIFICATION OF OVERALL OUTCOME RATING  1. The relevance of the Cerrado Program’s objectives and its related projects to the current CPF is rated High, the achievement of objectives (efficacy) is Substantial, and the efficiency is Substantial. Accordingly, the overall outcome is rated as **Satisfactory**.   Table 16: Cerrado Program overall outcomes ratings.   |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | **Cerrado Program /Projects** | | **Relevance** | **Efficacy** | | **Efficiency** | | | **Overall Outcome Rating** | | | Outcome 1: Promotion of the reduction of climate change impacts in the Cerrado by promoting environmental regularization of landholdings | | High | Substantial | | High | | | Satisfactory | | | Outcome 2: Promotion of the reduction of climate change impacts in the Cerrado by preventing, combating, monitoring and early detection of forest fires | | High | Substantial | | Substantial | | | | Outcome 3: Enhanced capacity of the MMA and States to establish integrated forest-fire management and landholding registration in selected rural areas of the Cerrado Biome | | High | Substantial | | Substantial | | | | **Piaui Project** | |  |  | |  | | |  | | | Outcome 1: Promotion of the reduction of climate change impacts in the Cerrado by promoting environmental regularization of landholdings | | High | Substantial | | High | | | Moderately Satisfactory | | | Outcome 2: Promotion of the reduction of climate change impacts in the Cerrado by preventing, combating, monitoring and early detection of forest fires | | High | Modest | | Modest | | | | **Bahia Project** | |  |  | |  | | |  | | | Outcome 1: Promotion of the reduction of climate change impacts in the Cerrado by promoting environmental regularization of landholdings | | High | Substantial | | High | | | Moderately Satisfactory | | | Outcome 2: Promotion of the reduction of climate change impacts in the Cerrado by preventing, combating, monitoring and early detection of forest fires | | High | Modest | | Modest | | | | **Federal Project** | |  | | |  | |  |  | | | Outcome 1: Promotion of the reduction of climate change impacts in the Cerrado by promoting environmental regularization of landholdings | | High | | | Substantial | | Substantial | Satisfactory | | | Outcome 2: Promotion of the reduction of climate change impacts in the Cerrado by preventing, combating, monitoring and early detection of forest fires | | High | | | Substantial | | Substantial | | Outcome 3: Enhanced capacity of the MMA and States to establish integrated forest-fire management and landholding registration in selected rural areas of the Cerrado Biome | | High | | | Substantial | | Substantial | | **INPE Project** | |  | | |  | |  |  | | | Outcome 2: Promotion of the reduction of climate change impacts in the Cerrado by preventing, combating, monitoring and early detection of forest fires | | High | | | High | | High | Highly Satisfactory | | | |

|  |  |
| --- | --- |
| E. OTHER OUTCOMES AND IMPACTS | |
| Gender | | | |
| 1. In the Cerrado, women play a critical but often unrecognized role in the survival strategies and economy of poor rural households. Many women contribute to the labor force and generate income through agroforestry and animal husbandry activities. Women’s traditional production is often limited to marginal soils in rainfed agricultural systems highly susceptible to climate-change impacts. They rely on traditional knowledge of biodiversity, use of non-timber forest products, seed varieties and drought‐resistant species. 2. According to the 2006 Agricultural Census, 27 percent of landholders in the Cerrado area are women. Some evidence indicates that male ownership and professional management tend to increase with property size. Data on gender for the owners of smallholdings registered in CAR are so far only available for Maranhão: of the 5,600 small holdings registered, 69 percent were owned by men, and 31 percent by women. 3. Generally, women represented around 30 percent of people trained in farming alternatives to the use fire, prevention of wildfires, and practices to restore degraded areas. | | | |
| Institutional Strengthening | | | |
| 1. Under Outcomes 2 and 3 of the Cerrado Program, activities focused on strengthening government institutions. The Program also placed a focus on influencing policy and practice guidelines, which affect a broad number of stakeholders. In addition to the institutional strengthening, the Cerrado Program contributed to enhancing the Cerrado’s relevance in Brazil’s environmental policies. Better interagency coordination mechanisms and increased stakeholder participation also produced lessons learned for other conservation projects and programs such as the Brazil Investment Plan (BIP).  Poverty Reduction and Shared Prosperity  1. A study commissioned by the UK government[[11]](#footnote-11) evaluated the potential livelihood impacts of CAR and projects that facilitated CAR registration, including the Bahia and Piauí Projects. The paper highlighted the multiple changes in natural, financial, human, social and physical capital assets caused by CAR and CAR-related programs. The following preliminary findings are highlighted: (a) the amount of initial RL area that a farmer has on his or her landholding appears to be a major determinant of how the CAR and CAR-related programs affect livelihoods, particularly through changes in [natural capital](https://www.sciencedirect.com/topics/earth-and-planetary-sciences/natural-capital) assets; (b) the programs that facilitate CAR registration help farmers to accumulate [human capital](https://www.sciencedirect.com/topics/earth-and-planetary-sciences/human-capital) by providing knowledge and information on how to comply with the Forest Code and on the value of ecosystem services generated by forests; and (c) the programs appear to have helped farmers prepare for greater market demands for sustainably produced products. However, improvements in livelihoods will not be guaranteed without proper compensation for farmers’ compliance efforts. 2. Enforcement of the Forest Code through CAR is likely to affect not only natural vegetation but also the livelihood of producers through changes in land-use practices and changes in or maintenance of environmental services, such as protecting headwaters and reviving springs. 3. As mentioned above, an important and innovative aspect of the Program was inclusion of rural territories of Traditional Peoples and Communities in the CAR in Maranhão, under the Federal, and the participation, in Bahia state, of a different set of traditional peoples and communities known as *Fundo de Pasto* (communities with collective grazing rights) and *Geraizeiros* (plateau dwellers with collective-use rights) in the restoration of degraded areas.  Other Unintended Outcomes and Impacts  1. The protection of headwaters and the revival of springs is a positive outcome of the Cerrado Program with regards to ecosystem services. The Federal Project identified and registered 770 springs on private rural landholdings and an additional 196 springs located on the collective territories of Traditional Peoples and Communities in Maranhão. This is a first step in a longer process of recovery of these areas and protection of groundwater. In the Bahia Project, materials were produced for the protection of springs and headwater areas in six municipalities. Initiatives by rural communities in the context of sustainable use of natural resources, were mapped, systematized and documented, and experiences were shared among communities and disseminated for replication in other places. 2. In Piauí, SEMAR-PI has begun setting up demonstration units for the restoration of degraded areas and established a service for recovery of areas around springs. Pilot recovery plots, training of outreach workers, and establishment of tree nurseries have raised interest in producing and acquiring seedlings to comply with the obligation to recover illegally cleared areas. The Piauí Project established a Geoprocessing Center in the state environmental agency to facilitate several state functions related to land-use monitoring and enforcement, water resources management, environmental management (zoning), and land-tenure regularization 3. The CAR process drastically reduced the initial fears among smallholders that CAR might be designed to take away their land. CAR is not a land-tenure regularization process. Nevertheless, participating smallholders felt reassured of their actual possession of their holdings. 4. The Piauí Project established a Geoprocessing Center in the state environment agency to facilitate several state functions related to land-use monitoring and enforcement, water resources management, environmental management (zoning), and land-tenure regularization. | | | |
| 1. KEY FACTORS THAT AFFECTED IMPLEMENTATION AND OUTCOME | | | | | |
| A. KEY FACTORS DURING PREPARATION |
| 1. Although the Program’s broad features had been defined by late 2011, two years and four months passed between the establishment of the UK Trust Fund (December 2011) and the start of the first project (April 2014). This time was taken up by the selection of priority areas (first only in Piauí and Bahia, and later in Tocantins and Maranhão) among 52 priority municipalities defined by MMA, the preparation of an Operational Manual, the preparation of projects and their activities, the formulation of results indicators, and the selection of suitable grant recipients for the projects. 2. Project preparation benefitted from a number of concurrent initiatives implemented under the Sustainable Cerrado Initiative, which were the driving force behind the Cerrado Program’s design. Extensive analysis and consultation conducted by the MMA as well as participatory consultation processes involving public and private stakeholders supported the selection of the states and implementing agencies. 3. The proposed implementation arrangements created a decentralized system in which each project was shielded from possible problems in another project. The decentralized approach had many advantages, but also implied the need to involve different executing agencies, with various levels of institutional capacity. 4. The structuring of the Cerrado Program into four separate, parallel recipient-executed projects, each with its own implementing agency and its own grant recipient, was certainly a factor for success, even if it meant increased transaction and supervision costs for the Bank. 5. The targets for regularization of landholdings were based on the best data available at the time (2006 Agricultural Census). They were realistic in terms of numbers of holdings, but in retrospect it became clear that the actual mean size of small holdings in Bahia, Piauí and Maranhão was much smaller than the estimates based on the Census, leading to overstated area targets. Moreover, the Federal Project formulated the area target for regularization of holdings of all sizes, rather than merely smaller holdings, although most project activities were focused on smallholders. This also resulted in an overambitious target area. 6. Project designs by components were straightforward and in line with the PDOs. The list of intended activities in Piauí and Bahia was likely too long, and some them were not carried out, without much detriment to expected outcomes. Other activities might have warranted the formulation of an associated outcome, albeit an intermediate one. The Federal Project was to work on CAR registration in Tocantins and Maranhão, but preparation did not check the feasibility of doing this in both states. Tocantins eventually was dropped without prejudice to the quantitative outcome. 7. The fire component in the Piauí Project was ambitious. It assumed that local governments in the target municipalities would actively cooperate and participate, which did not materialize due to the political changes after municipal elections in 2016. The component could have been conceived as a pilot experience with lessons learned as results, rather than increased capacity or reduced fire incidence. 8. The environmental regularization process had a solid legal basis in the Forest Code, but the implementation of fire prevention, firefighting and fire management had little legal basis before the program started. 9. The structuring of the Cerrado Program into four separate, parallel recipient-executed projects, each with its own implementing agency and its own grant recipient, was certainly a factor for success, even if it meant increased transaction and supervision costs for the Bank. |
| B. KEY FACTORS DURING IMPLEMENTATION | | |
| 1. Although implementation was successful overall, in some instances it experienced difficulties, primarily related to political issues and the legal framework. Important factors that impacted project implementation were:   *Factors subject to the control of the government and/or implementing entities control*  *Coordination and engagement*   1. Management, coordination, communications and consistency among participants worked well overall, not least because all participants in the federal and state agencies demonstrated a high level of ownership. Project partners have praised the Bank’s trustee role and performance as positive, attentive, respectful of partners, and leading with good foresight. 2. Program coordination by MMA provided leadership and oversight in the four projects, not only in the Federal Project. Hiring an advisor to the department director, a manager for the PPCerrado and the corresponding program for the Amazon region, and consultants advising the ICMBio on the fire component furthered implementation. MMA conducted technical visits to the projects and accompanied the Bank on supervision missions. There is no program-wide committee, but the Bank called annual meetings of all participants and the Donor (UK). States expressed an interest in a stronger role for MMA as liaison, to bring about greater proximity and convergence among projects, and suggested that the Federal Project could be used to this end. 3. There was an excellent degree of ownership and commitment on the part of the implementing agencies (State Environmental Secretariats in Bahia and Piauí, MMA, SFB, ICMBio, INPE) and of their assigned teams. 4. In Piauí, the state’s CAR team started with only two staff members. It was able to tackle the task only when project funds were used to hire consultants, which gave the team a strong boost in manpower and expertise. The SFP’s implementation of CAR registration only took off once a dedicated manager and technical staff had been hired. FUNCATE faced a lengthy process to finalize the technical cooperation agreement with INPE. In addition, severe fire disasters ravished Bahia and federal protected areas in 2015 which demanded the attention of state and federal agency staff.   *Factors Subject to World Bank*   1. The organization of the necessary steps and activities to begin implementation of the recipient-executed projects presented a significant challenge. The Bank offered training courses for state and federal staff on procurement rules and procedures, and on the preparation of terms of reference. Moreover, Piauí had a much slower start due to the scarcity of staff dedicated specifically to the respective projects. Initial staffing had a major impact on startup delays.   *Factor outside the control of government and or implementing agencies*  *Legal Framework*   1. The applicable legislation (the Forest Code) and legal basis for CAR changed significantly in 2012. The implementation of CAR began nationwide only in May 2014, and the federal responsibility for its implementation migrated from the MMA to the affiliated SFB in December 2014. The environmental agencies in Bahia and Piauí were not sufficiently functional for part of 2014 due to state elections. 2. The implementation of CAR in Brazil was constantly under a time constraint defined by the law (although the deadline was twice extended by decree), which added welcome pressure to complete the regularization task. 3. Farmers were initially wary of CAR in Piauí and considered it a potential threat (fear of government taking away their holdings). Today, CAR is accepted and welcomed by most farmers. Rural workers’ unions, representing family holdings, played an important role in increasing the confidence of small farmers and inducing them to register.   *Exchange rate of Brazilian currency*   1. The development of the exchange rate of the Brazilian currency to the dollar substantially increased the real availability of funds for the Cerrado Program. The exchange rate adopted at appraisal varied between R$2.30 for the Piauí, Bahia and INPE Projects, and R$2.46 per US$1 for the Federal Project, whereas the actual exchange rates used for disbursement were in the range of R$ 3.20 to 3.50 per US$. | | |
| 1. BANK PERFORMANCE, COMPLIANCE ISSUES, AND RISK TO DEVELOPMENT OUTCOME | | | | |
| QUALITY OF MONITORING AND EVALUATION (M&E)  1. The quality of M&E is rated **Modest**. | | | |
| **M&E Design**   1. The Program adopted an M&E approach at both the Program and at project level. The Cerrado Program team in MMA, jointly with the Bank and the project executing agencies, developed a set of indicators for each project, some of were aggregated across projects. Each project has its own framework of objectives, intermediate results and associated results indicators. The four project results and monitoring frameworks were complete and specific in terms of indicators, data-collection methodology, reporting responsibilities, and frequency of M&E activities. However, some were revised as part of a restructuring (Piauí and Bahia Projects) as stated further above. 2. There were challenges with defining some of the indicators and targets. In the three projects that included environmental regularization, two Bank core sector indicators (CSIs) on land users and land area adopting sustainable land management practices as results of the project were used. Core indicators are used to report Bank results to internal and external stakeholders and are required for all operations. To adequately measure the intended project outcomes related to environmental regularization of landholdings, the description of the indicators defined the actual meaning as number or area of "small landholdings enrolled in in the national CAR system (SICAR)." 3. The M&E design could have benefited from additional ways to measure the effectiveness of some of the activities. Indicators related to fire management in the Federal Project stipulate that three protected areas be brought under integrated fire management plans, without mentioning the effectiveness of such plans, leaving the impact of such integrated management and how it should be measured. 4. The INPE Project’s implementation agency found the indicator “number of users of the new platform” unclear and difficult to measure, as a number by itself does not specify the quantity of environmental managers using the information to prevent and control forest fires. | | |
| **M&E Implementation** | | |
| 1. The M&E system performed as expected, adequately collecting data to track program and project progress and results. Project outputs and evidence for each results achievement were gathered and recorded for each project. The measuring and recording of results were the responsibility of the grant recipients (financial agents), but were carried out in collaboration with the associated implementing agencies, which reported on them regularly through their semi-annual progress reports. The implementing agencies reported their monitoring data (achievements) at annual meetings of the Program participants. The grant recipients submitted final completion reports covering results and monitoring data. 2. The Bank team kept track of all monitoring results across the four projects and presented annual reports to Bank management and the UK as Donor, containing the accumulated results of all projects, serving as a systematic monitoring tool, and allowing the periodic review of strategies to ensure adequate guidance to the program’s objectives. 3. One PDO indicator (fire hotspots observed in the Bahia Project) was not reported on.   **M&E Utilization**   1. Monitoring data were used to keep track of outputs and outcomes, as well as to inform Bank management (Implementation Status and Results Reports, ISRs) and the Donor (annual reports) about Program and project progress toward the objectives. The information was used by the Bank and by project teams to resolve, or attempt to resolve, problems that arose during implementation. This is reflected in the ISRs, Annual Reports, and the Mid-Term-Review. Difficulties in measuring certain indicators were discussed by implementing agencies with the Bank and led to adjustments in restructurings (Piauí, Bahia and Federal Projects).   **Justification of Overall Rating of Quality of M&E**   1. The overall rating of the quality of M&E is “Modest.” There were significant shortcomings in its design and implementation, but it was generally sufficient to assess the achievement of the objectives.  ENVIRONMENTAL, SOCIAL AND FIDUCIARY COMPLIANCE *Safeguards Compliance*   1. The Cerrado Program, as well as each of its projects, complies with the current safeguards required by Brazilian regulations, the Common Approach to Environmental and Social Safeguards for Multiple Delivery Partners under the Forest Carbon Partnership Facility’s (FCPF) Readiness Fund, as well as with those of the Bank. | | |
| 1. The Bank has classified three of the four projects as Category B because their impacts are limited in scope, localized, temporary and reversible. The projects triggered the following safeguard policies: Environmental Assessment (OP/BP 4. 01), Natural Habitats (OP/BP 4. 04), and Forests (OP/BP 4. 36). Measures taken to address safeguard policy issues included the preparation of Environmental Assessments and the respective Environmental Management Frameworks; monitoring procedures as part of the Environmental Assessments; and consultation processes. Each project complied with the program’s overall safeguards framework and with federal and state laws. For the INPE Project, no significant negative environmental impacts were expected or identified. Thus, it was assigned Risk Category C.   Table 17: Safeguards policies triggered by each project and individual categories.   |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | PROJECTS | OP/BP 4.01 | OP/BP 4.04 | OP/BP 4.36 | OP 4.09 | OP/BP 4.11 | OP/BP 4.10 | OP/BP 4.12 | OP/BP 4.37 | **OP/BP**  **7.50** | OP/BP 7.60 | Risk | | Piauí Project | YES | YES | YES | NO | NO | NO | NO | NO | NO | NO | B | | Bahia Project | YES | YES | YES | NO | NO | NO | NO | NO | NO | NO | B | | Federal Project | YES | YES | YES | NO | NO | NO | NO | NO | NO | NO | B | | INPE Project | NO | YES | YES | NO | NO | YES | NO | NO | NO | NO | C |  1. Overall, implementation support missions and reports have confirmed general compliance with safeguards polices. During project implementation, no significant negative social and environmental impacts were identified. The implementing agencies kept channels to obtain citizen feedback and complaints. No complaints or grievances were received from stakeholders and institutional partners during the projects’ implementation. 2. The overall activities supported by the projects led to positive impacts on the environment, such as CAR, forest-fire prevention and control, and the improvement of forest-fire management in selected protected areas. Compliance with safeguards policies was assessed regularly by the IBRD team and reflected in the ISRs throughout the life of each project. These ISRs consistently rated safeguards compliance as Satisfactory. No grievances were submitted. This ICR agrees that there is evidence that the safeguards triggered were handled in an appropriate manner by each project.   *Fiduciary Compliance*   1. The staff of grant-recipient organizations and of implementing organizations received training in financial management (FM)and procurement, funded by the Trust Fund. Bank staff conducted procurement and FM supervision missions regularly for each project, as well expenditure and post-procurement reviews. Issues raised by these reviews were clarified and resolved efficiently. 2. There were no problems regarding compliance with procurement rules and procedures under any of the four projects. The grant recipients in three of the four projects (Bahia, Federal and INPE Projects) had no problems with FM, they fulfilled their obligations related to delivery of audit reports and Interim Financial Reports (IFRs), and no ineligible expenditure were identified. 3. However, there were some irregularities with FM in the case of the grant recipient for the Piauí Project. Bank missions rated FM as moderately unsatisfactory or even as unsatisfactory throughout the life of the project due to issues with the IFRs and accounting records. The audit reports for FY17, FY18 and FY19 were delayed in order to first reconcile the project’s IFRs with bank statements and accounting records. This reconciliation was concluded in August 2018 and auditors have been notified to commence the audit work. The project’s IFRs were considered acceptable to the Bank after the revision, subject to any findings by the auditors. 4. The FM issues arose in part due to lack of proper coordination and communication between the grant recipient and an outsourced accounting service, specifically due to the way the recipient communicated transaction details to the accounting service, unclear setting of responsibilities for the preparation of IFRs, and lack of a mechanism to resolve differences or reconcile accounting records and source data. There were other irregularities concerning treatment and use of interest earned on the Designated Account, which can only be used for project purposes. However, there were no instances of ineligible expenditures. 5. All projects fulfilled the obligation of delivering the audit reports and IFRs, and no ineligible expenditure was identified for all projects. | | |
| C. BANK PERFORMANCE | | |
| Quality at Entry | | | | |
| 1. All features of the program structure were thoroughly discussed and agreed with the Donor, the coordinating ministry (MMA) and each of the four implementing agencies. The Program’s design was complex but effective to forge stronger alliances with the involvement of all actors. All parties agreed to the decision to prepare four separate projects, reflecting lessons learned from other operations, as ownership by implementing agencies would be stronger when each had its own project, instead of having MMA in charge of a larger, centrally managed project. 2. The Bank agreed to manage the UK Trust Fund within the context of its own assistance strategy for Brazil. It acted as a coordinator and honest broker among concerned federal and state agencies in shaping the Cerrado Program and its component projects. While the Task Team Leader for the Program changed during the last phase of preparation, a close and productive relationship was established with implementing agencies. All implementing agencies stated their opinion that the Program design helped to build a strong institutional partnership and strong ownership. 3. The risk assessments identified the most relevant risk factors that the operations faced and proposed suitable mitigation measures. The Bank failed to fully appreciate the risk of discontinuity of support and ownership by federal, state and municipal governments after elections to implement agreements made prior to such changes in government. 4. Bank-executed TA, funded from the trust fund, was used to support preparation meetings, consultations and missions, and to hire consultants to assist in the preparation of the project documents for the clients. 5. The Bank could have done better with more concise and consistent formulation of PDOs and indicators. | | | | |
| Quality of Supervision | | | | |
| 1. Implementation support missions were conducted by Brazil Country Office staff at least twice a year for each project: once a year in the field and once a year during joint Program meetings in Brasília, optimizing the use of supervision funds, since the TTL was the same for all projects. In addition, there were several technical meetings over the life of each project. The Bank team maintained close communications with the grant recipients and implementing agencies through technical meetings and phone conferences and gave prompt support as needed. Joint meetings and other technical meetings in Brasília were crucial to integrate the various implementation agencies, identify arising problems, and provide needed support. 2. Four ISRs issued for each of the four projects addressed in detail the projects’ implementation history, the challenges faced, and compliance with fiduciary and safeguard provisions. They gave a consistent view of the implementation status of each project’s components. Bank management reviewed and commented on all ISRs. In addition, five Annual Program Reports were prepared and submitted to the Donor from 2013 to 2017. 3. A Program Mid-Term Review Mission (MTR) was carried out from December 2016 to March 2017, based on an MTR report prepared by an independent consultant. It covered the four projects and Bank-executed activities. 4. The Bank acted throughout as a responsible trustee/supervisor, performing its fiduciary functions correctly, but also played the role of de facto coordinator at national level. This role was expressly welcomed by all participants. Bank staff maintained a close relationship with the Donor (UK). 5. The Bank’s role was enhanced by the Bank-executed TA which provided more direct, hands-on training and capacity building to the projects, and permitted training of grant recipients by the Bank´s procurement and FM staff as well as swift and flexible hiring of consultants to assist projects in the field. 6. Bank staff readily proposed a restructuring when it became apparent that the Bahia, Piauí and Federal Projects needed more time after initial difficulties and delays, and that some indicators needed adjustment. | | | | |
| Justification of Overall Rating of Bank Performance  1. The Bank’s performance is rated Satisfactory. There were only minor shortcomings in quality at entry and quality of supervision.  D. RISK TO DEVELOPMENT OUTCOME  1. There is a low risk to the outcome of the environmental regularization of small rural holdings: the registered entries in CAR exist on several servers and losing them is highly unlikely. However, there is still a need for validation of all entries by the state environmental agencies (OEMAs) and for follow-up by farmers and authorities on the obligation to restore illegally degraded (cleared) areas, necessary for full environmental regularization. Both tasks require manpower, which may not be available in sufficient quantities in the States of Bahia and Maranhão after project conclusion. Temporary funding of this activity in Piauí appears to be secured under a World Bank loan to the state. Restoration of vegetation requires financing, which has been offered in principle by the National Development Bank (Banco Nacional de Desenvolvimento Econômico e Social, BNDES) to both large and family farmers. | | | | |
| 1. The larger risk is related to the expected impact of environmental regularization in terms of farmer behavior and if landholders will comply with the stipulations of the Forest Code not to clear the RLs and APPs shown in the cadaster. The mitigation of this risk is dependent on both OEMAs’ capacity to monitor and enforce land-use rules, and on the political climate to do so. 2. The outcomes of the program’s fire monitoring, prevention and firefighting components depend on (a) the willingness of municipal authorities to accept these tasks as part of their regular duties, and (b) obtaining funding for the maintenance of fire brigades and for the purchase or replacement of equipment. The need for, and benefits of, fire prevention and control has been demonstrated in selected municipalities, as were ways of avoiding the use of fire in agriculture and ranching, but continued awareness and implementation are not guaranteed. 3. INPE’s achievement in providing an improved, publicly accessible platform of information technology to monitor and predict forest-fire outbreaks is solid and not threatened. The initial response by state and local government authorities in the form of training requests and training participation was quite promising. Interest in the use of the platform is not likely to diminish in the future. | | | | |
| 1. LESSONS AND RECOMMENDATIONS | | | | |

