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Report No: PAD701

INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

PROJECT APPRAISAL DOCUMENT

ON A

PROPOSED STRATEGIC CLIMATE FUND GRANT

IN THE AMOUNT OF US\$ 10.62 MILLION

TO THE

SERVIÇO NACIONAL DE APRENDIZAGEM RURAL

FOR A

SUSTAINABLE PRODUCTION IN AREAS PREVIOUSLY CONVERTED TO
AGRICULTURAL USE PROJECT

JUNE 4, 2014

*Agriculture and Rural Development
Sustainable Development Department
Latin America and Caribbean Region*

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CURRENCY EQUIVALENTS

(Exchange Rate Effective January 2014)

Currency Unit = BRL
BRL 2.3 = USD 1
0.43 USD = BRL 1

FISCAL YEAR

January 1 – December 31

ABBREVIATIONS AND ACRONYMS

| | |
|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| ABC | Low Carbon Emissions Agriculture (<i>Agricultura de Baixa Emissão de Carbono</i>) |
| AFOLU | Agriculture, Forestry, and Other Land use |
| APP | Permanent Preservation Area on private land (<i>Área de Preservação Permanente</i>) |
| BIP | Brazil Investment Plan (for the Forest Investment Program) |
| BNDES | Brazilian National Development Bank (<i>Banco Nacional de Desenvolvimento Econômico e Social</i>) |
| CAR | Rural Environmental Registry (<i>Cadastro Ambiental Rural</i>) |
| CH ₄ | Methane |
| CIF | Climate Investment Fund |
| CNA | Brazilian Confederation of Agriculture and Livestock (<i>Confederação da Agricultura e Pecuária do Brasil</i>) |
| CONACER | The National Commission for the Sustainable Cerrado Program (<i>Comissão Nacional do Programa Cerrado Sustentável</i>) |
| COP | Conference of the Parties |
| CPS | Country Partnership Strategy |
| EMATER | State Institute of Technical Assistance and Rural Extension (<i>Empresa de Assistência Técnica e Extensão Rural</i>) |
| EMBRAPA | Brazilian Agricultural Research Corporation (<i>Empresa Brasileira de Pesquisa Agropecuária</i>) |
| FAO | Food and Agriculture Organization of the United Nations |
| FIP | Forest Investment Plan |
| GDP | Gross Domestic Product |
| GGE | State Management Group (<i>Grupo Gestor Estadual</i>) |
| GHG | Greenhouse Gas |
| GMCC | Green Manure Cover Crops |
| GoB | Government of Brazil |
| IBAMA | Brazilian Institute of Environment and Renewable Natural Resources (<i>Instituto Brasileiro de Meio Ambiente e dos Recursos Naturais</i>) |
| IBGE | The Brazilian Institute of Geography and Statistics (<i>Instituto Brasileiro de Geografia e Estatística</i>) |
| IBRD | International Bank for Reconstruction and Development |
| IDB | Inter-American Development Bank |
| IFR | Interim Financial Report |

| | |
|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| iLPF | Integration of Crop, Livestock, and Forest |
| IRR | Internal Rate of Return |
| LUCF | Land Use Change and Forestry |
| MAPA | Brazilian Ministry of Agriculture, Livestock, and Food Supply (<i>Ministério da Agricultura, Pecuária e Abastecimento</i>) |
| MCTI | Brazilian Ministry of Science, Technology, and Innovation (<i>Ministério da Ciência, Tecnologia e Inovação</i>) |
| MDB | Multilateral Development Bank |
| MF/SAIN | Secretariat of International Affairs of the Ministry of Finance (<i>Secretaria de Assuntos Internacionais Ministério da Fazenda</i>) |
| MMA | Brazilian Ministry of Environment (<i>Ministério do Meio Ambiente</i>) |
| NAMA | Nationally Appropriate Mitigation Action |
| NEPAD | New Partnership for Africa's Development |
| NFI | National Forest Inventory |
| NGO | Non-Governmental Organization |
| NPCC | National Policy on Climate Change |
| NPV | Net Present Value |
| PDO | Project Development Objectives |
| PMC | Project Monitoring Committee |
| PPCerrado | Action Plan to Prevent and Control Deforestation and Fires in the Cerrado Biome |
| PRONAF | Program for the Strengthening of Family Farming (<i>Programa Nacional para o Fortalecimento da Agricultura Familiar</i>) |
| REDD-plus | Reducing emissions from deforestation and forest degradation and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries |
| RL | Legal Reserve on private land (<i>Reserva Legal</i>) |
| SCF | Strategy Climate Fund |
| SENAR | National Rural Learning Service (<i>Serviço Nacional de Aprendizagem Rural</i>) |
| SIA | Sustainability Indicators for Agroecosystems |
| SOC | Soil Organic Carbon |
| tCO _{2eq} | Tons of Carbon Dioxide equivalent |
| UNFCCC | United Nations Framework Convention on Climate Change |
| URT | Technical Reference Unit |
| WB | World Bank |

| | |
|--------------------------|--------------------------|
| Regional Vice President: | Jorge Familiar |
| Country Director: | Deborah L. Wetzel |
| Sector Director: | Ede Jorge Ijjasz-Vasquez |
| Sector Manager: | Laurent Msellati |
| Task Team Leader: | David Tuchsneider |

