

PROJECT INFORMATION DOCUMENT (PID) CONCEPT STAGE

Report No.: PIDC1054

Public Disclosure Copy

Project Name	Development of systems to prevent forest fires and monitor vegetation cover in the Brazilian Cerrado (P143185)
Region	LATIN AMERICA AND CARIBBEAN
Country	Brazil
Sector(s)	Forestry (65%), General agriculture, fishing and forestry sector (20%), Public administration- Agriculture, fishing and forestry (15 %)
Theme(s)	Land administration and management (60%), Environmental policies and institutions (20%), Climate change (20%)
Lending Instrument	Technical Assistance Loan
Project ID	P143185
Borrower(s)	Fundacao de Desenvolvimento da Pesquisa (FUNDEP)
Implementing Agency	Ministerio da Ciencia, Tecnologia e Inovacao (MCTI)
Environmental Category	C-Not Required
Date PID Prepared/ Updated	11-Jul-2013
Date PID Approved/ Disclosed	29-Jul-2013
Estimated Date of Appraisal Completion	25-Sep-2015
Estimated Date of Board Approval	19-Nov-2015
Concept Review Decision	Track I - The review did authorize the preparation to continue

Public Disclosure Copy

I. Introduction and Context

Country Context

Brazil has experienced remarkable growth since 2000, except in 2009 due to the financial crisis, with a slowdown in 2011 and 2012. While losing relative importance in the economy, the agricultural sector has grown significantly over the last few decades, and more than 25 percent over the last five years. Agriculture and livestock contribute to 8 percent of Gross Domestic Product (GDP), account for 30 percent of the country's exports and for 19 percent of its employment. Brazil ranks third among the world's major agricultural exporters, fourth for food products and second for bio-ethanol production. Brazil has now the world's largest cattle herd after India's. It is the world's largest exporter of poultry, sugar cane and ethanol. Much of that agricultural growth has taken place in the Cerrado biome, the Brazilian savanna-forest mosaic. Just 8% of all agricultural properties (424,000 farms) in the country produce 85% of total output. Those farms are the main beneficiaries

of agricultural policies on price regulation, quality control, rural credit, exports, innovation and environmental conservation.

Since 1992, when the country hosted the United Nations Conference on Environmental and Development, Brazil's commitment with respect to climate change has been constant. To accomplish its goals, Brazil set ambitious national policies. On December 29, 2009 the Brazilian Government adopted the Law No. 12,187 which constitutes the National Policy on Climate Change (NPCC) of Brazil and sets a voluntary national greenhouse gas reduction target of between 36.1% and 38.9% of projected emissions by 2020. This implies a mitigation target to reduce the emissions of 1.2 billion of tCO₂ equivalent. Reaching these targets requires mitigation actions in key sectors, including agriculture and industry.

Currently, Brazil emits the highest amount of GHG in the region (52% of Latin America's emissions,) 60 % of which come from agriculture and forestry activities. The success of initiatives to reduce the carbon footprint of the Brazilian economy depends on improvements in carbon emissions from these sectors. The effects of climate change have also economic consequences for Brazilian agriculture, with effects on income and viability of the production areas.

Sectoral and Institutional Context

The quantification and verification of GHG emissions, a key element in the institutional architecture of policies and measures for climate change adaptation and mitigation, require monitoring strategies at different spatial and temporal scales. Integration at the biome scale is possible only with the use of remote sensing tools. Since 1988, Brazil has systematically monitored the dynamics of vegetation cover in the Amazon, generating annual deforestation data with the PRODES system, as well as near real-time alerts for rapid control intervention actions (DETER system). Other countries with tropical forests are adopting similar systems. Ad hoc surveys on vegetation cover are still undertaken in biomes apart from the Amazon but opportunities now exist to improve and systematize monitoring of other biomes, such as the Cerrado, at more regular intervals in order to enhance effectiveness of land-use planning, regulatory control and environmental conservation measures.