1. The Cerrado Program was an ambitious and innovative effort to address the climate-change consequences of rapid land-use change in the Cerrado Biome. Its four projects achieved major successes and experienced numerous difficulties in simultaneously promoting farmers’ and ranchers’ compliance with Brazil’s Environmental Law, reduced burning, and increased fire control and prevention in the agricultural frontier region.
2. A review of the Cerrado Program’s seven-year lifespan, from the creation of the BCCCMTF (2011) to the conclusion of the projects (2018), served as basis for delineating the following tentative list of lessons. They are organized into three thematic groups: Climate Change, Public Policy, and Program Operations.

**Climate Change**

* **Brazil’s recent climate-change focus on the Cerrado savanna-forest biome is a necessary and welcome complement to its ongoing efforts to reduce deforestation in the Amazon rainforest.**

1. For many years, the deforestation of the Amazon rainforest was the near-exclusive focus for reducing Brazil’s GHG emissions from land-use change. The environmental and climatological importance of the Cerrado region has been increasingly recognized and a host of climate change mitigation efforts have been undertaken, many with international donor support. In some cases, successful instruments and policy tools that were originally developed for the Amazon have been adapted to the specific needs of the Cerrado. By directly addressing the issue of land-use change, the country’s primary source of GHG emissions in both the Amazon and the Cerrado, Brazil is making a bold effort to reduce its GHG emissions.

* **Investing in behavioral changes regarding current agricultural and ranching practices requires a medium- to long-term time frame in order to produce significant reductions in GHG emissions from land-use practices.**

1. As changes in human behavior are often slow and require constant reinforcement and enforcement to take root, short-term indicators for achieving reductions in GHG emissions are not generally applicable. International donors in the climate-change effort will need to adopt a medium- to long-term approach if they hope to see the eventual achievement of significant GHG reductions.

**Public Policy**

* The launching and use of a state-of-the-art fire detection and monitoring system was a major advance in the effort to control and prevent fires in the Cerrado and requires continued support and expansion.

1. Given the rapidity with which fire spreads and its vast dispersal over the Cerrado Biome in numerous fire hotspots, there is a strong need for precise, georeferenced, real-time information that is readily available to all involved parties. The Terra MA2-Queimadas platform provides a reliable, easily accessible, state-of-the-art tool to help agencies and people at all levels of government—federal, state and local—as well as private parties to use real-time online information on fire occurrences and risks to monitor hotspots, for the purpose of preventing, fighting and avoiding fires, enforcing laws and regulations on fire use, and planning burnings. Although many users were reached, the number is still small from a national perspective. While INPE concluded software development, dissemination and training on time, it ran short of time and resources for reaching and training an even larger number of interested users, for observation of the actual use made of the software, and for correcting software bugs. Only about six months were available for this task; a longer period and more resources for post-development activities are required.

* The decision to strengthen and consolidate the existing Rural Environmental Cadaster (CAR) enabled significant gains in the number and area of total CAR registries.

1. By working with and strengthening existing policies such as CAR, the Program was able to move directly into action to increase the number of entries into the registry and to consolidate CAR as a primary source of information on characteristics of private rural holdings. The Bahia, Piauí and Federal (Maranhão) projects demonstrated that registration of large number of family landholders in an environmental cadaster is feasible in a reasonable timeframe and with low cost. The unit cost of CAR registration decreases as the implementing firms gain experience and compete among themselves.
2. The CAR environmental registry system will only produce positive environmental results if it generates reliable, georeferenced, up-to-date data. A forest monitoring system is only as good as the quality of the data that is put into it. Standardized data collection and georeferencing techniques need to be followed by all firms and government agencies conducting CAR registration. In addition, once landowners have widely registered their holdings, efforts are needed to promote monitoring, restoration and income-generating actions.

* Coordinated action by donors was a powerful impulse behind climate-change action in the Cerrado.

1. The overlapping participation of several international donors—the Global Environmental Facility; the Inter-American Development Bank (IADB); the International Finance Corporation (IFC); Germany (KfW and GIZ); and the United Kingdom (DEFRA)—in Brazil’s Cerrado region provided a broad, semi-coordinated approach to addressing climate change. There was a certain “division of labor”: FIP financed an extensive inventory of Cerrado forests; the Cerrado Program invested in the development of a fire detection and monitoring system; and the Sustainable Cerrado Initiative supported strengthening of the Cerrado’s protected areas.

* Institutional strengthening is an integral part of building long-term capacity for climate change actions.