BRAZIL
SUSTAINABLE PRODUCTION IN AREAS PREVIOUSLY CONVERTED TO
AGRICULTURAL USE PROJECT

TABLE OF CONTENTS

| | | |
|-------------|--------------------------------------------------------------------------------------------------|-----------|
| I. | STRATEGIC CONTEXT | 1 |
| A. | Country Context..... | 1 |
| B. | Sector and Institutional Context..... | 2 |
| C. | Higher Level Objectives to which the Project Contributes | 4 |
| II. | PROJECT DEVELOPMENT OBJECTIVE | 4 |
| A. | Project Development Objective (PDO)..... | 4 |
| B. | Project Beneficiaries | 4 |
| C. | PDO Level Results Indicators | 5 |
| III. | PROJECT DESCRIPTION | 5 |
| A. | Project Components | 5 |
| B. | Project Financing | 6 |
| C. | Lessons Learned and Reflected in the Project Design..... | 6 |
| IV. | IMPLEMENTATION | 7 |
| A. | Institutional and Implementation Arrangements | 7 |
| B. | Results Monitoring and Evaluation | 7 |
| C. | Sustainability..... | 8 |
| V. | KEY RISKS AND MITIGATION MEASURES | 9 |
| A. | Risk Ratings Summary Table | 9 |
| B. | Overall Risk Rating Explanation | 9 |
| VI. | APPRAISAL SUMMARY | 9 |
| A. | Economic and Financial Analysis..... | 9 |
| B. | Technical..... | 11 |
| C. | Financial Management..... | 12 |
| D. | Procurement | 12 |
| E. | Social (including Safeguards)..... | 13 |
| F. | Environment (including Safeguards) | 14 |
| | Annex 1: Results Framework and Monitoring | 15 |
| | Annex 2: Detailed Project Description | 22 |
| | Annex 3: Implementation Arrangements | 28 |
| | Annex 4 Operational risk assessment framework (ORAF) | 42 |
| | Annex 5: Implementation Support Plan | 47 |
| | Annex 6: The Forest Investment Plan, Brazil Investment Plan, Climate Change and REDD+ | 49 |
| | Annex 7: MAP IBRD 41007 | 63 |

PAD DATA SHEET

Brazil

SUSTAINABLE PRODUCTION IN AREAS PREVIOUSLY CONVERTED TO AGRICULTURAL USE (P143184)

PROJECT APPRAISAL DOCUMENT

LATIN AMERICA AND CARIBBEAN

LCSAR

Report No.: PAD701

| Basic Information | | | |
|----------------------------------------------------------|------------------------------------------------|---------------------------------------|-------------------------------------------|
| Project ID P143184 | EA Category B - Partial Assessment | Team Leader David Tuchschnieder | |
| Lending Instrument Investment Project Financing | Fragile and/or Capacity Constraints [] | | |
| | Financial Intermediaries [] | | |
| | Series of Projects [] | | |
| Project Implementation Start Date 31-Jul-2014 | Project Implementation End Date 31-May-2018 | | |
| Expected Effectiveness Date 31-Jul-2014 | Expected Closing Date 20-Nov-2018 | | |
| Joint IFC No | | | |
| Sector Manager Laurent Msellati | Sector Director Ede Jorge Ijjasz-Vasquez | Country Director Deborah L. Wetzel | Regional Vice President Jorge Familiar |
| Borrower: SENAR - Serviço Nacional de Aprendizagem Rural | | | |
| Approval Authority | | | |
| Approval Authority Board/AOB Decision | | | |
| Project Financing Data(in USD Million) | | | |
| [] Loan | [X] Grant | [] Guarantee | |
| [] Credit | [] IDA Grant | [] Other | |

| | | | | | | | | | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|-----------------------|---------------------------------------------------------|------|-------|--------------------------|----------------------------|--------------------------|------|
| Total Project Cost: | 11.13 | Total Bank Financing: | 0.00 | | | | | | |
| Financing Gap: | 0.00 | | | | | | | | |
| Financing Source | | Amount | | | | | | | |
| Borrower | | 0.51 | | | | | | | |
| Strategic Climate Fund Grant | | 10.62 | | | | | | | |
| Total | | 11.13 | | | | | | | |
| Expected Disbursements (in USD Million) | | | | | | | | | |
| Fiscal Year | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 0000 | 0000 | 0000 |
| Annual | 0.20 | 2.95 | 3.80 | 2.92 | 0.75 | 0.00 | 0.00 | 0.00 | 0.00 |
| Cumulative | 0.20 | 3.15 | 6.95 | 9.87 | 10.62 | 10.62 | 0.00 | 0.00 | 0.00 |
| Proposed Development Objective(s) | | | | | | | | | |
| The objective of the Project is to promote the adoption of selected sustainable low carbon emissions agricultural technologies by mid-sized producers in the Cerrado Region. | | | | | | | | | |
| Components | | | | | | | | | |
| Component Name | | | | | | | Cost (USD Millions) | | |
| Component 1: Producer Training | | | | | | | 3.38 | | |
| Component 2: Field Technical Assistance | | | | | | | 5.46 | | |
| Component 3: Project Management, Monitoring and Evaluation | | | | | | | 2.29 | | |
| Institutional Data | | | | | | | | | |
| Sector Board | | | | | | | | | |
| Agriculture and Rural Development | | | | | | | | | |
| Sectors / Climate Change | | | | | | | | | |
| Sector (Maximum 5 and total % must equal 100) | | | | | | | | | |
| Major Sector | | | Sector | | % | Adaptation Co-benefits % | | Mitigation Co-benefits % | |
| Agriculture, fishing, and forestry | | | Agricultural extension and research | | 76 | 38 | | 38 | |
| Public Administration, Law, and Justice | | | Public administration-Agriculture, fishing and forestry | | 20 | 5 | | 5 | |
| Agriculture, fishing, and forestry | | | Forestry | | 4 | | | 4 | |
| Total | | | | | 100 | | | | |

I certify that there is no Adaptation and Mitigation Climate Change Co-benefits information applicable to this project.