The coupling of satellite monitoring to methods for carbon accounting (relating different vegetation and land use types to remote imagery) is essential for defining and increasing the accuracy of emission reference levels and for reducing uncertainties related to GHG emissions estimates. A high resolution monitoring system for the Cerrado, analogous to the one in place for the Amazon, will be deployed based on open source geographic information systems that enable a collaborative environment to develop and integrate application tools. This way the system will be able to manage all the data needed for associated projects, including: a system to monitor vegetation cover changes by remote sensing (additional and complementary to a deforestation warning system) and a conceptual model for calculating greenhouse gas emissions from deforestation (at high resolution). Such a monitoring system/platform must be designed with a multisensory and multiscale approach for various objectives and many institutions, functioning as a command and control instrument but also generating information to guide land use planning and management.

National Climate Change Policy. The PNMC contains sector-level plans for mitigation and adaptation to climate change, aimed at consolidating the low-carbon economy and fulfilling the voluntary national commitment to reduce emissions. In response to the PNMC, a 2010-2012 Sector Climate Change Mitigation and Adaptation Plan (the ABC Plan) has been developed to consolidate

a low-carbon emission economy in the agriculture sector, which has been used as a tool to promote sustainable land use by farmers. In addition, in order to encourage producers to adopt low-carbon technologies, the ABC Program was created, which, among other initiatives, provides concessional funding for producers wanting to adopt low-carbon technologies.

Forest Code. The Forest Code is considered the most important land-use regulation in the country, given its national scope and the constraints it imposes on private property for the purpose of protecting public goods such as forests and vegetation. The code requires: (i) that all private rural landholdings maintain a percentage of native vegetation as “Legal Reserve” (RL); and (ii) that “Areas of Permanent Preservation” (APP), such as riparian forest along water courses, steep slopes, mountain tops, etc., also be maintained by landholders.

The Forest Code also involves the creation of the Rural Environmental Cadastre (CAR), which sets a deadline for farmers to register protected forest areas (APP and RL) on their farms, and to submit proposals for restoring their degraded areas if they are not compliant with the legislation. It is estimated that nearly 30 million hectares of APP and RL across the country require restoration to comply with the Forest Code. Currently over half of Brazilian properties (about 2.5 million farmers) are thought to be illegal. Compliance with the environmental legislation in the Forest Code will be a prerequisite for medium and large producers to access rural credit available in the ABC Program.

Deforestation control. Deforestation in Brazil has been driven largely by agricultural conversion, particularly for livestock and soybean. The programs and plans that have been implemented by the government in the Amazon have succeeded in drastically reducing deforestation from an annual 27,700 km² in 2004 to only 6,200 km² in 2011. While the Amazon biome still maintains around 80% of its original cover, approximately 48% of the Cerrado has been converted over the past 50 years. In 2002-2008 the average deforestation rate in the Cerrado was 14,200 km² per year. GoB is aware of this challenge and is replicating in the Cerrado the programs and plans already implemented in the Amazon, adapting them as necessary to the environmental and socioeconomic conditions of the region.

The adoption of deforestation control measures, as well as of positive incentives such as REDD+ in the Cerrado, Caatinga and Pantanal biomes, involves developing monitoring and verification methodologies that are scalable, replicable and accurate.

Prevention of Forest Fires. The Cerrado has a highly seasonal climate with bush burning occurring mainly in the end of the dry season (May through September). The biomass burned annually associated with forest and Cerrado conversion to pastureland and its annual maintenance contributes significantly to the atmospheric loading of pollutants in Brazil and is an important agent of weather and climate change. Frequent fires affect net ecosystem productivity. Repeated fire over the long term may result in significant net loss of soil nutrients and reduce plant productivity.

In September 2010, the Federal Government launched the Action Plan for Prevention and Control of Deforestation and Forest Fires in the Cerrado (PPCerrado). The Plan has three components: (i) control and monitoring; (ii) protected areas and landscape planning; and (iii) promotion of sustainable productive activities. The PPCerrado is the operational instrument to implement the National Program for the Conservation and Sustainable Use of the Cerrado Biome and its actions correspond to the components of that program.