1. Twelve institutions were directly involved in the implementation of the Cerrado Program and successfully coordinated their actions, even though they operated at different levels of administrative authority: federal (INPE, MMA, ICMBio, SFB); state (SEMA-BA, SEMAR-PI, SEMA-MA); civil society (FLEM, Fundação Agente, FUNCATE, FUNATURA); and international (World Bank). The experience gained in administering the Cerrado Program and in coordinating actions across administrative levels can serve as building block for an expansion of these activities and a refinement of climate-change actions in the Cerrado.

* An adequate level and appropriate timing of stakeholder participation are key elements in gaining acceptance of program activities.

1. Landholders’ initial reluctance to register themselves can be overcome through clear communication of the “why, how and what,” by explaining the benefits as well as the possible negative consequences of not registering, and by dispelling unfounded fears. It was important to clarify that CAR does not interfere with property or land use rights. The positive involvement of unions or associations representing the target population in CAR was essential to obtain acceptance by family landholders.
2. Meanwhile, the lack of cooperation by some municipal governments has hindered the implementation of the fire prevention and firefighting component, notably in Piauí. Prior involvement of and consultation with stakeholders during project preparation can avoid unpleasant surprises later on, when certain stakeholders may refuse to cooperate.

**Program Operations**

* **A decentralized approach to program execution allows for increased use of local knowledge and for greater program “ownership” by local communities.**

1. The decentralized execution of a larger regional program through several smaller projects, rather than under one large umbrella project, is viable and likely more effective. However, this implies higher transaction and supervision costs for the Bank as Trustee. Greater effectiveness is likely linked to greater ownership on the part of implementing agencies. Project agencies have demonstrated an unusually high degree of ownership.
2. Making direct grants to nongovernmental organizations (NGOs), with government supervision, can allow for greater flexibility and increased efficiency in project implementation. This approach has simplified implementation and relieved public-sector implementing agencies of the burdens of grant administration. Channeling funds through federal or state budgets would have made implementation much more difficult due to the rules and procedures imposed by applicable laws. The hiring of individual consultants by the grant recipients was quite straightforward and would have been nearly impossible for a public-sector agency. Implementing agencies also highlighted the fact that the excellent relationships between financial (NGO) and technical teams were particularly conducive to good implementation.
3. However, there must be an excellent relationship between the financial and administrative team (NGO) and the public-sector technical team. The lead role must be with the latter and may not be challenged by the former, which serves in an auxiliary manner. This needs to be clear in the agreement between the two parties.
4. Partnerships are essential but sometimes turn out not to be viable. Lack of cooperation by municipal governments (mayors) has hindered the implementation of the fire component in Piauí.

* **An adaptive management approach is essential in order for a program to overcome unexpected challenges and to take advantage of unforeseen opportunities.**

1. External factors can often provoke unexpected delays to project implementation. The Cerrado Program dealt with fire catastrophes in 2015 in Bahia; state and municipal elections which often changed their interlocutors; and changes in the administrative structure of federal policy as the CAR registry was passed from the MMA to the SBF in 2014.
2. When an original plan turns out not to be viable, flexibility in choosing and implementing an alternative approach, rather than insisting on the original plan, can produce positive results. When faced with difficulties in establishing municipal fire brigades, for example, the Piauí Project promoted law enforcement campaigns by the state environmental and civil police and strengthened the fire monitoring infrastructure at the state level.
3. Adaptive management allows for taking advantage of unforeseen opportunities. With significant reduction in unit costs for CAR registries, the program was able to expand the number of landholders registered, as well as the total area covered by CAR registries, making this a highly successful action of the Cerrado Program.

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| **ANNEX 1. RESULTS FRAMEWORK AND KEY OUTPUTS** |

**A. RESULTS FRAMEWORK AND KEY OUTPUTS: CERRADO PROGRAM**

**A.1 PDO Indicators**

| Indicator | Unit of Measure | Baseline Value | Actual Value | End-Target Value | Target/Achieved Value | | | | Description/sources |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Bahia | Piauí | Federal | INPE |
| Land users adopting sustainable land management practices as a result of the project. | Number | 0 | 38,017 | 9,676 | 3,376/  25,342 | 2,600/  4,565 | --- /  5,604 | --- | Small rural landholdings enrolled in the national CAR system. The intended outcome has not only been fully achieved in terms of numbers of holdings but has been greatly exceeded. |
| Land area where sustainable practices have been adopted as a result of the project. | Number of hectares | 0 | 861,143 | 817,102 | 83,092/  312,875 | 2000,000/  201,023 | 533,200/  347,245 | --- | Landholding areas enrolled in the national CAR system as a result of the project. The Legal Reserves (RLs) and Areas of Permanent Preservation (APPs) were measured as disaggregated data from the landholding areas inputted in the CAR system: 289,833 ha of RLs and APPs registered in CAR, in three states (PI, MA, BA) as a result of the Cerrado Program. |
| Protected areas brought under integrated forest-fire management plans. | Number | 0 | 3 | 3 | ---- | ---- | 3 | --- | Number of protected areas supported by the project to prevent and fight forest fires. |
| Reforms in forest policy, legislation or other regulation supported. | Yes/No | No | Yes | Yes | ---- | ---- | Yes | --- | Protected areas supported implementation of the Action Plan to Prevent and Control Deforestation.  Proposed National Forest Fire Law. |
| Target municipalities equipped to combat forest fires. | Number | 0 | 11 | 14 | 8 | 3 | ---- | --- | Municipalities supported by the project to prevent and fight forest fires. |
| Government institutions provided with capacity-building support to improve management of forest resources. | Number | 0 | 88 | 7 | 2 | 2 | 1 | 7/  88 | Government institutions using the new forest-fire monitoring and warning platform in the Brazilian Cerrado. The 88 institutions reported by INPE include the Environmental Agencies of Bahia, Piauí and MMA. |
| Number of people trained. | Number | 0 | 1,877 | 1,190 | 487 | 322 | 653 | 90/  325 | People trained in alternatives to the use of fire, in techniques to prevent and fight forest fires, and in the use of the new forest-fire monitoring and warning platform. |

A.1.2. CERRADO PROGRAM: ORGANIZATION OF THE ASSESSMENT OF THE PDO

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| **Outcome 1: *Promotion of the reduction of climate change impacts in the Cerrado by promoting environmental regularization of landholdings*** | |
| Outcome Indicators | **38,017** Land users adopting sustainable land management practices as result of the project having their landholdings enrolled in the National CAR System: first step for environmental compliance.  **861,143 hectares** of land area where sustainable practices have been adopted as result of the project, by having the CAR registered. |
| Intermediate Results Indicators | SICAR and CEFIR systems improved  CAR training conducted  Government institutions provided with capacity building support to improve management of forest resources |
| Key Outputs by Component  (linked to the achievement of Outcome 1) | 38,017 38,017 Land users adopting sustainable land management practices as result of the project having their landholdings enrolled in the National CAR System: first step for environmental compliance.  43 municipalities participating  Educational materials: videos; CAR guidelines  289,833.41 hectares of APPs and RLs registered in SICAR, in three states (PI, MA, BA)  Communication campaigns to promote CAR and mobilize key stakeholders were conducted in 59 Cerrado municipalities in the states of Goiás, Minas Gerais, Maranhão, Mato Grosso, Mato Grosso do Sul, Tocantins, and the Federal District and included the production and distribution of brochures, folders, leaflets, stickers, banners and posters  Geoprocessing Center established in Piauí |
| **Outcome 2: *Promotion of the reduction of climate change impacts in the Cerrado by preventing, combating monitoring and early detection of forest fires*** | |
| Outcome Indicators | 3 protected areas brought under integrated forest-fire management plans  11 Targeted Municipalities equipped to combat forest fires  88 Government institutions provided with capacity building support to improve management of forest resources  Decrease in fire hotspots observed in APPs and RLs in targeted municipalities in the State of Piauí for 2017 (baseline 2010–2016)  Local governments and municipal committees in Bahia and Piauí have been mobilized and sensitized to the need for fire prevention, control and firefighting, including training and equipment for fire brigades in selected municipalities, as well as drawing up municipal plans to deal with fires  1,877 Staff in State and Municipal environmental agencies trained to monitor hotspots under the Project and trained in techniques to prevent and control forest fires under the Project; landholders trained in alternatives to the use of fire under the Project; environmental managers trained in using the new forest-fire monitoring and warning platform  Forest-fire monitoring and warning platform available and functional |
| Intermediate Results Indicators | 972 people trained in techniques to prevent and fight forest fires  422 users of the new forest-fire monitoring and warning platform  12,000 monthly accesses to the forest-fire monitoring and warning platform |
| Key Outputs by Component  (linked to the achievement of Objective/Outcome 2) | Integrated Fire Management Plan (MIF) for each protected area prepared, including maps and database  Formation of fire brigades in 11 municipalities  Piauí State Committee for Fire Prevention and Firefighting has been reactivated  Educational materials on how to combat, prevent and avoid fires: folders, booklets, videos, serial albums.  Six meteorological stations were installed in Bahia |
| **Outcome 3*: Enhanced the capacity of the MMA and States to establish integrated forest-fire management and landholding registration in selected rural areas of the Cerrado Biome*** | |
| Outcome Indicators | Reforms in forest policy, legislation or other regulations supported – a proposal of a National Policy on Forest Fire Management, Prevention and Control, mandated by the new Forest Code, including consultation process. The innovative concept of “integrated fire management,” which avoids the fallacy of avoiding fires at all cost in a biome such as the Cerrado, has been incorporated in proposed new legislation. |
| Intermediate Results Indicators | PPCerrado monitored, updated and evaluated periodically  National Policy on Forest Fire Management, Prevention and Control proposal, including a broad consultation process |
| Key Outputs by Component  (linked to the achievement of Objective/Outcome 3) | PPCerrado 2016–2020 Action Plan launched and being implemented  Draft National Policy on Forest Fire Management, Prevention and Control |

**B. CERRADO PROGRAM’S PROJECTS**

B.1. PIAUÍ PROJECT - RESULTS FRAMEWORK AND KEY OUTPUTS

**PDO: To promote the reduction of climate change impacts in the Cerrado of Southern Piauí State by: (i) promoting the environmental regularization of landholdings in the targeted municipalities; and (ii) preventing and combating forest fires through the integration of local actors and promoting the adoption of sustainable production practices in the targeted municipalities.**

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| **B.1.1. PDO Indicators** |

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| **B.1.2. Intermediate Results Indicators** | |

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| |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | **Component:**  Rural Environmental Regularization | | | | | | | **Indicator Name** | **Unit of Measure** | **Baseline** | **Original Target** | **Formally Revised**  **Target** | **Actual Achieved at Completion** | | | Electronic Rural Environmental Cadastre System (SICAR) operating in SEMAR, with the ability to conduct Rural Environmental Cadastre (CAR) in coordination with IBAMA/MMA and municipal agencies. | Percentage | 0.00 | 100.00 | 100.00 | 100.00 | | |  | 08-Apr-2014 | 08-Apr-2014 | 31-Dec-2017 | 29-Dec-2017 | | | **Comments (achievements against targets):** Target achieved (100%). Piauí established a Geoprocessing Center in the state environmental agency, intended to facilitate several state functions and activities related to land use monitoring and enforcement, water resource management, environmental management (zoning), and land tenure regularization. | | | | | | |  | | | | | |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | **Indicator Name** | **Unit of Measure** | **Baseline** | **Original Target** | **Formally Revised**  **Target** | **Actual Achieved at Completion** | | | Persons trained to register landholdings in the SICAR. | Number | 0.00 | 10.00 | 105.00 | 180.00 | | |  | 08-Apr-2014 | 08-Apr-2014 | 31-Dec-2017 | 29-Dec-2017 | | | **Comments (achievements against targets):** Target surpassed (171%). 06 CAR training courses conducted, benefiting 39 municipalities, much beyond the target municipalities. 3 courses conducted on recovery of degraded areas: 90 people trained. | | | | | |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | |  | | | | | | | **Component:**  Prevention and Control of Forest Fires | | | | | | | **Indicator Name** | **Unit of Measure** | **Baseline** | **Original Target** | **Formally Revised**  **Target** | **Actual Achieved at Completion** | | | Staff in State and Municipal environmental agencies trained to monitor hotspots under the Project. | Number | 0.00 | 20.00 | 20.00 | 46.00 | | |  | 08-Apr-2014 | 08-Apr-2014 | 31-Dec-2017 | 29-Dec-2017 | | | **Comments (achievements against targets):** Target surpassed (230%). 46 people attended IBAMA training to monitor on hotpots with Project support. | | | | | |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | **Indicator Name** | **Unit of Measure** | **Baseline** | **Original Target** | **Formally Revised**  **Target** | **Actual Achieved at Completion** | | | Staff in State and Municipal environmental agencies trained in techniques to prevent and control forest fires under the Project. | Number | 0.00 | 20.00 | 20.00 | 119.00 | | |  | 08-Apr-2014 | 08-Apr-2014 | 31-Dec-2017 | 29-Dec-2017 | | | **Comments (achievements against targets):** Target surpassed (595%). 119 firefighters were trained and 39 were selected to join the firefighting brigades of 3 municipalities. Piauí State Committee for Fire Prevention and Firefighting has been reactivated. | | | | | |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | **Indicator Name** | **Unit of Measure** | **Baseline** | **Original Target** | **Formally Revised**  **Target** | **Actual Achieved at Completion** | | | Number of landholders trained in alternatives to the use of fire under the Project. | Number | 0.00 | 200.00 | 200.00 | 203.00 | | |  | 08-Apr-2014 | 08-Apr-2014 | 31-Dec-2017 | 29-Dec-2017 | | | **Comments (achievements against targets):** Target achieved (101%).Smallholders and technicians were trained in alternatives to the use of fire in the municipalities of Santa Filomena, Palmeira do Piauí and Currais. In addition, 1,363 members of 26 communities in six municipalities participated in educational events on preventing and fighting forest fires. | | | | | |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | **Indicator Name** | **Unit of Measure** | **Baseline** | **Original Target** | **Formally Revised**  **Target** | **Actual Achieved at Completion** | | | Number of targeted Municipalities equipped to combat forest fires. | Number | 0.00 | 6.00 | 6.00 | 3.00 | | |  | 08-Apr-2014 | 08-Apr-2014 | 31-Dec-2017 | 29-Dec-2017 | | | **Comments (achievements against targets):** Target partially achieved (50%). The project has had difficulties in implementing the fire prevention, control and avoidance component due to a general lack of cooperation from municipal governments. One notable exception was the municipality of Uruçuí, where SEMAR organized a course on the identification of causes and origins of forest fires in partnership with the National Center for Forest-Fire Prevention and Firefighting which lent five instructors. Adverse factors included the financial crisis of local governments, which affected payment for fire brigades, municipal elections in 2016 and a severe drought that caused a 90 percent shortfall in commercial crops. Nonetheless, the Piauí project was able to equip three, out of a targeted six, municipalities for firefighting and in training state and municipal staff in fire prevention and control, including acquisition of 5 motorcycles and PPE for preventive patrolling; 3 cooperation agreements: Uruçuí, Baixa Grande and Ribeiro Gonçalves; equipment and firefighting; educational booklets. As a viable alternative to establishing municipal fire brigades, the project promoted three law enforcement campaigns in four municipalities by the state environmental and civil police, resulting in arrests, confiscation of arms, ammunition and game meat, and fines, as well as the detection of hunting camps and consumers of game meat. | | | | | | |  | | | | | | |