Themes

Theme (Maximum 5 and total % must equal 100)

| Major theme | Theme | % |
|----------------------------------------------|-----------------------------------|-----|
| Environment and natural resources management | Climate change | 40 |
| Rural development | Rural services and infrastructure | 40 |
| Rural development | Rural policies and institutions | 20 |
| Total | | 100 |

Compliance

Policy

| | | |
|-----------------------------------------------------------------------------------|-----------|----------|
| Does the project depart from the CAS in content or in other significant respects? | Yes [] | No [X] |
| Does the project require any waivers of Bank policies? | Yes [] | No [X] |
| Have these been approved by Bank management? | Yes [] | No [X] |
| Is approval for any policy waiver sought from the Board? | Yes [] | No [X] |
| Does the project meet the Regional criteria for readiness for implementation? | Yes [X] | No [] |

Safeguard Policies Triggered by the Project

| | Yes | No |
|------------------------------------------------|-----|----|
| 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 |

Legal Covenants

| Name | Recurrent | Due Date | Frequency |
|-------------------|-----------|-------------|-----------|
| Schedule 2, I.A.4 | | 01-Sep-2014 | |

Description of Covenant

The Recipient shall establish by no later than 30 days after the Effective Date, and thereafter operate and maintain throughout the period of implementation of Project activities, a Project monitoring committee; which committee shall be composed by representatives of the Recipient, MAPA and EMBRAPA, with functions, powers, resources and competencies acceptable to the Bank.

| Name | Recurrent | Due Date | Frequency |
|-------------------|------------------|-----------------|------------------|
| Schedule 2, I.A.5 | | 31-Jul-2016 | |

The Recipient shall carry out an in-depth review (the Mid-Term Review) jointly with MAPA and the World Bank two years after the date of this Agreement or such later date as the World Bank shall agree, on the progress achieved in the implementation of the Project.

Conditions

| Source Of Fund | Name | Type |
|-----------------------|---------------------|---------------|
| CSCF | Article IV, 4.01(b) | Effectiveness |

Description of Condition

The Project Operational Manual has been adopted by the Recipient in a manner acceptable to the World Bank.

Team Composition**Bank Staff**

| Name | Title | Specialization | Unit |
|------------------------------------|--------------------------------------|--------------------------------------|-------------|
| Alberto Coelho Gomes Costa | Senior Social Development Specialist | Senior Social Development Specialist | LCSSO |
| David Tuchsneider | Senior Rural Development Specialist | Team Lead | LCSAR |
| Mariana Margarita Montiel | Senior Counsel | Senior Counsel | LEGLE |
| Tatiana Cristina O. de Abreu Souza | Finance Analyst | Finance Analyst | CTRLN |
| Miguel-Santiago da Silva Oliveira | Senior Finance Officer | Senior Finance Officer | CTRLN |
| Darwin Marcelo Gordillo | Infrastructure Economist | Impact evaluation | TWISI |
| Eduardo Franca De Souza | Financial Management Specialist | Financial Management Analyst | LCSFM |
| Barbara Cristina Noronha Farinelli | Operations Analyst | Operations Analyst | LCSAR |
| Danilo Pereira de Carvalho | Procurement Specialist | Procurement Specialist | LCSPT |
| Marcio Cerqueira | E T Consultant | E T Consultant - | LCSSEN |

| | | | | | |
|--------------------------|--------------------------------------|------------------------------|----------------|---------------|-----------------|
| Batitucci | | Environment | | | |
| Stavros Papageorgiou | Consultant | Forest carbon | LCSAR | | |
| Priscila Leal Dos Santos | E T Temporary | Team assistant | LCSAR | | |
| Non Bank Staff | | | | | |
| Name | Title | Office Phone | City | | |
| Pierre Werbrouck | Agribusiness specialist | | Albuquerque | | |
| Locations | | | | | |
| Country | First Administrative Division | Location | Planned | Actual | Comments |
| Brazil | Piaui | Estado do Piaui | X | | |
| Brazil | Maranhao | Estado do Maranhao | X | | |
| Brazil | Minas Gerais | Estado de Minas Gerais | X | | |
| Brazil | Estado de Mato Grosso do Sul | Estado de Mato Grosso do Sul | X | | |
| Brazil | Mato Grosso | Estado de Mato Grosso | X | | |
| Brazil | Goiias | Estado de Goias | X | | |
| Brazil | Federal District | Distrito Federal | X | | |
| Brazil | Estado de Bahia | Estado da Bahia | X | | |
| Brazil | Tocantins | Estado de Tocantins | X | | |

I. STRATEGIC CONTEXT

A. Country Context

17. 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 from 2007 to 2012¹. Agriculture and livestock contribute to eight 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 production and second for bio-ethanol production. It has the second largest cattle herd and is the world's largest exporter of poultry, sugar cane and ethanol.