In this context, the generation and provision of spatially and temporally consistent information and data on the forest resources and fires of this biome is necessary to underpin the elaboration of strategies for improving land-use sustainability and efficiency. These strategies would contribute to the maintenance of natural ecosystems, together with their biodiversity and associated environmental services. The forest resources information will need to take into account both the environmental heterogeneity of the biome and the way it is being occupied.

Access to accurate and updated information on forest resources will assist public and private sector decision-makers. It should also improve forest conservation-based rural development standards and help to promote sustainable practices with decreased environmental impacts, which in turn would raise the value of forest resources that are increasingly important socioeconomic and environmental assets.

BRAZIL'S INVESTMENT PLAN (BIP) FOR THE FOREST INVESTMENT PLAN (FIP)

The Strategic Climate Fund (SCF) provides financing for new ways of developing or up-scaling activities that seek to respond to a specific challenge related to climate change or to provide a sector response through directed programs. The Forest Investment Program (FIP) is one of those directed programs catalyzing policies and measures and mobilizing funds to facilitate the reduction of deforestation and forest degradation. The program aims at promoting more sustainable forest management, leading to reduced emissions and enhanced conservation of forest carbon stocks. The Brazil Investment Plan (BIP) of the Forest Investment Program (FIP) was approved by the FIP Sub-Committee in May 2012. The BIP aims at promoting sustainable land use and improving management of the productive landscape in the Cerrado (Brazilian Savanna), the second largest biome in Brazil and South America. The BIP will contribute to reducing pressure on the remaining forests, reducing GHG emissions and increasing CO₂ sequestration. The FIP subcommittee agreed to a range of funding of USD\$50-70 million in FIP resources.

BIP's specific objectives are (1) improving environmental management in areas previously anthropized and (2) producing and disseminating environmental information at the biome scale. BIP comprises coordinated actions by three Ministries: the Ministry of the Environment (MMA), the Ministry of Science, Technology & Innovation (MTCI), and the Ministry of Agriculture, Livestock and Food Supply (MAPA).

Each of the projects in the BIP will fund investments and activities that support actions of the various implementing agencies and their relationships with other entities. In addition to addressing the different aspects of interagency coordination, BIP will also contribute to resolving operational, regulatory and management challenges. Nature conservation, respect for traditional communities and the reduction of GHG emissions arising from land use changes in the Cerrado are challenges related to improving the use and management of land and natural resources in landholdings. The Cerrado has played a major role in the growth of food production and the challenge now is to ensure that agriculture can continue to develop while adopting more sustainable practices that preserve natural resources and reduce GHG emissions.

The BIP strategy mainly targets the following FIP investment areas: (i) institutional capacity, forest governance and information; and (ii) investments outside the forest sector necessary to reduce the pressure on forests. As a complementary measure, BIP also focuses on the third FIP investment area by supporting mitigation actions related to forests, such as encouraging forest recovery of Legal

Reserves (RLs) and Permanent Preservation Areas (APPs) in landholdings.

The BIP has two thematic areas and four projects, to be implemented as a coordinated set:
Theme 1 - : Management and Use of already anthropized areas – Access improvement for producers to resources on offer for Low Carbon Emission Agriculture Implementation of the Rural Environmental Cadastre in the entire biome, which include the following projects:

Project 1.1- Environmental regularization of rural lands (based on the Rural Environmental Registry, CAR) - Loan: US\$32.5million - MDB: IBRD

Project 1.2- Sustainable production in areas previously converted to agricultural use based upon the Sector Plan for the Mitigation and Adaptation of Climate Change for a Low Carbon Emission Agriculture (ABC Plan) - Grant: US\$10.72million - MDB: IBRD

Theme 2: Generation and Management of Forest Information - Generation and availability of spatially and temporally consistent environmental information - forest inventory, remote sensing monitoring and early warning system for forest fires, which include the following projects:

Project 2.1- Forest information to support public and private sectors in managing initiatives focused on conservation and valorization of forest resources - Grant: US\$16.55million - MDB: IDB

Project 2.2- Implementation of an early-warning system for preventing forest fires and a system for monitoring the vegetation cover - Grant: US\$9.25million - MDB: IBRD

The proposed project has been renamed from Project 2.2: Implementation of an early-warning system for preventing forest fires and a system for monitoring the vegetation cover.