**B.1.3. Organization of the Assessment of the PDO**

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| **Outcome 1: Promotion of the reduction of climate change impacts in the Cerrado by promoting environmental regularization of landholdings** | |
| Outcome Indicators | * + 4,565 land users adopting sustainable land management practices as a result of the project: CAR   + 201,203 hectares of land area under sustainable landscape management practices |
| Intermediate Results Indicators | * + Electronic Rural Environmental Cadaster System (SICAR) operating in SEMAR: fully implemented   + 180 persons trained to register landholdings in SICAR |
| Key Outputs by Component  (linked to the achievement of Objective/Outcome 1) | * 79,874 hectares of APPs and RLs registered in SICAR, corresponding to 39.73% of total area registered as a result of the project * 3,797 landholders intend to enroll in the Environmental Regulation Program (PRA) to restore APPs and RLs * Educational videos; CAR guidelines * SEMAR has begun setting up demonstration units for the restoration of degraded areas and has established a service for recovery of areas around springs |
| **Outcome 2: Promotion of the reduction of climate change impacts in the Cerrado by preventing, combating, monitoring and early detection of forest fires** | |
| Outcome Indicators | * 10% fewer hotspots observed in APPs and RLs in the targeted municipalities * Controlled fire authorizations issued in the four selected municipalities as a result of the project |
| Intermediate Results Indicators | * 46 staff members in state and municipal environmental agencies trained to monitor hotspots under the project * 119 staff members in state and municipal environmental agencies trained in techniques to prevent and control forest fires under the project * 203 landholders trained in alternatives to the use of fire under the project * 3 targeted municipalities equipped to combat forest fires |
| Key Outputs by Component  (linked to the achievement of Objective/Outcome 2) | * SEMAR has conducted six workshops and 22 talks on environmental education, dealing with ways to prevent fires and reduce land clearing, and reaching a total of 2,000 people * Educational materials: videos; forest firefighting campaign |

B.2. BAHIA PROJECT - RESULTS FRAMEWORK AND KEY OUTPUTS

**PDO: The Project’s main objective is to promote the reduction of climate change impacts in the Cerrado of the west of the Bahia State by: (i) promoting the environmental regularization of landholdings in the targeted municipalities and support actions to promote recovery of environmental liabilities; and (ii) strengthening the State’s capacity to prevent and combat forest fires through the integration of local actors and promoting the adoption of sustainable production practices in the targeted municipalities.**

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| **B.2.1. PDO Indicators** |

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The initial target set by the project was greatly surpassed in terms of number of landowners registered and number of municipalities involved. One of the main reasons behind the remarkable rate of success in this outcome was a significant decrease in the cost of individual registries, which allowed the program to greatly expand its scope. This, in turn, was due to several factors: improvement in the SICAR registry system which lowered the cost of its services and made them affordable; market competition among the contractors who performed the registries; and an increase in the value of the US dollar with respect to the Brazilian Real. | | | | | |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | **Indicator Name** | **Unit of Measure** | **Baseline** | **Original Target** | **Formally Revised**  **Target** | **Actual Achieved at Completion** | | | Land area where sustainable practices have been adopted as result of the project. | Hectare(Ha) | 0.00 | 83,902 | 83,9020 | 312875.00 | | |  | 17-Sep-2014 | 17-Sep-2014 | 31-Dec-2017 | 29-Dec-2017 | | | **Comments (achievements against targets):** The target was exceeded (373%). A total of 312,875 hectares were register in the CEFIR as a result of the project, of which 68,8299.99 hectares are APPs and RLs areas. This indicator measures the cumulative land area that as a result of the project was enrolled in the SICAR.CAR registries generate georeferenced details on the total area of landholdings, areas earmarked for alternative land use, Permanent Protection Areas (APPs) and Legal Reserves (RLs). CAR also requires that the vegetation cover of APP and RL areas illegally cleared after July 22, 2008 be restored within 20 years. Landholders who illegally cleared APP and RL areas prior to that date must still comply with the law but are entitled to benefits from a special regime by enrolling in an Environmental Regularization Program (PRA) and signing a Commitment Agreement, along with submitting a Forest Recovery Plan (PRAD) that details how and when the areas will be restored. | | | | | |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | |  | | | | | | |  | | | | | | |  | | | | | | |  | | | | | | |  | | | | | | |  | | | | | | |  | | | | | | |  | | | | | | |  | | | | | | |  | | | | | | |  | | | | | | |  | | | | | | |  | | | | | | |  | | | | | | |  | | | | | | |  | | | | | | |  | | | | | | |  | | | | | | |  | | | | | | |  | | | | | | | **Objective/Outcome: Promotion of the reduction of climate change impacts in the Cerrado by preventing, combating, monitoring and early detection of forest fires** | | | | | | | **Indicator Name** | **Unit of Measure** | **Baseline** | **Original Target** | **Formally Revised**  **Target** | **Actual Achieved at Completion** | | | Hotspots observed in Areas of Permanent Preservation (APPs) and Legal Reserves (RLs) registered in the in CEFIR, in the targeted municipalities, as a result of the Project. | Percentage | 0.00 | 0.00 | 7.00 | 0.00 | | |  | 17-Sep-2014 | 17-Sep-2014 | 31-Dec-2017 | 29-Dec-2017 | | | **Comments (achievements against targets):** This target was not measured. The PDO indicator related to the reduction of forest-fire areas observed in each target municipality was replaced by this new PDO indicator related to hotspots (fires) observed in APPs and RLs registered in CEFIR (Bahia’s version of CAR) in the targeted municipalities. The baseline for this indicator will also be the average number of hotspots identified by INPE in the APPs and RLs registered in CEFIR between 2006 and 2016 in the target municipalities. Neither the baseline (2006-2016 average), nor the number observed in 2017 has been reported by the Bahia government. | | | | | |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | **Indicator Name** | **Unit of Measure** | **Baseline** | **Original Target** | **Formally Revised**  **Target** | **Actual Achieved at Completion** | | | Indicator: Number of actions to combat forest fires in the targeted municipalities as a result of the project. | Number | 0.00 | 150.00 | 150.00 | 85.00 | | |  | 17-Sep-2014 | 17-Sep-2014 | 31-Dec-2017 | 29-Dec-2017 | | | **Comments (achievements against targets):** Target partially achieved (57%). In conjunction with the National Center for Preventing and Combating Forest Fires (Centro Nacional de Prevenção e Combate aos Incêndios Florestais, PREVFOGO), the Bahia Project administered a course on forest-fire expertise to 45 technicians. A fire-prevention workshop was held in two municipalities for 53 people, individual and collective protection kits were acquired, and 85 firefighting actions were carried out under the project. Six meteorological stations were also installed. Local municipal governments collaborated with the project, particularly with training and workshops. The Bahia Project also promoted alternatives to the use of fire in agriculture, controlled burning and support to the Bahia Without Fire (Bahia Sem Fogo) campaign in the form of mobile workshops with the aim of promoting awareness of fires and their prevention among inhabitants of and visitors to the state’s western region. | | | | | | |  | | | | | | |  | | | | | | |  | | | | | | |  | | | | | | |  | | | | | | |  | | | | | | | |
| **B.2.2. Intermediate Results Indicators** | |

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| |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | |  | | | | | | | **Component:**  Rural Environmental Regularization | | | | | | | **Indicator Name** | **Unit of Measure** | **Baseline** | **Original Target** | **Formally Revised**  **Target** | **Actual Achieved at Completion** | | | Government institutions provided with capacity building support to improve management of forest resources (SEMA-BA and INEMA-BA). | Number | 0.00 | 2.00 | 2.00 | 2.00 | | |  | 12-Sep-2014 | 12-Sep-2014 | 31-Dec-2017 | 29-Dec-2017 | | | **Comments (achievements against targets):** Target achieved (100%). INEMA and SEMA were provided with capacity building support to improve management of forest resources, including vehicles, software, hardware, equipment and training. Six meteorological stations were also installed. | | | | | |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | **Indicator Name** | **Unit of Measure** | **Baseline** | **Original Target** | **Formally Revised**  **Target** | **Actual Achieved at Completion** | | | Municipalities provided with CEFIR registration for small landholdings as a result of the Project. | Number | 0.00 | 4.00 | 4.00 | 12.00 | | |  | 17-Sep-2014 | 17-Sep-2014 | 31-Dec-2017 | 29-Dec-2017 | | | **Comments (achievements against targets):** Target surpassed (300%). The project implemented CAR registries in 12 selected municipalities with the focus on family landholders having an area of four “fiscal modules” or less. The CAR registration was supported in the following municipalities: Formosa do Rio Preto, São Desidério, Riachão das Neves, Luís Eduardo Magalhães, Barreiras, Correntina, Jaborandi, Cocos, Coribe, Santa Rita de Cássia, Mansidão, and Buritirama. CAR registries generate georeferenced details on the total area of landholdings, areas earmarked for alternative land use, Permanent Protection Areas (APPs) and Legal Reserves (RLs). | | | | | |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | **Indicator Name** | **Unit of Measure** | **Baseline** | **Original Target** | **Formally Revised**  **Target** | **Actual Achieved at Completion** | | | Demonstrative degraded areas where recovery practices have been implemented as a result of the Project. | Hectare(Ha) | 0.00 | 30.00 | 30.00 | 350.00 | | |  | 17-Sep-2014 | 17-Sep-2014 | 31-Dec-2017 | 29-Dec-2017 | | | **Comments (achievements against targets):** Target surpassed (1167%). CAR requires that the vegetation cover of APP and RL areas illegally cleared after July 22, 2008 be restored within 20 years. Landholders who illegally cleared APP and RL areas prior to that date must still comply with the law but are entitled to benefits from a special regime by enrolling in an Environmental Regularization Program (PRA) and signing a Commitment Agreement, along with submitting a Forest Recovery Plan (PRAD) that details how and when the areas will be restored. The project supported strategic restoration actions in eight micro-catchments. Restoration results are measured in terms of number of landholdings supported, which is not the same as restoration of vegetation, which takes much longer than the project’s duration. SEMA intends to monitor these lands after the end of the project. | | | | | |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | **Indicator Name** | **Unit of Measure** | **Baseline** | **Original Target** | **Formally Revised**  **Target** | **Actual Achieved at Completion** | | | People trained to prepare and assist with the PRAD. | Number | 0.00 | 200.00 | 200.00 | 235.00 | | |  | 17-Sep-2014 | 17-Sep-2014 | 31-Dec-2017 | 29-Dec-2017 | | | **Comments (achievements against targets):** Target surpassed (117%). 5 workshops on introduction to restoration, with 182 participants; two forest restoration courses, with 53 participants | | | | | |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | |  | | | | | | | **Component:**  Prevention and Control of Forest Fires | | | | | | | **Indicator Name** | **Unit of Measure** | **Baseline** | **Original Target** | **Formally Revised**  **Target** | **Actual Achieved at Completion** | | | People trained on techniques to prevent and fight forest fires. | Number | 0.00 | 120.00 | 120.00 | 270.00 | | |  | 17-Sep-2014 | 17-Sep-2014 | 31-Dec-2017 | 29-Dec-2017 | | | **Comments (achievements against targets):** Target surpassed (225%). The project conducted training courses in eight different municipalities (in conjunction with the State Fire Department) for 217 volunteer firefighters on how to combat, prevent and avoid fires. In conjunction with the National Center for Preventing and Combating Forest Fires (PREVFOGO), the project administered a course on forest-fire expertise to 45 technicians | | | | | |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | **Indicator Name** | **Unit of Measure** | **Baseline** | **Original Target** | **Formally Revised**  **Target** | **Actual Achieved at Completion** | | | People trained in alternatives to the use of fire under the Project. | Number | 0.00 | 160.00 | 160.00 | 217.00 | | |  | 17-Sep-2014 | 17-Sep-2014 | 31-Dec-2017 | 29-Dec-2017 | | | **Comments (achievements against targets):** Target surpassed (135%). The project conducted eight workshops regarding alternatives to use forest fire with 217 participants. An interesting teaching tool is the use of “serial albums,” also funded by the project, which take the place of slide presentations and flipcharts and contain the entire lesson delivered as a story with text, pictures and graphs. | | | | | | |  | | | | | | |  | | | | | |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | **Indicator Name** | **Unit of Measure** | **Baseline** | **Original Target** | **Formally Revised**  **Target** | **Actual Achieved at Completion** | | | Targeted municipalities equipped to combat forest fires. | Number | 0.00 | 8.00 | 8.00 | 11.00 | | |  | 17-Sep-2014 | 17-Sep-2014 | 31-Dec-2017 | 29-Dec-2017 | | | **Comments (achievements against targets):** Target surpassed (137%). A fire-prevention workshop was held in two municipalities for 53 people, individual and collective protection kits were acquired, and 85 firefighting actions were carried out under the project. Six meteorological stations were also installed. Local municipal governments collaborated with the project, particularly with training and workshops. The project also promoted controlled burning and support to the Bahia Without Fire campaign in the form of mobile workshops with the aim of promoting awareness of fires and their prevention among inhabitants of and visitors to the state’s western region. | | | | | | |  | | | | | | |

**B.2.3. Organization of the Assessment of the PDO**

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| **Outcome 1: Promotion of the reduction of climate change impacts in the Cerrado by promoting environmental regularization of landholdings** | |
| Outcome Indicators | * 25,342 land users adopting sustainable land management practices as a result of the project: CAR * 312,875 hectares of land area under sustainable landscape management practices |
| Intermediate Results Indicators | * Two government institutions provided with capacity building to improve management of forest resources * Twelve municipalities provided with CEFIR registration for small landholdings as a result of the project * 350 demonstrative degraded areas where recovery practices have been implemented as a result of the project * 270 people trained to prepare and assist with the PRAD |
| Key Outputs by Component  (linked to the achievement of Objective/Outcome 1) | * 68,829.99 hectares of APPs and RLs registered in CEFIR * 21,229 landholders intend to enroll in the Environmental Regulation Program to restore APPs and RLs * Educational materials were produced for the protection of springs and headwater areas in the municipalities of Mansidão, Barreiras, Correntina, Jaborandi, Coribe and Cocos * Educational videos; CAR guidelines |
| **Outcome 2: Promotion of the reduction of climate change impacts in the Cerrado by preventing, combating, monitoring and early detection of forest fires** | |
| Outcome Indicators | * Hotspots observed in APPs and RLs registered in CEFIR, in targeted municipalities, as a result od the project (indicator not measured) * 85 actions to combat forest fires in the targeted municipalities as a result of the project |
| Intermediate Results Indicators | * 270 people trained on techniques to prevent and fight forest fires * 11 targeted municipalities equipped to combat forest fires |
| Key Outputs by Component  (linked to the achievement of Objective/Outcome 2) | * 11 municipalities equipped * 217 volunteer firefighters trained on how to combat forest fires * Educational materials: “serial album” * Bahia Without Fire campaign in the form of mobile workshops with the aim of promoting awareness of fires and their prevention among inhabitants of and visitors to the state’s western region |