18. **The Cerrado.** Much of that agricultural growth has taken place in the Cerrado biome, the savanna-forest mosaic located in central Brazil, south and east of the Amazon region, covering almost one quarter, or 2.04 million km², of the country². The Cerrado has been the stage for an expansion of agricultural production, primarily through cattle ranching since the 1940s, and, since the 1970s, through mechanized commercial production of soybean, maize and cotton. The Cerrado is a strategic biome both for economic and environmental reasons and also for food security. Agriculture occupies around 22 million hectares in the Cerrado (11% of land area), and there are around 50 million heads of cattle, almost 33% of the national herd, on 54 million hectares of pasture (25% of land area), of which approximately 40 to 80%³ are degraded to a greater or lesser extent.

19. Twenty two percent of Brazil's population (43 million) lives in the Cerrado but only 16 percent resides in the rural areas. The Center-West region has the largest portion of the land area occupied by rural properties (32% of the total) in Brazil and has the highest average area per property of all farms in the country (397.2 ha).

20. **Soil Carbon Stocks.** From a climate change perspective, Cerrado forests are important due to the substantial amount of carbon stored in its biomass and soils (see Annex 6). The structural diversity of vegetation types in the Cerrado involves a wide spectrum of total biomass amounts. However, the organic matter in the soil is estimated in the Brazil Investment Plan (BIP) to comprise up to 70% (185 tC/ha) of the total carbon stock. Therefore, changes in the soil organic carbon pool in the Cerrado could have significant impacts on CO₂ emissions.

21. **Deforestation.** Estimates indicate that deforestation in the Cerrado is proportionally more severe than in the Amazon. During the 2002-2008 period, Amazon deforestation represented 3.2% of the area of the biome (18,954 km²/yr), with 82% of the original forested area remaining, while over the same period the Cerrado lost 4.1% of its cover (14,200 km²/yr) and only 52% of the area covered by native vegetation remained (around 1 million km²). Deforestation is on a declining trend in both biomes: in 2010, the area deforested in the Cerrado was similar to the area deforested in the Amazon (6,400 km²), though still representing a higher percentage in relative terms (0.32% in the Cerrado vs. 0.15% in the Amazon). These declining trends however might still be reversed if current policy frameworks are not maintained and

¹ Source: FAO Stat.

² Unless otherwise indicated, all the statistics are derived from the Brazil Investment Plan (for the Forest Investment Program--BIP).

³ The estimates vary widely according to the source of information and the definition of "degraded".

adequately enforced, as seen by the 28 percent increase in deforestation in the Brazilian Amazon over the last year⁴.

22. **Greenhouse gas (GHG) emissions.** Historically, Brazil has been responsible for the bulk of Latin America's GHG emissions. Emissions have decreased by about 38% between 2005 and 2010 (2.03 to 1.25 billion tCO_{2eq}) due to the drop in deforestation rates. In 2005, 57% of national GHG emissions originated from the Land Use Change and Forestry (LUCF) sector, while agriculture was responsible for 20% of national emissions. By 2010, agriculture became the country's main source of GHG emissions (35%), reducing the role of the LUCF sector in the country's overall GHG profile.⁵

23. Agricultural activity is set to continue to increase in the Cerrado region, given that it still possesses very large areas with agricultural and forestry potential. These areas are likely to become gradually more accessible and thus more attractive to investment, which might take advantage of increasing prices in the agricultural commodities markets. The key challenge for Brazil thus now is to promote the adoption of agricultural technologies that can reduce GHG emissions without compromising productivity and profitability, while still maintaining low rates of deforestation across the country.

B. Sector and Institutional Context

24. The main reference points for Brazil's REDD-plus⁶ type actions are the National Plan on Climate Change, launched by Brazil in 2008, and the National Policy on Climate Change Law (NPCC), enacted in 2009. The NPCC sets a national voluntary commitment to reduce GHG emissions between 36.1% and 38.9% of the projected emissions by 2020, implying a reduction in emissions of around 1.2 billion tCO_{2eq}.⁷

25. The set of mitigation actions stipulated by the NPCC to achieve this goal include reducing the rates of deforestation by biome, disseminating sustainable technologies in the agricultural sector, increasing energy efficiency and renewing the steel manufacturing sector. Decree No. 7,390, December 2010, which regulates the NPCC, establishes specific targets for reducing GHG emissions, including: (i) 80% reduction of deforestation in Amazon compared to the 1996-2005 average; (ii) 40% reduction of deforestation in the Cerrado compared to the 1999-2008 average; (iii) recovery of 15 million ha of degraded pastures; (iv) expansion of crop, livestock and forestry integrated systems in 4 million ha; (v) expansion of no-tillage farming systems in 8 million ha; (vi) expansion of cultivated commercial forests in 3 million ha; (vii) increase in 4.4 million m³ the treatment of animal waste; and (viii) increased use of charcoal from planted forests in steelmaking.

26. The NPCC stipulates the launch of the Action Plan to Prevent and Control Deforestation and Fires in the Cerrado Biome (PPCerrado). This plan is complementary to the Forest Code, which requires rural property owners both to maintain the most fragile areas (Permanent

⁴ Based on data published by PRODES, accessed December 2013. See also: Nepstad et al., 2013. Why is Amazon deforestation rising? available at mongabay.com. Data on the Cerrado biome were available only up to 2010.