Relationship to CAS

The objectives of the proposed Project are fully covered by the current World Bank Group's Country Partnership Strategy, discussed by the Executive Directors on November 1, 2011 (CPS 2012-2015) (Report No 63731 BR), under the heading "Improving environmental management, biodiversity conservation and climate change mitigation", specifically through the support to "improve the efficiency and effectiveness of environmental licensing and monitoring systems, including by means of more transparent and user-friendly tools to speed up the licensing approval process and social participation and control, as well as the adoption of new environmental assessment instruments."

II. Proposed Development Objective(s)

Proposed Development Objective(s) (From PCN)

The development objectives of the project are to (i) generate and disseminate geospatial and on-time information about deforestation, forest degradation and land use in the Cerrado, Caatinga and Pantanal biomes; and (ii) develop an early-warning system to prevent forest fires at national scale. Although the BIP focuses on the Cerrado, the proposed project will be a joint exercise in the three biomes owing to the structural similarities and common major transition areas.

Key Results (From PCN)

The long-term goals of the proposed Project are to contribute to the maintenance and enhancement of forest carbon stocks by informing and improving government efforts to reduce deforestation and degradation of the native vegetation cover. Together with three other projects to be co-financed with FIP resources, it is expected that the project will help to inform and improve government efforts to reduce deforestation and degradation of the native vegetation cover, enhanced capacity for land use planning and management and reduce material and human losses resulting from uncontrolled fires. While efforts will be focused on the Cerrado, the monitoring system will cover the Caatinga and

Pantanal biomes, complementing existing monitoring capacity which is currently focused on the Amazonian biome. The early-warning system for fires will provide information and tools at a national scale.

The PDO indicator will be: (i) information on changes in the vegetation cover disseminated to interested stakeholders; and (ii) information to increase the number of forest fires prevented through the early warning system. The methodology to measure these indicators, including the baseline statistics, will be developed during preparation.

The Project results would be measured against the following indicators:

- By the end of Project Year ... an updated land cover and land use map for the Cerrado biome is publicly available;
- By the end of Project Year a high resolution, spatially-explicit land-use, forestry and land-use change model for the Cerrado and other biomes is developed within Ministry of Science, Technology and Innovation that is assessing implications of scenarios of public policies, land-use and climate change;
- By the end of the Project, a model for estimating GHG emissions related to deforestation in the Cerrado, Pantanal and Caatinga, taking into account and incorporating the different aspects of the deforestation process and its regional diversity is developed and used to estimate GHG emissions;
- By the end of Project Year ... selected (number) Government institutions are capable of applying the early warning systems to prevent forest fires and monitoring vegetation cover;
- Official annual reports (specify from whom) on the extent of burned areas publicly available (number);
- By the end of Project Year ... (number) state and municipal entities trained and organized to receive forest fire alerts;

The project objectives and results are strongly linked to the intended BIP results. The information that will result from this project will contribute to the second BIP result mentioned above: "Environmental information produced and disseminated and forests and forest landscapes managed in a sustainable way in order to address the drivers of deforestation and forest degradation." Indeed the provision of timely information on the state of the forest and other landscapes as well as the early warning system on forest fires on a national scale will help to develop policies addressing the drivers of deforestation and forest degradation.

In particular, this project will strongly contribute to the following BIP results: (i) official annual reports on vegetation cover and land use in the Cerrado publicly available; (ii) official annual reports on the extent of burned areas publicly available; and (iii) number of state and municipal entities trained and organized to receive forest fire alerts.

III. Preliminary Description

Concept Description

The proposed US\$9.25 million grant is part of the Brazil Investment Plan (BIP) and will support the Ministry of Science, Technology and Innovation (MCTI) in the development of systems to monitor changes in the vegetation cover and prevent forest fires in the Brazilian Cerrado, Caatinga and Pantanal biomes. The proposed project has three components:

Component 1: Design and Implementation of a model for monitoring changes in the vegetation cover. Estimated FIP funds: US\$ 3.5 million.