B.3. PROCERADO FEDERAL PROJECT - RESULTS FRAMEWORK AND KEY OUTPUTS

**PDO: To enhance the capacity of the Ministry of Environment to establish integrated forest fire management and landholding registration in selected rural areas of the Cerrado Biome.**

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| **B.3.1. PDO Indicators** |

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| |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | **Outcome 1: Promotion of the reduction of climate change impacts in the Cerrado by promoting environmental regularization of landholdings** | | | | | | | | | | | **Indicator Name** | **Unit of Measure** | | **Baseline** | | **Original Target** | | **Formally Revised**  **Target** | | **Actual Achieved at Completion** | | | Land area where sustainable land management has been adopted because of the Project. | Hectare(Ha) | | 0.00 | | 533,200 | | 533,200 | | 347,244 | | |  | | 27-Apr-2015 | | 27-Apr-2015 | | 31-Dec-2017 | | 31-May-2018 | | | **Comments (achievements against targets):** Target partially achieved (65%). An innovative aspect of the CAR registries was the inclusion of rural territories of Traditional Peoples and Communities in Maranhão by the Federal Cerrado project. These peoples, who historically have been marginalized from federal government programs, include quilombos (rural Afro-descendant communities) and babassu coconut gatherers and processors, whose territories are collectively managed and recognized by Brazilian law. Thirty-two such territories, encompassing a total area of 94,897 hectares, were georeferenced, while 2,500 families gained CAR registries, of which a majority were granted to women. The project conducted a series of activities to disseminate knowledge of the CAR registry system and increase adherence to it. Communication campaigns to promote the CAR and to mobilize key stakeholders were conducted in 59 Cerrado municipalities in the states of Goiás, Minas Gerais, Maranhão, Mato Grosso, Mato Grosso do Sul, Tocantins and the Federal District and included the production and distribution of brochures, folders, leaflets, stickers, banners and posters. Other important activities of the project were the training of state and municipal officials on how to register in the CAR, validate CAR entries and issue CAR certificates; and conducting 16 workshops and seminars to promote the CAR with a total of 480 participants. | | | | | | | | | | | **Indicator Name** | | **Unit of Measure** | | **Baseline** | | **Original Target** | | **Formally Revised**  **Target** | **Actual Achieved at Completion** | | Reforms in forest policy, legislation or other regulations supported | | Yes/No | | N 27-Apr-2015 | | Y 27-Apr-2015 | | Y 31-Dec-2017 | Y 31-May-2018 | | **Comments (achievements against targets):** Target achieved (100%). The Federal Cerrado project supported the Action Plan for Prevention and Control of Deforestation and Fires in the Cerrado (PPCerrado) through activities aimed at reducing deforestation and promoting landholders’ compliance with the Forest Code; monitoring and evaluating the PPCerrado in light of changes introduced by the 2012 Forest Code; and developing the governance capacity to implement the PPCerrado. The PPCerrado was first adopted in 2010 as an action plan to reduce deforestation in the Cerrado and has been under implementation since then. A second, revised version was adopted in January 2014 for 2014–2015 after having received support from the Federal Cerrado project. The project supported four workshops in 2016 to revise the PPCerrado, which resulted in the approval and publication of its third phase which runs from 2016 to 2020. | | | | | | | | | |  | | 27-Apr-2015 | 27-Apr-2015 | 31-Dec-2017 | 31-May-2018 |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | |  | | | | | | | **Objective/Outcome: Promotion of the reduction of climate change impacts in the Cerrado by preventing, combating, monitoring and early detection of forest fires** | | | | | | | **Indicator Name** | **Unit of Measure** | **Baseline** | **Original Target** | **Formally Revised**  **Target** | **Actual Achieved at Completion** | | | Protected Areas brought under integrated forest-fire management plans | Number | 0.00 | 3.00 | 3.00 | 3.00 | | |  | 27-Apr-2015 | 27-Apr-2017 | 31-Dec-2017 | 28-Jul-2017 | | | **Comments (achievements against targets):** Target achieved (100%). The following Protected Areas were selected to be supported, which were among those most affected by forest fires in the Cerrado biome: • Serra da Canastra National Park – Minas Gerais state (200,000 hectares); • Chapada das Mesas National Park – Maranhão state (160,046 hectares); and • Veredas do Oeste Baiano Wildlife Refuge – Bahia state (128,521 hectares). The main activities completed in the outcome were the development of an Integrated Fire Management Plan (MIF) for each protected area; equipping and providing training to volunteer brigades; providing training on environmental management and environmental education for adjacent communities; and acquisition of equipment to strengthen actions aimed at forest-fire prevention and control. MIF planning and implementation require the involvement of and agreements with local communities, as well as information and training on fire prevention, fire control and firefighting. Burnings in those communities must follow a plan that specifies who can conduct them, and where and when they can take place. An integrated forest fires management plan was prepared and adopted for each of the three protected areas, which are now being managed in accordance with these plans. Park management capacity was increased through training of staff and of neighboring farmers and through necessary equipment for firefighting and radio communication. | | | | | |  |  | | --- | |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | **Outcome 3: Enhanced capacity of the MMA and States to establish integrated forest-fire management and landholding registration in selected rural areas of the Cerrado Biome** | | | | | | | | **Indicator Name** | **Unit of Measure** | **Baseline** | **Original Target** | **Formally Revised**  **Target** | **Actual Achieved at Completion** | | | Reforms in forest policy, legislation or other regulations supported | Yes/No | N | Y | Y | Y | | |  | 27-Apr-2015 | 27-Apr-2015 | 31-Dec-2017 | 31-May-2018 | | | **Comments (achievements against targets):** Target achieved (100%). The National Policy on Forest Fire Management, Prevention and Control, mandated by the new Forest Code was a key element of the project. In September 2016, the MMA instituted a working group to formulate this policy. Draft versions of the policy received ample consultation with stakeholder groups, while a final version was validated by the Ministry of Environment’s secretariats and its related agencies. A draft bill of law for a “National Policy of Integrated Fire Management” (NPMIF) was submitted to the Presidency of Brazil, for subsequent submission to the Brazilian Congress. The innovative concept of “integrated fire management,” which avoids the fallacy of avoiding fires at all cost in a biome such as the Cerrado, has been incorporated in new proposed legislation. | | | | | | |

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| **B.3.2. Intermediate Results Indicators** |

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| |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | **Component:** Support to the Action Plan for Prevention and Control Deforestation and Forest Fire in the Cerrado | | | | | | | **Indicator Name** | **Unit of Measure** | **Baseline** | **Original Target** | **Formally Revised**  **Target** | **Actual Achieved at Completion** | | | Actions of PPCerrado Phase 2 under implementation | Percentage | 0.00 | 30.00 | 30.00 | 58.00 | | |  | 27-Apr-2015 | 27-Apr-2015 | 31-Dec-2017 | 28-Jul-2017 | | | **Comments (achievements against targets):** Target achieved (100%). This indicator measures the implementation of the Action Plan for Prevention and Control of Deforestation and Burnings in the Cerrado (PPCerrado) and official endorsement of its Phase 2. The Federal Cerrado project supported the Action Plan for Prevention and Control of Deforestation and Fires in the Cerrado (PPCerrado) through activities aimed at reducing deforestation and promoting landholders’ compliance with the Forest Code; monitoring and evaluating the PPCerrado in light of changes introduced by the 2012 Forest Code; and developing the governance capacity to implement the PPCerrado. The PPCerrado was first adopted in 2010 as an action plan to reduce deforestation in the Cerrado and has been under implementation since then. A second, revised version was adopted in January 2014 for 2014–2015 after having received support from the Federal Cerrado project. The project supported four workshops in 2016 to revise the PPCerrado, which resulted in the approval and publication of its third phase which runs from 2016 to 2020. The PPCerrado3 (2016-2020) was approved in 15 Dec 2016. This PPCerrado 3rd phase is under implementation. | | | | | |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | **Indicator Name** | **Unit of Measure** | **Baseline** | **Original Target** | **Formally Revised**  **Target** | **Actual Achieved at Completion** | | | PPCerrado monitored and evaluated periodically | Number | 0.00 | 2.00 | 2.00 | 2.00 | | |  | 27-Feb-2015 | 27-Feb-2015 | 31-Dec-2017 | 28-Jul-2017 | | | **Comments (achievements against targets):** Target achieved (100%). The PPCerrado implementation was annually monitored by MMA and periodically reported. PPCerrado2 officially monitored: 58% of planned actions implemented or were implementation in 2016. | | | | | |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | **Indicator Name** | **Unit of Measure** | **Baseline** | **Original Target** | **Formally Revised**  **Target** | **Actual Achieved at Completion** | | | National Policy on Forest-Fire Management, Prevention and Control, including the Cerrado Biome, under preparation. | Yes/No | N | Y | Y | Y | | |  | 27-Apr-2015 | 27-Apr-2015 | 31-Dec-2017 | 28-Jul-2017 | | | **Comments (achievements against targets):** Target achieved (100%). The formulation of a National Policy on Forest Fire Management, Prevention and Control, mandated by the new Forest Code, was another key element of the Federal Cerrado project. In September 2016, the MMA instituted a working group to formulate this policy. Draft versions of the policy received ample consultation with stakeholder groups, while a final version was validated by the Ministry of Environment’s secretariats and its related agencies. A draft bill of law for a “National Policy of Integrated Fire Management” (NPMIF) was submitted to the Presidency of Brazil, for subsequent submission to the Brazilian Congress. The innovative concept of “integrated fire management,” which avoids the fallacy of avoiding fires at all cost in a biome such as the Cerrado, has been incorporated in new proposed legislation. This project also supported meetings of the technical working group on REDD+ to prepare forest reference emissions levels (FRELs). This group was formed in 2014 to conduct surveys of data and information on results and emission-reduction methodologies for Brazil’s land-use and land-use change sector, and to review the technical content to be used as the basis for Brazil’s submissions to the United Nations Framework Convention on Climate Change (UNFCCC). | | | | | |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | |  | | | | | | | **Component:** Rural Environmental Cadastre | | | | | | | **Indicator Name** | **Unit of Measure** | **Baseline** | **Original Target** | **Formally Revised**  **Target** | **Actual Achieved at Completion** | | | Small landholdings applications to enroll in CAR | Number | 0.00 | 3700.00 | 3700.00 | 8110.00 | | |  | 27-Apr-2015 | 27-Apr-2015 | 31-Dec-2017 | 31-May-2018 | | | **Comments (achievements against targets):** Target surpassed (219%).The indicator measured the number of rural landholdings enrolled in the National CAR System (SICAR). The CAR registries implemented were one of its most successful aspects. The project implemented CAR registries with the focus on family landholders having an area of four “fiscal modules” or less. The initial target set by the project was greatly surpassed in terms of number of landowners registered. An innovative aspect of the Program’s CAR registries was the inclusion of rural territories of Traditional Peoples and Communities in Maranhão by the Federal Cerrado project. These peoples, who historically have been marginalized from federal government programs, include quilombos (rural Afro-descendant communities) and babassu coconut gatherers and processors, whose territories are collectively managed and recognized by Brazilian law. Thirty-two such territories, encompassing a total area of 94,897 hectares, were georeferenced, while 2,500 families gained CAR registries, of which a majority were granted to women. The project conducted a series of activities to disseminate knowledge of the CAR registry system and increase adherence to it. Communication campaigns to promote the CAR and to mobilize key stakeholders were conducted in 59 Cerrado municipalities in the states of Goiás, Minas Gerais, Maranhão, Mato Grosso, Mato Grosso do Sul, Tocantins and the Federal District and included the production and distribution of brochures, folders, leaflets, stickers, banners and posters. Other important activities of the Federal Cerrado project were the training of state and municipal officials on how to register in the CAR, validate CAR entries and issue CAR certificates; and conducting 16 workshops and seminars to promote the CAR with a total of 480 participants. | | | | | |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | |  | | | | | | | **Component:** Preventing and Fighting Forest Fires in Protected Areas | | | | | | | **Indicator Name** | **Unit of Measure** | **Baseline** | **Original Target** | **Formally Revised**  **Target** | **Actual Achieved at Completion** | | | People trained to combat forest fires in the selected PAs | Number | 0.00 | 580.00 | 580.00 | 449.00 | | |  | 27-Apr-2015 | 27-Apr-2015 | 31-Dec-2017 | 28-Jul-2017 | | | **Comments (achievements against targets):** Target partially achieved (77%). 140 women and 309 men trained | | | | | |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | **Indicator Name** | **Unit of Measure** | **Baseline** | **Original Target** | **Formally Revised**  **Target** | **Actual Achieved at Completion** | | | PAs provided with capacity-building support to improve integrated forest fire management | Number | 0.00 | 3.00 | 3.00 | 3.00 | | |  | 27-Apr-2015 | 27-Apr-2015 | 31-Dec-2017 | 28-Jul-2017 | | | **Comments (achievements against targets):** Target achieved (100%). The ICMBio improved the integrated fire management (manejo integrado de fogo, MIF) in three federal protected areas, i.e., the Chapadas das Mesas National Park in Maranhão (160,046 hectares), Serra da Canastra National Park in central Minas Gerais (200,000 hectares), and Veredas do Oeste Baiano Wildlife Refuge in western Bahia (128,521 hectares). The outputs were the development of an Integrated Fire Management Plan (MIF) for each protected area; equipping and providing training to volunteer brigades; providing training on environmental management and environmental education for adjacent communities; and acquisition of equipment to strengthen actions aimed at forest-fire prevention and control. MIF planning and implementation require the involvement of and agreements with local communities, as well as information and training on fire prevention, fire control and firefighting. Burnings in those communities must follow a plan that specifies who can conduct them, and where and when they can take place. PAs management capacity was as increased through training of staff and of neighboring farmers and through necessary equipment for firefighting and radio communication. However, a question that remains is how the impact of the plans is to be measured, since the existence of integrated fire management plans does not necessarily guarantee positive impacts regarding the control and prevention of fires. | | | | | |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | **Indicator Name** | **Unit of Measure** | **Baseline** | **Original Target** | **Formally Revised**  **Target** | **Actual Achieved at Completion** | | | PAs' forest management plans prepared | Number | 0.00 | 3.00 | 3.00 | 3.00 | | |  | 27-Apr-2015 | 27-Apr-2015 | 31-Dec-2017 | 28-Jul-2017 | | | **Comments (achievements against targets):** Target achieved (100%). An integrated forest fires management plan was prepared and adopted for each of the three protected areas, which are now being managed in accordance with these plans. Protected Areas management capacity was increased through training of staff and of neighboring farmers and through necessary equipment for firefighting and radio communication. | | | | | | |  | | | | | | |