⁵ Second National Communication to the UNFCCC. Available at: www.mct.gov.br/index.php/content/view/326984.html#lista; Estimativas anuais de emissões de gases de efeito estufa no Brasil. Ministério da Ciência, Tecnologia e Inovação, 2013. Available in: <http://www.mct.gov.br/index.php/content/view/347281.html>.

⁶ REDD-plus stands for "Reducing Emissions from Deforestation and forest Degradation, and the role of conservation, sustainable management of forests, and the enhancement of forest carbon stocks in developing countries". It is a mechanism being negotiated under the UNFCCC. For detailed information on the REDD-plus background in Brazil, refer to point D.

⁷ See Annex II of Copenhagen Accord: Nationally Appropriate Mitigation Actions (NAMAs) by developing countries.

Preservation Areas – APP), and to ensure the preservation of part of the original native vegetation (Legal Reserve – RL) in their properties. The amendments made in 2012 to the Forest Code include the creation of the Rural Environmental Cadaster (CAR), which sets a deadline for farmers to register APPs and RLs on their farms, and to submit proposals for restoring their degraded areas if they are not compliant.

27. In the context of the NPCC, the Ministry of Agriculture, Livestock and Food Supply (MAPA) developed the "Sector Plan for Mitigation and Adaptation to Climate Change for the Consolidation of a Low Carbon Emissions Agriculture Economy", also known as the ABC Plan. Its overall objective is to promote the reduction of GHG emissions and the increase of carbon sequestration in agriculture by improving efficiency in the use of natural resources, increasing the resilience of production systems and enabling adaptation of the agricultural sector to climate change⁸. The plan is expected to reduce pressure on forests by increasing agricultural productivity and promoting sustainable management practices.

28. ABC Plan Technologies. To achieve its objectives the ABC plan promotes six technologies that have a proven effect on the reduction of GHG emissions and increase of carbon sequestration by the agriculture sector: (i) recovery of degraded pasture land; (ii) crop, livestock, forestry integrated systems (iLPF); (iii) no-tillage farming systems; (iv) biological nitrogen fixation; (v) cultivated commercial forests; and (vi) treatment of animal waste. The Brazilian agricultural sector has already initiated the adoption of some of these production technologies (such as biological nitrogen fixation and no-tillage) while also increasing productivity.

29. **The ABC Plan credit line.** The main financial instrument of the ABC Plan is the provision of a subsidized credit line for farmers, launched in 2010, to convert traditional agricultural practices to the above-mentioned technologies. Initially, ABC-related lending by the National Development Bank (BNDES) was at a low level mainly due to lack of information and technical assistance for farmers⁹. In 2011, with the approval of the ABC Plan, more effective action towards its implementation was started. Among other activities, Banco do Brasil became the main financial promoter of the ABC Plan credit line and the State Management Groups (GGE) were created, with many public and private actors promoting the Plan through training and research. As a result, use of the credit line increased from R\$418 million in 2010/11, to R\$1.5 billion in 2011/12 and R\$3 billion in 2012/13 (or 88% of the planned credit authorizations). In 2011/12 about 77 percent of the ABC credits were provided for pasture recovery. Although farmers can obtain up to R\$1 million for agriculture and R\$3 million for commercial forest establishment, the average loan size is about R\$230,000 for an average land area of 105 ha. This means that producers are “testing” the credit line and the technologies on a limited portion of their properties.

30. **Constraints for ABC Plan technology adoption.** There remain a few other hurdles for ABC technology adoption. Most importantly, there is a lack of knowledge and understanding among farmers of the technologies promoted. Second, some technologies require strong farm management skills, and adequate training and technical assistance for farmers and ranchers. Finally, there are high upfront costs for technology adoption in some cases. The project design

⁸ Further details on the ABC Plan are available at: www.agricultura.gov.br/desenvolvimento-sustentavel/plano-abc.

⁹ Medrado, M., Vilcahuman, L., Medrado, R., and Medrado, M., (2011.) Perceptions of Rural Groups on the Low Carbon Emission Agriculture Plan and Programme, CNA Brazil. This study evaluated the perceptions of farmers on the 6 month old ABC credit line, when the ABC Plan was not yet released.

addresses a mid-size producer technological knowledge gap in order to speed up and improve the quality of adoption of ABC Plan technologies.

31. An additional constraint is the lack of trained professionals to support innovation¹⁰. The 2006 census data from IBGE¹¹ indicate that nine percent of the farms in the Cerrado occasionally receive some form of technical orientation while barely six percent receive technical assistance on a regular basis. Hence 85 percent of the farms do not receive any technical orientation. As the economic analysis (see below) demonstrates, the correct application of the technologies is imperative to assure farm economic and environmental sustainability.

C. Higher Level Objectives to which the Project Contributes

32. The objectives of the proposed Project are fully in line with the current Country Partnership Strategy (CPS 2012-2015), discussed by the Executive Directors on November 1, 2011 (Report No 63731 BR), under the Strategic Objective 4: Improving sustainable natural resource management and climate resilience. Supporting the "expanded sustainable agriculture" result area, the Project would focus on: (i) increasing the proportion of agriculture and livestock production using Low Carbon Emissions technologies; (ii) evaluate methodologies for, and generating knowledge about, agricultural extension, in cooperation with the private sector; and (iii) increasing agricultural sustainability in the Cerrado.