The component will co-finance

- (i) the revision of current monitoring methods and the production of a new Cerrado land cover and land-use map at 1:100.000 scale that can be periodically adjusted;
- (ii) the development of a high resolution, spatially-explicit land-use, forestry and land-use change model to monitor vegetation cover and land use in the Cerrado, Caatinga and Pantanal biomes;
- (iii) the testing of several scenarios examining the feedbacks between climate change, deforestation and agricultural expansion as well as several recent public policies (such as infrastructure investments of the Growth Acceleration Plan, MAPA plan to expand croplands, cattle ranching intensification and other measures promoted under the low carbon agriculture plan (ABC), forest restoration programs, as well as the National Climate Change plan, including the action of PPCerrado on fire regimes in the Cerrado biome .
- (iv) the monitoring of degradation processes by evaluating the spectral-temporal signals for areas previously identified as planted pastures with high accuracy;
- (v) the periodical measurement of the changes in vegetation coverage and land use; and
- (v) the analysis and dissemination of the results for the information of stakeholders.

Component 2: Implementation of an early-warning system for the prevention of forest fires. Estimated FIP funds: US\$ 4.5 million.

The second component will co-finance the revision and development of suitable protocols for producing and disseminating information that can guide fire prevention and fire fighting activities. Activities include:

- (i) Understanding fire history and the spatial and temporal changes in fire regime;
- (ii) Estimating regional behavior of fires (building the relationship with climate, land use, landscape structure);
- (iii) Fire probability and estimation of area at risk of burning;
- (iv) High- spatial resolution land-use, vegetation and fire dynamics model for the Cerrado Biome;
- (v) Training rural managers and landholders so that they can evaluate the risks (and losses) involved in using fire as a routine agricultural tool;
- (vi) Dissemination of information and training in the use of information related to fire alert systems that will also help to develop innovative instruments for reducing the risks of fire damage such as introducing forest insurance against fires and systems of regional rural prevention services for combating fires; and
- (vii) Provision of information to facilitate improvement of legislation and administrative processes for regulating the use of prescribed burnings and for attributing civil and criminal responsibility to landholders for fires caused by negligence, bad faith, etc.

Component 3: Project Management and Implementation. Estimated FIP funds: US\$ 1.25 million.

IV. Safeguard Policies that might apply

Safeguard Policies Triggered by the Project	Yes	No	TBD
Environmental Assessment OP/BP 4.01		x	

Natural Habitats OP/BP 4.04			x
Forests OP/BP 4.36	x		
Pest Management OP 4.09		x	
Physical Cultural Resources OP/BP 4.11		x	
Indigenous Peoples OP/BP 4.10			x
Involuntary Resettlement OP/BP 4.12		x	
Safety of Dams OP/BP 4.37		x	
Projects on International Waterways OP/BP 7.50		x	
Projects in Disputed Areas OP/BP 7.60		x	

V. Financing (in USD Million)

Total Project Cost:	9.25	Total Bank Financing:	0.00
Financing Gap:	0.00		
Financing Source		Amount	
Borrower		0.00	
Strategic Climate Fund Grant		9.25	
Total		9.25	

VI. Contact point

World Bank

Contact: David Tuchschnieder
 Title: Senior Rural Development Speci
 Tel: 473-7118
 Email: dtuchschnieder@worldbank.org

Borrower/Client/Recipient

Name: Fundacao de Desenvolvimento da Pesquisa (FUNDEP)
 Contact: Fabiano Siqueira
 Title: Gerente de Projetos
 Tel: 3134094200
 Email: fabianosiqueira@fundep.ufmg.br

Implementing Agencies

Name: Ministerio da Ciencia, Tecnologia e Inovacao (MCTI)
 Contact: Andrea Portela
 Title: Assessoria de Capacitação e de Recursos
 Tel: 6133177918
 Email: aportela@mcti.gov.br

VII. For more information contact:

The InfoShop
 The World Bank
 1818 H Street, NW
 Washington, D.C. 20433

Public Disclosure Copy

Telephone: (202) 458-4500
Fax: (202) 522-1500
Web: <http://www.worldbank.org/infoshop>

Public Disclosure Copy