**B.3.3. Organization of the Assessment of the PDO**

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| --- | --- |
| **Outcome 1: Promotion of the reduction of climate change impacts in the Cerrado by promoting environmental regularization of landholdings.** | |
| Outcome Indicators | * 347,244 hectares of land area under sustainable landscape management practices |
| Intermediate Results Indicators | * 8110 small landholding applications to enroll in CAR |
| Key Outputs by Component  (linked to the achievement of Objective/Outcome 1) | * 141,129.36 hectares of APPs and RLs registered in SICAR * 4,679 landholders intend to enroll in the Environmental Regulation Program (PRA) to restore APPs and RLs * Educational videos; CAR guidelines |
| **Outcome 2:** **Promotion of the reduction of climate change impacts in the Cerrado by preventing, combating, monitoring and early detection of forest fires.** | |
| Outcome Indicators | * Three APPs brought under integrated forest-fire management plans |
| Intermediate Results Indicators | * 449 people trained to combat forest fires in the selected APPs * 3 APPs provided with capacity-building support to improve integrated forest-fire management * APPs’ forest management plans prepared |
| Key Outputs by Component  (linked to the achievement of Objective/Outcome 2) | * 488,567 hectares under integrated forest-fire management * Formation of fire brigades * Staff trained * Equipment, including radio communication, vehicles, materials to combat forest fires |
| **Outcome 3: Enhanced capacity of the MMA and States to establish integrated forest-fire management and landholding registration in selected rural areas of the Cerrado Biome.** | |
| Outcome Indicators | * PPCerrado: reforms in forest policy, legislation or other regulations supported * National Forest-Fire Policy: Reforms in forest policy, legislation or other regulations supported |
| Intermediate Results Indicators | * PPCerrado monitored and evaluated periodically * National Policy on Forest-Fire Management, Prevention and Control, including the Cerrado Biome ,prepared and submiited for approval |
| Key Outputs by Component  (linked to the achievement of Objective/Outcome 3) | * Participatory workshops * National policy proposal |

B.4. INPE PROJECT - RESULTS FRAMEWORK AND KEY OUTPUTS

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | |  | | | | | | | **B.4.1. PDO Indicators**  **PDO: To facilitate the monitoring, analysis and early detection of forest fires by using the TERRA-MA²-Queimadas to support decision making among environmental managers in the Cerrado Biome.**  **Objective/Outcome: Promotion of the reduction of climate change impacts in the Cerrado by preventing, combating, monitoring and early detection of forest fires.** | | | | | | | **Indicator Name** | **Unit of Measure** | **Baseline** | **Original Target** | **Formally Revised**  **Target** | **Actual Achieved at Completion** | | | Government institutions provided with capacity building support to improve management of forest resources (number). | Number | 0.00 | 7.00 | 7.00 | 32.00 | | |  | 15-Dec-2014 | 15-Dec-2014 | 31-Dec-2017 | 29-Dec-2017 | | | **Comments (achievements against targets):** Target surpassed (489%). This indicator measures the Number of Government Institutions using the new platform. At least 32 institutions were trained including: IBAMA, ICMBio, 27 State Agencies, IBRAM, Funai, Environmental Emergencies Battalion (BEA) of the Military Fire Department of Mato Grosso (CBM-MT). | | | | | | |  | | | | | |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | **Indicator Name** | **Unit of Measure** | **Baseline** | **Original Target** | **Formally Revised**  **Target** | **Actual Achieved at Completion** | | | Number of users of the new platform. | Number | 0.00 | 325.00 | 500.00 | 422.00 | | |  | 15-Dec-2014 | 15-Dec-2014 | 31-Dec-2017 | 29-Dec-2017 | | | **Comments (achievements against targets):** Target partially achieved (84%). An initial training course on the new platform was conducted in October 2016, for 30 managers from two federal agencies – IBAMA and ICMBio – and five state-level agencies – SEMA (Bahia), SEMAR (Piauí), Naturatins (Tocantins), SEMAD (Minas Gerais), and IBRAM (Brasília). This was followed by weekly site visits from July to December 2017, when training was conducted for all interested parties by instructors and researchers responsible for the execution of the project. The project team continues to receive high demand for additional training from all parts of the country. | | | | | |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | **Indicator Name** | **Unit of Measure** | **Baseline** | **Original Target** | **Formally Revised**  **Target** | **Actual Achieved at Completion** | | | Number of accesses to the system monthly. | Number | 0.00 | 7000.00 | 7000.00 | 12000.00 | | |  | 15-Dec-2014 | 15-Dec-2014 | 31-Dec-2017 | 29-Dec-2017 | | | **Comments (achievements against targets):** Target surpassed (171%). The TERRA MA2-Queimadas platform, an open software computer system which was launched in December 2017 (http://www.inpe.br/queimadas/portal/terrama2q) for the detection, monitoring, analysis and alerts of forest fires. This new platform is extremely user friendly and works with various types of data sources, generating highly relevant information in a large variety of formats such as alerts sent by email to potentially affected parties, daily reports on the current state of each fire and statistical summaries of forest fires for each Brazilian state and for the country as a whole. It integrates geographic services and modeling, with real-time access to geo-environmental data and can be used to build applications for monitoring, analysis and alert in different regions of the Cerrado. It is available on any server connected to the internet. | | | | | | |

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| **B.4.2. Intermediate Results Indicators** |

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| |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | |  | | | | | | | **Component:**  Development of a Platform to monitor, analyze, and early detection of forest fires | | | | | | | **Indicator Name** | **Unit of Measure** | **Baseline** | **Original Target** | **Formally Revised**  **Target** | **Actual Achieved at Completion** | | | Platform validated and functional | Yes/No | N | Y | Y | Y | | |  | 15-Dec-2014 | 15-Dec-2014 | 31-Dec-2017 | 29-Dec-2017 | | | **Comments (achievements against targets):** Target achieved (100%).The TERRA MA2-Queimadas platform, an open software computer system which was launched in December 2017 (http://www.inpe.br/queimadas/portal/terrama2q) for the detection, monitoring, analysis and alerts of forest fires. This new platform is extremely user friendly and works with various types of data sources, generating highly relevant information in a large variety of formats such as alerts sent by email to potentially affected parties, daily reports on the current state of each fire and statistical summaries of forest fires for each Brazilian state and for the country as a whole. It integrates geographic services and modeling, with real-time access to geo-environmental data and can be used to build applications for monitoring, analysis and alert in different regions of the Cerrado. It is available on any server connected to the internet. | | | | | |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | **Indicator Name** | **Unit of Measure** | **Baseline** | **Original Target** | **Formally Revised**  **Target** | **Actual Achieved at Completion** | | | Environmental Managers trained | Number | 0.00 | 90.00 | 90.00 | 325.00 | | |  | 15-Dec-2014 | 15-Dec-2014 | 31-Dec-2017 | 29-Dec-2017 | | | **Comments (achievements against targets):** Target surpassed (361%). An initial training course on the new platform was conducted in October 2016, for 30 managers from two federal agencies – IBAMA and ICMBio – and five state-level agencies – SEMA (Bahia), SEMAR (Piauí), Naturatins (Tocantins), SEMAD (Minas Gerais), and IBRAM (Brasília). This was followed by weekly site visits from July to December 2017, when training was conducted for all interested parties by instructors and researchers responsible for the execution of the project. The project team continues to receive high demand for additional training from all parts of the country. | | | | | |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | **Indicator Name** | **Unit of Measure** | **Baseline** | **Original Target** | **Formally Revised**  **Target** | **Actual Achieved at Completion** | | | Instruction Material on the new platform available | Yes/No | N | Y | Y | Y | | |  | 15-Dec-2014 | 15-Dec-2014 | 31-Dec-2017 | 29-Dec-2017 | | | **Comments (achievements against targets):** Target achieved (100%). The platform is user-friendly, and the courses detail potential uses. | | | | | | |

**B.4.3. Organization of the Assessment of the PDO**

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| **Outcome 2: Promotion of the reduction of climate change impacts in the Cerrado by preventing, combating, monitoring and early detection of forest fires.** | |
| Outcome Indicators | * 32 government institutions provided with capacity building to improve management of forest resources * 422 users of the new platform * 12,000 monthly accesses to the system |
| Intermediate Results Indicators | * Platform validated and functional * 325 environmental managers trained * Instruction material on the new platform available |
| Key Outputs by Component  (linked to the achievement of Objective/Outcome 1) | * Communication strategy * Training activities * http://www.inpe.br/queimadas/bdqueimada |

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| **ANNEX 2. BANK LENDING AND IMPLEMENTATION SUPPORT/SUPERVISION** |

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| 1. **TASK TEAM MEMBERS** |

| **Name** | **Role** | |
| --- | --- | --- |
| **Preparation** | | |
| Alberto Coelho Gomes Costa | | Social Safeguards Specialist |
| Catarina Isabel Portelo | | Counsel |
| Christian Albert Peter | | Peer Reviewer |
| Daniella Ziller Arruda Karagiannis | | Team Member |
| Emilia Battaglini | | Program Manager |
| Frederico Rabello T. Costa, Michele Martins | | Procurement Specialists |
| Garo J. Batmanian | | Peer Reviewer |
| Gregor V. Wolf | | Team Member |
| João Vicente Campos | | Financial Manager Specialist |
| Maria Bernadete Ribas Lange | | Task Team Leader |
| Maria João Pagarim Ribei Kaizeler | | Financial Manager Specialist |
| Maria Virginia Hormazabal | | Finance Officer |
| Mariana Margarita Montiel | | Counsel |
| Miguel-Santiago da Silva Oliveira | | Financial Management Specialist |
| Susana Amaral | | Financial Management Specialist |
| Tatiana Cristina O. de Abreu Souza | | Team Member |
| Waleska Magalhaes Pedrosa | | Team Member |
| Wanessa de Matos | | Program Assistant |
| Wanessa De Matos Firmino Silva | | Team Member |
| **External Consultants** | | |
| Antonio Cipriano da Luz Neto | |  |
| Antonio Paulo Reginato | | Moderator |
| Dejanira Fialho Carvalho | | Moderator |
| Denise Marinho dos Santos | | Communication adviser |
| Guilherme Abdala Cardoso | |  |
| Halina Soares Jancoski | | Analyst |
| Janice Molina | | Editor |
| João Martins da Luz | |  |
| Ralph Trancoso da Silva | | Geogprocessing specialist |
| Renata Cruz Franco | | Assistant |
| Ronaldo Cesar Costa Chaves | | IT adviser |
| **Supervision/ICR** | | |
| Adriana de Moraes | Program Assistant | |
| Alberto Coelho Gomes Costa | Social Safeguards Specialist | |
| Catarina Isabel Portelo | Counsel | |
| Christian Albert Peter | Peer Reviewer | |
| Daniella Ziller Arruda Karagiannis | Team Member | |
| Danilo de Carvalho | Senior Procurement Specialist | |
| Emilia Battaglini | Program Manager | |
| Frederico Rabello T. Costa | Senior Procurement Specialist | |
| Garo J. Batmanian | Peer Reviewer | |
| Gregor V. Wolf | Team Member | |
| João Guilherme de Queiroz | Procurement Specialist | |
| Luciano Wuerzius | Senior Procurement Specialist | |
| Marcio Cerqueira Batitucci | Environmental Safeguards Specialist | |
| Maria Bernadete Ribas Lange | Task Team Leader(s) | |
| Maria Joao Pagarim Ribei Kaizeler | Team Member | |
| Maria Virginia Hormazabal | Team Member | |
| Mariana Margarita Montiel | Counsel | |
| Michele Martins | Program Assistant | |
| Miguel-Santiago da Silva Oliveira | Financial Management Specialist | |
| Patricia Melo | Finance Analyst | |
| Raúl Alfaro-Pelico | Practice Manager | |
| Sofia Neiva | Program Assistant | |
| Susana Amaral | Financial Management Specialist | |
| Tatiana Cristina O. de Abreu Souza | Team Member | |
| Valerie Hickey | Practice Manager | |
| Veronica Yolanda Jarrin | Operations Analyst | |
| Waleska Magalhaes Pedrosa | Team Member | |
| Wanessa De Matos Firmino Silva | Team Member | |
| **External Consultants** | | |
| Caroline Barreto Moreira | Communication Adviser | |
| Christoph Diewald |  | |
| Janice Molina | Editor | |

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| 1. **STAFF TIME AND COST** |

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| --- | --- | --- |
| **Stage of Project Cycle** | **Staff Time and Cost** | |
| No. of staff weeks | US$ (including travel and consultant costs) |
| **Preparation** | 88.01 | 221,828.63 |

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| --- | --- | --- |
| **Supervision/ICR** | 83.75 | 217,482.93 |
| **Overall Total** | 171.76 | 439,311.56 |

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| **ANNEX 3. PROJECT COST BY COMPONENT** |

1. At the end of the program, in September 2018, 97 percent of the Trust Fund (TF) resources allocated to the four recipient-executed projects (US$14.15 million) had been spent.
2. The reason for the undisbursed balance was the exchange-rate fluctuation between the US dollar (US$) and the Brazilian Real (R$). The Brazilian currency depreciated since 2014: R$2.40 per US$1 in January 2014, R$3.97 per US$1 in February 2016, and about R$3.82 per US$1 in June 2018. This reduced project costs and spending in US dollars.
3. The exchange-rate level was a key consideration not only for procurement activities, but also for the overall disbursement rate. The projects’ Procurement Plans were often updated to incorporate or cancel acquisitions and review costs. Despite this fluctuation, at the Piauí Project’s closing date the grant fund was fully disbursed.

**Bahia Project**

|  |  |  |  |
| --- | --- | --- | --- |
| **Components** | **Amount at Approval** | **Actual at Project Closing** | **Percentage** |
| Comp 1: Environmental Regularization | 2.42 | 2.05 | 85% |
| Comp 2: Fire Prevention and Control | 1.54 | 1.72 | 111% |
| Comp 3: Administration | 0.44 | 0.44 | 100% |
| **Total** | **4.40** | **4.21** | **96%** |

**Piauí Project**

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| --- | --- | --- | --- |
| **Components** | **Amount at Approval** | **Actual at Project Closing** | **Percentage** |
| Comp 1: Environmental Regularization | 2.42 | 2.39 | 99% |
| Comp 2: Fire Prevention and Control | 1.54 | 1.56 | 101% |
| Comp 3: Administration | 0.44 | 0.45 | 102% |
| **Total** | **4.40** | **4.40** | **100%** |

**Federal Project**

|  |  |  |  |
| --- | --- | --- | --- |
| **Components** | **Amount at Approval** | **Actual at Project Closing** | **Percentage** |
| Comp 1: Policy Support | 0.16 | 0.17 | 105% |
| Comp 2: Env. Regularization | 1.42 | 1.38 | 97% |
| Comp 3: Fire Management in Protected Areas | 1.90 | 1.81 | 95% |
| Comp 4: Administration | 0.82 | 0.67 | 82% |
| **Total** | **4.30** | **4.03** | **94%** |

**INPE Project**

|  |  |  |  |
| --- | --- | --- | --- |
| **Components** | **Amount at Approval** | **Actual at Project Closing** | **Percentage** |
| Comp. 1: Fire Monitoring and Warning Platform | 0.93 | 0.82 | 88% |
| Comp 2: Administration | 0.12 | 0.11 | 90% |
| **Total** | **1.05** | **0.93** | **88%** |

**Cerrado Program: overview**

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| --- | --- | --- | --- |
| **Components** | **Amount at Approval** | **Actual at Project Closing** | **Percentage** |
| Environmental Regularization | 6.25 | 5.82 | 93% |
| Fire Management and Monitoring | 5.92 | 5.91 | 100% |
| Policy Support | 0.16 | 0.17 | 105% |
| Administration | 1.82 | 1.67 | 92% |
| **Total** | **14.15** | **13.57** | **96%** |

1. In addition, US$1.365 million of the UK Trust Fund were spent by the Bank on Bank-executed technical assistance for the program. Therefore, total spending was US$14.94 million.