33. The Project is part of the Brazil Investment Plan (BIP) under the Forest Investment Program (FIP), approved by the FIP Sub-Committee in May 2012. The BIP includes four interrelated projects implemented under two thematic areas: (i) improving environmental management in previously converted areas; and (ii) producing and disseminating environmental information at the biome scale. The project is part of the first thematic area and contributes to the higher level objective of the BIP: to promote sustainable land use and improved forest management in the Cerrado, leading to reduced pressure on its remaining forests, reduced GHG emissions and increased CO₂ sequestration (see Annex 6).

II. PROJECT DEVELOPMENT OBJECTIVE

A. Project Development Objective (PDO)

18. The objective of the project is to promote the adoption of selected sustainable low carbon emissions agricultural technologies by mid-sized producers in the Cerrado Region.

B. Project Beneficiaries

19. The target population is about 12,000 producers with medium-sized farms (production area between 4 and 70 fiscal units¹²) and 160 field technicians who will provide technical assistance to farmers. These farmers and ranchers are targeted because: (i) medium-sized production units form the bulk of total agricultural land use in the Cerrado¹³; (ii) small farmers can access other programs promoting sustainable agriculture and livestock, tailored to their

¹⁰ Fundação Getulio Vargas, Sao Paulo, Agricultura de Baixa Emissão de Carbono, A evolução de um novo paradigma. www.observatorioabc.com.br

¹¹ Instituto Brasileiro de Geografia e Estatística - Brazilian Institute for Geography and Statistics.

¹² A fiscal unit covers between 5 and 100 ha depending on the municipality.

¹³ The family farms (78% of farms) occupy only 14.7% of the total productive area; while the remaining 22% midsize and large farms occupy 85.3% of the productive area.

realities, and with greater financial advantages¹⁴; and (iii) large farmers can access the technological know-how without government assistance. By increasing the sustainability and productivity of agricultural systems, indirect project benefits would be reflected in increased levels of employment and food security (through improved supply and resilience).

C. PDO Level Results Indicators

20. The achievements of the PDO will be measured through the following indicators:
- (a) The increase in the agricultural area using the technologies recommended by the ABC Plan in relation to the total productive area of the participating producers;
 - (b) The increase in the number of participating producers adopting at least one selected technology compared with the control group;
 - (c) Number of direct beneficiaries (percentage female); and
 - (d) Sets of lessons learned from the project incorporated annually by MAPA, SENAR and EMBRAPA¹⁵ and disseminated to the rural extension institutions of Brazil.

III. PROJECT DESCRIPTION

A. Project Components

21. The Project has three components: (i) producer training; (ii) field technical assistance; and (iii) project management, monitoring and evaluation. Component structure is based on the project's experimental design, with components 1 and 2 generating two intervention groups (producers with training and producers with training and technical assistance, respectively) and a control group.

22. **Component 1: Producer Training** (USD 3.38 million – FIP 100%) –

- (a) Provision of support for the planning and preparation of dissemination events and training courses in the Cerrado States¹⁶, including, *inter alia*: (i) identification of demands, prioritized technologies and sub-regions in each of the Cerrado States; (ii) definition and preparation of training courses and production of printed and audiovisual course materials; and (iii) selection and training of course instructors.
- (b) Carrying out of a communication and dissemination campaign to inform potential stakeholders (farmers, farm technicians and rural institutions) about the scope and rules of the ABC Plan and the Project through dissemination events and mass-media outlets.
- (c) Provision of training to rural producers and farm technicians in ABC Plan technologies and farm management, including courses on, *inter alia*: (i) no-tillage farming systems; (ii) recovery of degraded pasture land; (iii) crop-livestock-forestry integration; (iv) cultivated commercial forests; and (v) farm management and formulation of project proposals for funding under the ABC Plan.

¹⁴ For example, the National Program to Strengthen Family Farming (PRONAF) provides subsidized credit and technical assistance, and the *Plan Brasil sem Miséria*, focuses on the poorest family farmers.

¹⁵ Brazilian Agricultural Research Corporation.

¹⁶ This component will be carried out in nine of the eleven Cerrado States: Bahia, Distrito Federal, Goiás, Mato Grosso, Mato Grosso do Sul, Maranhão, Minas Gerais, Piauí and Tocantins. Paraná and Sao Paulo are not included because of their low importance in the Cerrado Biome.

23. **Component 2: Field Technical Assistance** (USD 5.46 million – FIP 100%) – Carrying out of pilot technical assistance program for selected rural producers located in four of the Cerrado States¹⁷, including, *inter alia*:

- (a) the selection and training of technical supervisors and field technicians for the provision of technical assistance to rural producers on ABC Plan technologies;
- (b) the provision of technical assistance for the implementation of ABC Plan technologies to selected farms; and
- (c) the establishment of Technological Reference Units (URTs) in selected farms, as a basis for the dissemination of practical lessons learned in the adoption of ABC Plan technologies to Project stakeholders.

24. **Component 3: Project Management, Monitoring and Evaluation** (USD 2.29 million – FIP 78%) – Provision of support for the technical and administrative management of the Project, including supervision, monitoring and evaluation activities, as well as Project audits.

B. Project Financing

25. The proposed investment project financing operation is partly financed by a grant from the FIP window of the Strategic Climate Fund in the amount of USD 10.62 million.

Table 1: Project Costs and Financing (USD million)

| Project Components | Project cost | SENAR/ MAPA Financing | FIP Financing (USD) | FIP Financing % of total |
|------------------------------------------|--------------|-----------------------------|---------------------------|--------------------------------|
| 1. Rural producer training | 3.38 | | 3.38 | 100% |
| 2. Field technical assistance | 5.46 | | 5.46 | 100% |
| 3. Management, Monitoring and Evaluation | 2.29 | 0.51 | 1.78 | 78% |
| Total Project Costs (USD million) | 11.13 | 0.51 | 10.62 | 95% |

C. Lessons Learned and Reflected in the Project Design

26. Many publications on technology adoption advocate using a diversity of dissemination channels and intensive communication to reach a variety of actors involved in innovation¹⁸. World Bank research also emphasizes the need for pluralism in agricultural extension service provision through farmer organizations, agribusiness, private sector, local governments and NGOs¹⁹. SENAR will mobilize and disseminate lessons learned to a diverse group of extension agents.

27. The role of the private sector has become increasingly important as a source of information. The advice given by providers of inputs or machinery, often linked with market standards, is for many farmers the most important source of information. For reaching commercial and possible income goals of farmers, such advice may be adequate, but for

¹⁷ The selected states are: Goias, Tocantins, Mato Grosso do Sul and Minas Gerais. See Annex 2 paragraph 17 for selection criteria.

¹⁸ IFPRI, Innovations Systems Governance in Bolivia, December 2007, Discussion Paper 00732

¹⁹ Enhancing Agricultural Innovation: How to go beyond strengthening of research systems, World Bank, 2007, page 114.

enhancing environmental sustainability or reducing input use it is often not.

28. Technology innovation programs should focus on innovators and early adopters who are willing to take risks and experiment. Once the technology proves feasible other producers are likelier to adopt. The project will train producers who express interest in technological adoption.

29. Farmer organizations are key to successful extension programs because they allow reducing the costs of technical advice per farm; improve articulation of problem statements and information needs; and prefer extension systems that are cost effective and demand-oriented. Farmer organizations (such as CNA – SENAR’s parent organization, and their affiliated municipal *sindicatos*) will be involved in the mobilization and learning phases of the project.

30. There are few impact studies of extension systems. Investments in enhanced extension systems have to consider from the start the need for impact assessment and put in place baselines and quasi-experimental designs that allow tracking the benefits of the extension investments. The project’s evaluation strategy follows an experimental design, with interested producers selected randomly into intervention and control groups.

IV. IMPLEMENTATION

A. Institutional and Implementation Arrangements

31. SENAR (*Serviço Nacional de Aprendizagem Rural* - National Rural Learning Service) will be the Recipient and will implement the project on behalf of MAPA.

32. SENAR is a private institution housed in the Brazilian Confederation of Agriculture and Livestock (CNA). MAPA and SENAR have signed a specific Cooperation Agreement for the project, which will be updated prior to Effectiveness. EMBRAPA will support SENAR at the technical level, train instructors and technicians in ABC Plan technologies and monitor the quality of technological adoption.

33. A tripartite Project Monitoring Committee (PMC, composed of MAPA, EMBRAPA and SENAR) will accompany overall project implementation. The PMC will: (i) determine the overall implementation strategy and changes thereof; (ii) review and approve the project operational manual (POM); (iii) review and agree on annual project implementation plans and budgets; and (iv) review monitoring and evaluation reporting.

34. SENAR has twenty years of experience in planning, carrying out and supervising training programs and education of rural professionals in Brazil, including large and small producers, extension technicians and technical assistance staff. SENAR has highly qualified staff in the fields of planning, training, technical assistance, financial administration and procurement. Its annual budget is currently about USD230 million. SENAR works under high standards of governance and under close scrutiny of auditors. It has, however, little experience in evaluating the results and impact of its training programs.

B. Results Monitoring and Evaluation (M&E)

36. M&E is a key element of the Project (see Annex 3 for details). The PMC will monitor and evaluate the Project’s progress and results at the technical, financial, social and environmental levels. Monitoring will cover the measurement of the PDO and results indicators,

the quality and results of the training and technical assistance program and effects on carbon sequestration.

37. Technical Monitoring. SENAR will monitor the results and effects of (i) the dissemination seminars; (ii) the rural producer training; and (iii) the field technical assistance on general knowledge about ABC technologies, their adoption rate as well as the adoption quality. It will also monitor social and environmental safeguards compliance.

38. Project implementation progress. To strengthen SENAR's M&E capacity, a firm will be hired to develop and implement a computerized management information system. The system will produce the required reporting documents, such as: Procurement Plans, financial reports, Annual Operational Plan and updated indicators for the Results Framework.

39. Impact Evaluation. An independent research institution (or firm) will be contracted to collect data from a sample of producers and control groups in order to establish baseline and progress information. First, an assessment will test the hypothesis whether the project has a positive impact on the rate of adoption of ABC Plan technologies. Second, it will estimate the project's impact on the quality of the technology adoption. Third, the Project will monitor a set of sustainability indicators in agroecosystems (SIA²⁰) in a limited sample of assisted farms. Fourth, the Project will experiment with different methodologies to measure the project impact on forested areas within the participating production units.

40. The Bank, MAPA and SENAR will carry out a mid-term review two years after Effectiveness. This mid-term review will analyze progress towards the PDO objectives and results indicators, and will allow for methodological adjustments, if warranted. SENAR will carry out a final evaluation under agreed terms of reference.