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| **ANNEX 4. EFFICIENCY ANALYSIS** |

1. At the preparation stage, there was agreement on the difficulty of estimating in monetary terms the real value of forest control and prevention policies. Furthermore, determining in advance an estimated economic rate of return for the program and its projects as a whole would be not possible.
2. Following small grant recipient-executed project guidance, an economic/financial analysis was not carried out at appraisal stage to assess the potential efficiency of the recipient-executed projects.
3. The Program closed with complete physical and financial execution. Despite initial challenges, the implementing agencies were able to deliver the agreed activities and outcomes of the program and individual projects, disbursing 97.5 percent of the available funds. By and large, the design and delivery mechanism has proven to be appropriate to achieve the projects’ results.

***Outcome 1: Promotion of the reduction of climate change impacts in the Cerrado by promoting environmental regularization of landholdings***

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| --- | --- | --- | --- |
|  | **Allocated (US$ million)** | **Applied** | **Percentage** |
| Cerrado Program | 6.42 | 5.82 | 91 |
| Piauí Project | 2.42 | 2.05 | 85 |
| Bahia Project | 2.42 | 2.39 | 99 |
| Federal Project | 1.42 | 1.38 | 97 |

1. The table above shows that the funds invested in the three projects represent 91 percent of the total initially allocated resources for this outcome. As mentioned in the Efficacy section, the program exceeded the three projects’ targeted number of registrations by 392 percent. It also exceeded the target for registering total area in the CAR by five percent, and the target for the number of municipalities registered by 115 percent.
2. Consistent with the Program’s approval scheme, efficiency is assessed based on the “value-for-money” (VfM) effectiveness of the projects’ design and strategy, and the focus on Output 1: to promote the reduction of climate-change impacts in the Cerrado by promoting farmers’ compliance with Environmental Law/environmental regularization of landholdings–improving environmental management. Efficiency, under the term “value for money,” can be evaluated essentially by asking two questions aimed at two different aspects of efficiency: (a) could the same project outcome have been achieved at lesser cost (cost effectiveness)? or (b) do the benefits of the project exceed the costs (cost–benefit analysis)? (There are several variants to these approaches.)
3. Efficiency, even under the term “value for money,” can essentially be evaluated by asking two questions aimed at two different aspects of efficiency: (a) could the same project outcome have been achieved at lesser cost (cost effectiveness)? or (b) do the benefits of the project exceed the costs (cost-benefit analysis)?
4. Cost effectiveness. The appraisal of the four projects did not analyze cost effectiveness. The Bahia Project Paper listed the average costs of previous CAR registration pilot experiences in the Amazon, showing an average of R$817 per holding (US$355 in 2014). The actual costs of registration under the Bahia, Piauí and Federal Projects were much lower than those experienced previously, and also lower than reference values used by the SFB in the three states. They were the result of competitive selections of providers for technical services (not including consulting).

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| --- | --- | --- | --- | --- |
| **Project** | **Cost per holding–initial (R$)** | **Cost per holding– second contract (R$)** | **Savings (R$ per CAR)** | **Total savings (R$)** |
| Piaui Project | 268.02 | 234.17 | 33.85 | 154,525.25 |
| Bahia Project | 275.00 | 211.60 | 63.40 | 1,606,682.80 |
| Federal Project | 260.55 | 250.94 | 9.61 | 77,937.10 |

1. These numbers indicate substantial efficiency gains relative to prior experience, although they do not prove that the results could not have been achieved at even lower cost. However, it is difficult to conceive a methodology to cover a large number of rural smallholders in a municipality other than the one that was used by the technical services providers. Unlike medium and large landholders, who are able to contract technical services themselves, smallholders could not be expected to respond in large numbers to a call for registration in the CAR system, to provide all the georeferenced data of their properties in the form and detail that the system requires, and to make the actual data entry to conclude the cadaster for their holding.
2. Therefore, the landholding registrations in SICAR/CEFIR can be assumed to have been achieved in a cost-effective manner.
3. **Cost–benefit analysis.** One of the projects’ immediate outcomes was the registration of rural smallholdings in CAR. However, this registration generates benefits only if the behavioral response of the smallholders after registration is indeed the conservation of native Cerrado vegetation relative to a scenario without such registration, in which they might have cleared such vegetation, or the restoration of cleared vegetation as required by the Forest Code, in both cases in areas designated as RLs and APPs.
4. There are two ways to measure such benefits: (a) by estimating the quantity of CO2 emissions avoided (or, in the case of restoration, of CO2 absorption) relative to a baseline scenario, or (b) by estimating the cost of restoring the vegetation cover of an (illegally) cleared area.
5. The analysis considered only the areas of RLs and APPs declared by the small farmers who registered their holdings in CAR. The Forest Code prohibits the clearing of these areas, but not of a holding’s other areas. The expected impact of the CAR registration is farmers’ compliance with the law’s stipulations, relative to a baseline scenario in which farmers feel less obliged, or not obliged, to maintain their RLs and APPs under native vegetation cover. Where the vegetation cover in RLs and APPs has already been cleared, the law mandates restoration of that cover over a period of 20 years.
6. The cost–benefit analysis was based on the following data and assumptions:

|  |  |
| --- | --- |
| Total area of RLs and APPs registered in CAR, in three states (PI, MA, BA) as a result of the Cerrado Program | 289,833 ha |
| CO2 emissions from clearing/burning one hectare in the Cerrado, based on the FREL from deforestation in the Cerrado Biome[[12]](#footnote-12) | 221 t/ha |
| Price per ton of CO2 | Three levels: R$15, R$70 and R$140 per ton |
| Rate of avoided vegetation clearing (difference between the rate of clearing of RLs and APPs with and without CAR registration) | Varied in steps between 0 and 50% |
| Cost of CAR registration (actual) | R$18.06 million |

1. Of course, there are uncertainties regarding several of the parameters. The data considered as reasonably firm are the total reserve/protected areas registered and the total cost of registration (which does not include costs of the fire component). The estimate of emissions from land clearing in the Cerrado (FREL) is well supported by studies undertaken in Brazil and has been reported by Brazil for the purposes of REDD+. Other variables, such as the value of a ton of CO2 not emitted, and the rate of land clearing avoided relative to a baseline, are much less certain and thus have been varied parametrically to assess the robustness of the cost–benefit relationship.
2. The entire analysis was undertaken in domestic currency and at “financial” values (prices), ignoring possible modifications due to conversion to economic (efficiency) prices, which was deemed not to have had a significant impact on the conclusions.
3. Avoided land clearing or deforestation is considered as the difference between the percentage of RLs and APPs cleared after CAR registration and the percentage cleared if CAR had not occurred.[[13]](#footnote-13) The avoided clearing was assumed to occur over 20 years, whereas the cost of registration occurs all in year 0. An annual discount rate of 10 percent was assumed to calculate the NPV. No distinction was made between economic and financial prices.
4. The resulting NPV under different assumptions regarding farmer response (avoided clearing) and values for carbon dioxide is as follows:

NPV of the CAR component of the Cerrado Program, in R$ million.

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Carbon price in R$/ton of CO2** | | |
| **Avoided Clearing** | **15** | **70** | **140** |
| 1% | (14.0) | 1.0 | 20.1 |
| 5% | 2.4 | 77.4 | 172.8 |
| 10% | 22.8 | 172.8 | 363.7 |
| 20% | 63.7 | 363.7 | 745.4 |
| 50% | 186.4 | 936.3 | 1,890.6 |

1. As can be seen, the NPV is positive at the lowest assumed price of carbon (R$15, about US$4.55 per ton of CO2) and if farmers refrained from clearing only five percent of their reserve and protected areas relative to what they would clear without CAR registration. Five-percent compliance is considered a rather conservative assumption.
2. The calculations are sensitive to the assumed quantity of CO2 emissions from clearing and burning one hectare of average Cerrado vegetation. If this quantity was only half (for example, 110 tons per ha), the rate of avoided deforestation must be at least 10 percent of the lowest carbon price. This is still a reasonably conservative assumption.
3. A different approach to look at efficiency is to compare the cost of restoring vegetation cover that would have been removed in the absence of CAR registration. This was estimated at R$12,000 per hectare (NPV of R$10,428 over three years) with the actual cost of CAR. This method avoids putting a price on carbon emissions or absorptions and assumes that farmers registered under CAR would avoid the cost of correcting any “environmental liabilities” in accordance with Brazilian law, for the differential amount of land area not cleared in comparison to the area cleared in the absence of CAR. Again, avoidance is assumed to occur over a period of 20 years.

NPV of the CAR component of the Cerrado Program, in R$ million: alternative approach

|  |  |
| --- | --- |
| Rate of avoided clearing | R$ million |
| 1% | (5.1) |
| 5% | 46.8 |
| 10% | 111.7 |
| 20% | 241.6 |
| 50% | 631.0 |

1. The environmental regularization of smallholder landholdings under the CAR system appears to be efficient if the rate of avoided land clearing after CAR registration exceeds one percent of what it would have been without CAR.

***Outcome 2: Promotion of the reduction of climate change impacts in the Cerrado by preventing, combating, monitoring and early detection of forest fires***

Outcome 2, funds allocated and applied

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Allocated (US$ million)** | **Applied** | **Percentage** |
| Cerrado program | 5.91 | 5.91 | 100 |
| Piauí Project | 1.54 | 1.56 | 101 |
| Bahia Project | 1.54 | 1.72 | 111 |
| Federal Project | 1.90 | 1.81 | 95 |
| INPE Project | 0.93 | 0.82 | 88 |

1. The above table shows that the funds invested in the three projects represent 100 percent of the total initially allocated resources for this outcome.
2. Vehicles, meteorological stations and equipment (mainly electronic) were purchased to support the participating institutions. Individual and collective protective equipment (EPI and EPC) and educational materials were also supplied. Twelve municipalities (the original target was eight) benefited from training. Several municipalities outside the scope of the Program called for Forest Fire Brigades to be formed. Some municipalities were also keen on the idea of creating farmers’ associations.
3. The fire-prevention and control outcome of the program was substantially successful, and with good prospects for tackling this permanent challenge for the States. The positive outcomes of this component in the Federal and Bahia Projects were surpassed only by those reported by Piauí. The activities developed under the Federal Cerrado Project attracted the attention of other government agencies that were keen to learn about the activities and results with the aim of seeking similar actions and investments.
4. The Bahia Project’s goal to introduce sustainable land management practices in 2,600 rural properties in an area of 200,000 ha was surpassed. Properties occupying 201,952 ha were reported to have adopted the recommended practices.
5. The Integrated Fire Management Plans that were instituted in three federal protected areas offer an important template for addressing the challenges of fire control in protected areas and their respective buffer zones. This template can be used as a model for developing similar plans for federal, state and municipal protected areas throughout the country, thereby producing a positive multiplier effect. The National Policy for Integrated Fire Management bill, which was presented to the Office of the President, now needs to be debated and passed by the National Congress so that it can produce the desired results. This represents a major challenge, given the polarized political climate that currently exists in Brazil. Meanwhile, the difficulties experienced by the Bahia and Piauí Projects at both the state and municipal levels in promoting alternative fire-use models and fire-prevention actions indicate that a great deal of effort will be needed in the future for continued fire control and prevention.

The TERRA-MA²-Queimadas platform for fire monitoring and warning in the Cerrado, and its accompanying fire database, is a state-of-the-art system, fully compatible with international standards.

***Outcome 3: Enhanced capacity of the MMA and States to establish integrated forest-fire management and landholding registration in selected rural areas of the Cerrado Biome***

Outcome 2, funds allocated and applied

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Allocated (US$ million)** | **Applied** | **Percentage** |
| Cerrado Program | 0.16 | 0.17 | 105 |
| Federal Project | 0.16 | 0.17 | 105 |

1. Reforms of Brazilian laws and regulations on Cerrado protection and the national fire-control policy were concluded and submitted for scrutiny by the legislative branch as part of the review and updating of the PPCerrado, to include the need to regulate Art. 40 of Law No. 12,651/2012 for establishing the National Policy on the Management and Control of Fires and the Prevention and Combatting of Forest Fires.
2. The Program also supported meetings of the technical working group on REDD+ to prepare FRELs. This group was formed in 2014 to conduct surveys of data and information on results and emission-reduction methodologies for Brazil’s land-use and land-use change sector, and to review the technical content to be used as the basis for Brazil’s submissions to the UNFCCC.
3. An important medium-term impact of the Cerrado Program can be seen in the strengthening of institutions—both governmental and non-governmental—that were responsible for carrying out various project actions. State environmental agencies in Piauí and Bahia and the SFB have mastered the process of registering small/family holdings in CAR, including the ability to hire professional services to this end. They have also learned to critically review CAR registries and reject those of insufficient quality. A large number of professionals have been trained to implement CAR.

***Overall assessment of the efficiency of the Cerrado Program***

1. The overall assessment of the efficacy of the Cerrado Program and its related projects is Substantial.
2. A review of the key indicators of the Cerrado Program’s four key projects reveals that many of them were not only met but greatly exceeded. This is a testament to the program’s overall success and efficient use of resources. The most striking result was the fact that the number of small landholdings registered in the CAR system nearly quadrupled the number in the original program targets. A variety of factors were responsible for this positive result and the three projects that were tasked with this activity were able to successfully harness these factors.
3. Other positive benefits of the Program are: (a) the national image, in view of the demonstration of political willingness to comply with the Paris Agreement commitments; (b) the program’s impact on the preservation of water quality and availability due to its indirect and direct effects on springs; (c) the preservation of the affected biome’s biodiversity; (d) the “demonstration effect” to farmers in general of environmentally correct and clearly profitable farming practices; and (e) the spread of conservation-oriented awareness among farmers, including those not eligible for incorporation in the Program.

|  |
| --- |
| **ANNEX 5. BORROWER, CO-FINANCIER AND OTHER PARTNER/STAKEHOLDER COMMENTS** |

1. Each Implementing agency for the four Recipient-Executed Projects prepared a Completion Report summarizing each Project’s results individually.
2. All implementing agencies confirmed receipt of the World Bank’s draft ICR and stated that they were in agreement with the report and evaluation prepared.

|  |
| --- |
| **ANNEX 6. SUPPORTING DOCUMENTS** |

[https://prodwww-queimadas.dgi.inpe.br/aq30m/#](https://prodwww-queimadas.dgi.inpe.br/aq30m/)

<http://www.inpe.br/queimadas/portal/terrama2q>)

<http://www.inpe.br/queimadas/bdqueimadas>

<http://www.mma.gov.br/biomas/cerrado/programa-cerrado-sustentavel.html>

<http://www.mma.gov.br/biomas/cerrado/projeto-terraclass.html>

<http://combateaodesmatamento.mma.gov.br/>

http://www.brasil.gov.br/noticias/meio-ambiente/2014/10/programa-cerrado-combate-o-desmatamento-na-bahia-e-no-piaui

<http://www.mma.gov.br/component/k2/item/618.html?Itemid=1157>

<http://www.car.gov.br/#/>

https://redd.unfccc.int/files/brazil\_frel-cerrado-en-20160106-final.pdf

Bahia Sem Fogo. Album ilustrado.

Brazil Cerrado Climate Change Mitigation Trust Fund. Brazil Cerrado Program. 2013 Progress Report.

Brazil Cerrado Climate Change Mitigation Trust Fund. Brazil Cerrado Program. 2014 Progress Report.

Brazil Cerrado Climate Change Mitigation Trust Fund. Brazil Cerrado Program. 2015 Progress Report.

Brazil Cerrado Climate Change Mitigation Trust Fund. Brazil Cerrado Program. 2016 Progress Report.

Brazil Cerrado Climate Change Mitigation Trust Fund. Brazil Cerrado Program. 2017 Progress Report.

Brazil’s National Environmental Registry of rural proprieties: implications for livelihoods. Ecological Economics 136 (2017) 53–61. [*https://www.sciencedirect.com/science/article/pii/S0921800916308758*](https://www.sciencedirect.com/science/article/pii/S0921800916308758)

Final evaluation report, PROCERRADO Piauí, with six annexes, December 2017, Antonio Paulo Reginato, Consultant

Final evaluation report, Projecto Cerrado Bahia, July 2018, Regys Fernando de Jesus Araujo, Consultant

Final evaluation report, Projeto Cerrado INPE, Luciana Mamede, FUNCATE, April 2018

Final Evaluation Report, Projeto Cerrado Federal, July 2018, Gabriel Ferreira, Consultant

Guia técnico para a recuperação de vegetação em imóveis rurais no estado da Bahia.

Mittermeier, RA et al. Hotspots revisited: Earth’s biologically richest and most endangered terrestrial ecoregions, 2nd edition, University of Chicago Press, 2005.

Plano de Ação para Prevenção e Controle do Desmatamento e das Queimadas no Cerrado (PPCerrado). Fase 2016–2020. Volume I. Plano Operativo 2016–2020. Ministério do Meio Ambiente. 2018. <http://www.mma.gov.br/images/arquivo/80120/Anexo%20I%20-%20PLANO%20OPERATIVO%20DO%20PPCERRADO%20-%20GPTI%20_%20p%20site.pdf>

Projeto Cerrado Federal. Relatório Final. Programa de Cooperação entre Brasil, Reino Unido e Banco Mundial. Maio de 2018

Projeto de Apoio ao Cadastro Ambiental Rural, prevenção e combate a incêndios florestais no Estado da Bahia. Projeto Cerrado Bahia. Relatório Final. Dezembro 2017.

Projeto Monitoramento do Cerrado. <http://www.obt.inpe.br/cerrado/>

Saberes e Práticas: Tecendo Experiências Socioambientais No Cerrado Baiano.

Study case report of the Brazil Cerrado Climate Change Mitigation Trust Fund. Principal Results and Lessons Learned. Main author: Paul Little. September 2018.

2017–2018 ICF KPI18 report for Brazil Cerrado Program (Brazil1), western Bahia and Piauí assessment years 2015 and 2016. Ecometrica. March 2018.

Videos:

<https://www.youtube.com/watch?v=T-oozN6FbGQ>

<https://www.youtube.com/watch?v=_DA9Dru9Ds4>

<https://www.youtube.com/watch?v=hyG9EMrOpnk>

Bahia Project videos:

Primeiro Intercambio Barreiras – Bahia – 7:21 min

Segundo Intercambio Correntina – Bahia – 7:53 min

Saberes em Praticas – Bahia - 20:57

Regularizar – Bahia – 3:07

Prevenir e Combater – Bahia 2:48 min

Fortalecer – Bahia – 2:52 min

Preservar – Bahia – 2:56 min

Institucional – Bahia – 13:34 min

Federal Project videos:

Cadastro Ambiental Rural em Territórios de Populações Tradicionais – SFB – 15:02 min

Maranhão – CAR- Quilombola- SFB- 6:55 min

Maranhão CAR Quilombola \_ SFB – 16:00 min

Piauí Project videos:

Animais Silvestres

Caça

Caça e Queimadas

Desmatamento

Recursos Hídricos

Reserva Legal

Programa Cerrado videos

O Programa Cerrado – Portuguese and English versions

Parcerias – Procerrado – Portuguese and English versions

CAR – Procerrado – Portuguese and English versions

Fogo – ProCerrado – Portuguese and English versions

**ANNEX 7. STAKEHOLDERS WORKSHOP**

The principal actors and stakeholders of the Cerrado Program came together in Brasília, DF, on September 26, 2018, for a final meeting to reflect on the program, its challenges, results and lessons learned, and to celebrate its successful closing. Representatives of the States of Bahia and Piauí, the Ministry of the Environment, the Brazilian Forest Service, ICMBio, INPE, the four NGOs/foundations that were recipients and administrators of the client-executed trust funds, and the World Bank project team attended this event.

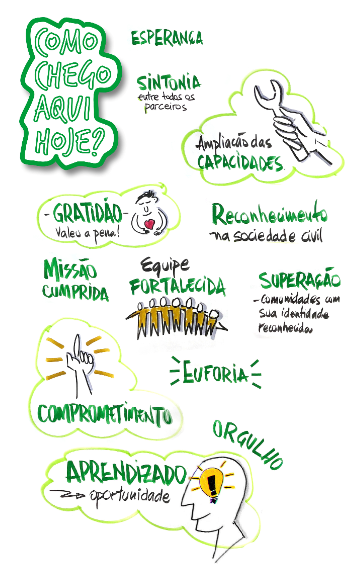
The event was professionally moderated, and the individual contributions were recorded in real time on a large panel:



All participants responded in a frank, lively and mutually reinforcing manner.

The moderator asked the participants to respond to five questions: (a) How did I arrive here today? (b) What has marked me (in participating in the Program)? (c) What would I do again? (d) What am I taking away (from participating in the Program)? And (e)What about next steps?

The following are the main results of the workshop:

**How did I arrive here today?** Participants, without exception, expressed extremely positive feelings about having been part of the Program and about its achievements:

* Hope
* Affinity among participants
* Expanded capacities
* Gratitude
* It was worthwhile
* Recognition in civil society
* Mission accomplished
* Team strengthened
* Obstacles overcome
* Communities and their reality recognized
* Euphoria
* Commitment
* Pride
* Learning

**What has marked me?** Participants highlighted the following personal impacts that participation had on them:

1. Public spirit
2. Unity and dialogue
3. Ownership of results by the states
4. The limits and contradictions of production versus conservation in the Cerrado
5. Seeds well-watered
6. Personal and institutional integration
7. Tighter relations
8. Model for other projects
9. Trust
10. Management

**What would I do again?**

Participants were asked to specify what was so good in their experience that they would do it again. The following points are highlighted:

* Partnerships with NGOs (as recipients and administrators of funds)
* *Rave* in the quilombo community
* A fantastic tool
* Mosaics in protected areas
* Integration of areas within the State Environmental Secretariats
* Evaluation of 100% of CAR records
* Social impact on 38,000 families that need public policies

**What am I taking away?**

* Hope
* Information
* Learning
* Getting closer to municipalities
* I want more
* Robust experiences
* Strengthened partnerships
* Optimism

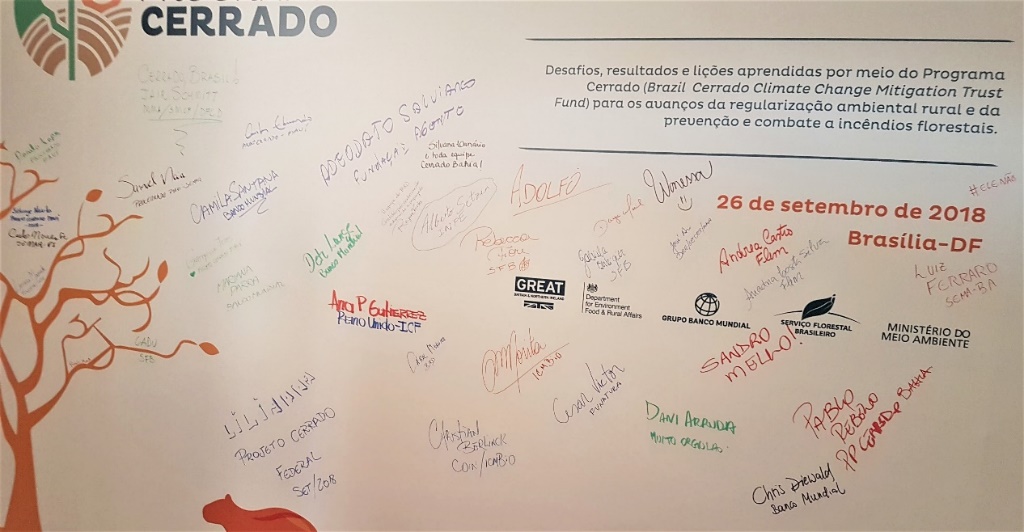
**What would I do differently?**

* Environmental education right from the start
* Strengthen local initiatives right from the start
* More systematic monitoring and reporting
* More effective communication plan
* Governance
* Communication with partners and donors
* More precise social and environmental diagnostic
* Invisibility of traditional communities

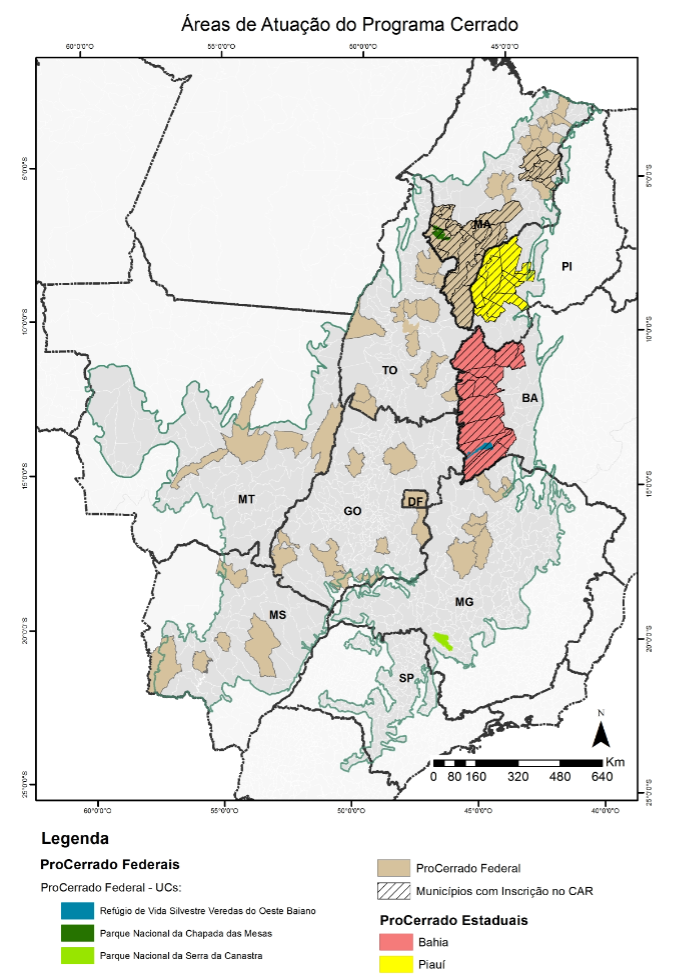
**Next Steps**

* Environmental regularization to be followed by income generation and recovery of forests
* “Sustainable fire”: how to make it less bureaucratic. Authorization process without defined date
* Engage the private sector
* Brazil advancing in monitoring of fires
* Consider the semi-arid regions, more consistent work in that region
* Upscaling
* Continuity of an integrated agenda
* Benefits of sustainable agriculture

Signatures of all participants:



**ANNEX 8. CERRADO PROGRAM MAP**



Selected Municipalities under the Project

1. <http://www.dpi.inpe.br/tccerrado/> [↑](#footnote-ref-1)
2. The percentage to be held as Legal Reserves varies from 80 percent in the Amazon to 35 percent in the Cerrado within the Legal Amazon, to 20 percent in the rest of Brazil. [↑](#footnote-ref-2)
3. Environmental regularization, according to the Forest Code, means getting a holding into compliance with the law, initially by registering the holding in CAR, signing a commitment and presenting a recovery plan (PRA), and eventually by restoring illegally cleared vegetation. [↑](#footnote-ref-3)
4. http://www.casacivil.gov.br/.arquivos/101116%20-%20PPCerrado\_Vfinal.pdf [↑](#footnote-ref-4)
5. Considering the Government of Brazil’s position and the agreement reached in 2013 under the Warsaw Framework for REDD+ under the UNFCCC (Decisions 9 to 15/CP.19), none of the indicators refers to measuring GHG emissions. The REDD+ results are reported by GoB at the biome scale, in accordance with Brazil’s Forest Reference Emission Level (FREL) for Reducing Emission from Deforestation in the Cerrado Biome for results-based payments for REDD+ under the UNFCCC. Nevertheless, the economic assessment estimated the potential of CO2 sequestration as a result of the environmental regularization of landholdings in the selected municipalities. [↑](#footnote-ref-5)
6. The three federal protected areas were selected among those most affected by forest fires in Brazil and in the Cerrado Biome: Serra da Canastra National Park (Minas Gerais), Chapada das Mesas National Park (Maranhão), and Veredas do Oeste Baiano Wildlife Refuge (Bahia). [↑](#footnote-ref-6)
7. The cumulative total area includes family landholdings and traditional community territories (settlements; *quilombola* territories) registered in the SICAR as a result of the project. [↑](#footnote-ref-7)
8. http://redd.mma.gov.br/images/apresentacoes/gttredd\_reuniao6\_mercedesbustamante\_cerradoterceiroinventario.pdf [↑](#footnote-ref-8)
9. After rural environmental registration, it was assumed that adhering farmers would maintain and/or recover the gap between required legal reserves and actual native vegetation cover over a period of 20 years, considering what native forest cover was still present in 2006 in each municipality. They would re-plant one twentieth of the gap every year, for 20 years. [↑](#footnote-ref-9)
10. 2017–2018 ICF KPI18 report for Brazil Cerrado Program (Brazil1), western Bahia and Piauí assessment years 2015 and 2016. Ecometrica. March 2018. [↑](#footnote-ref-10)
11. Brazil’s National Environmental Registry of rural proprieties: implications for livelihoods. Ecological Economics 136 (2017) 53–61. https://www.sciencedirect.com/science/article/pii/S0921800916308758 [↑](#footnote-ref-11)
12. <https://redd.unfccc.int/files/brazil_frel-cerrado-en-20160106-final.pdf> [↑](#footnote-ref-12)
13. That is, if a farmer clears 20% of his entire RL and APP area over time without the constraints of registration under CAR but clears only 15% of that area after registering under CAR, the rate of avoided deforestation is 5%. [↑](#footnote-ref-13)