C. Sustainability

41. The sustainability of the dissemination and training program will depend on its short-and medium-term effects. If the program is considered successful, SENAR and MAPA have the necessary budget to continue the program. The monitoring system and integration of lessons learned should normally result in a sustainable and better performing training program. Lessons learned are also expected to support scaling-up discussions with relevant actors.

42. The degree of technological adoption does not only depend on training and technical assistance. Many other factors play a role, such as world demand for crops and livestock commodities, the impact of the technologies on productivity, climate factors and the overall macro-economic situation. Further, the ABC Plan is continuing its activities in collaboration with the State Management Groups and other partners. Hence the sustainability of the technologies is not under the control of this project. The economic analysis shows that the correct adoption of ABC Plan technologies is economically and financially feasible (compared to conventional technologies) and financially sustainable.

²⁰ For more information on SIA see Agroecosystems Sustainability Indicators Analysis – H. Gunsu Emesi, Iowa State University.

V. KEY RISKS AND MITIGATION MEASURES

A. Risk Ratings Summary Table

| Risk Category | Rating |
|------------------------------------------|-----------------|
| Stakeholder Risk | Moderate |
| Implementing Agency Risk | Moderate |
| - Capacity | Moderate |
| - Governance | Low |
| - Fraud and corruption | Low |
| Project Risk | Moderate |
| - Design | Moderate |
| - Social and Environmental | Low |
| - Program and Donor | Low |
| - Delivery Monitoring and Sustainability | Moderate |
| Overall Implementation Risk | Moderate |

B. Overall Risk Rating Explanation

43. The project's main risk is at the technical and economic levels. SENAR is used to provide technical training in the format proposed for the first component. The training of technical assistance professionals and field technical assistance, however, are new proposals in its portfolio, and will require some adjustments. Moreover SENAR will adopt a training impact evaluation methodology that will also require methodological modifications.

44. Training and capacity building (even with a parallel credit line) may not be sufficient to significantly increase ABC Plan technology adoption. The promoted technologies need investments that show only financial returns in the medium-term (after 3-4 years). Hence only financially well established and credit-worthy farmers may be willing to adopt. Capacity building opens a road towards technology adoption; it is a key determining factor but not the only one. Hence there is a risk that the Project may not produce the estimated results and outcomes.

45. Key measures to address these concerns include the design and implementation of a solid Monitoring and Evaluation system, the involvement of the Ministry of Agriculture (MAPA) and of the Brazilian Agricultural Research Corporation (EMBRAPA) in an oversight role, and the inclusion of targeted technical assistance in the Bank's implementation support strategy.

46. Summarizing Implementing Agency and Project Risks, the overall Project Implementation risk rating of the Project is **Moderate**.

VI. APPRAISAL SUMMARY

A. Economic and Financial Analysis

47. The economic and financial analysis is based on three studies²¹ and an analysis of degraded pasture recovery by EMBRAPA. The studies and analyses are available in the project files. The main conclusions are that: (i) no-tillage farming systems, iLPF and commercial forestry show potential for significant financial returns; and (ii) recovery of degraded pasture is profitable if livestock holders also adopt good management practices including soil conditioning, livestock husbandry and pasture management, a fact emphasized in the project's training program.

48. **Project Financial Rate of Return (FIRR).** The project's FIRR is estimated at 14 percent. The FIRR is based on the main assumption that the direct project impact will be the adoption of ABC Plan technologies on 900,000 ha, with each technology adoption area proportional to the ABC Plan objectives. The FIRR for the main technologies are respectively: degraded pasture recovery for conventional livestock: 2%; degraded pasture conversion into no-tillage farming 29%, and into iLPF 23% and into commercial forest plantations 20%. The low FIRR for conventional livestock shows the need to adopt above-mentioned management practices.

49. **Project Economic Rate of Return (EIRR).** The EIRR is estimated at 17 percent using a 0.9 conversion factor and taking into account the value of USD6²² per tCO_{2eq} sequestered.

50. **Sensitivity analysis.** Both FIRR and EIRR are robust. The analysis identified, however, some sensitivity to: (i) the share of ABC Plan technology adoption for degraded pasture recovery: the lower the share of degraded pasture recovery in the total adoption area the higher the estimated financial returns; and (ii) a drop in prices of agricultural, livestock and forest products. Financial returns on pasture land recovery are relatively low. To achieve significant financial returns the Project will encourage no tillage farming and integration of livestock/agriculture and forestry. A drop in agricultural commodity prices by 10 percent would decrease the FIRR and EIRR by some 3 percentage points. Considering the demand forecast for agricultural commodities, there is a low probability of such price decrease in the long term.

51. **Is public financing of training the appropriate vehicle?** The Brazilian Government is promoting the adoption of ABC Plan technologies as a public good and introduced a subsidized credit line to adopt the technologies. Hence, the Government has a vested interest in accelerating the adoption and ensuring that the farmers/ranchers are properly trained to make certain they use best practices while adopting such technologies. The transfer of technological know-how is a key factor for the success of the ABC Plan.

52. **Value Added.** Brazil has sufficient public funds to finance training program without the assistance of FIP or the World Bank. The value added of FIP and the Bank in this program is the

²¹ The studies are:

- (i) Análise Financeira de modelos típicos de produção com e sem adoção de práticas de baixo carbono, Ernani do Espírito Santo, CHES Agroambiental, Julho 2013. Financed by MAPA as part of project preparation.
- (ii) Brazil Low-Carbon Case Study, The World Bank, ESMAP, 2010.
- (iii) Estudo de Viabilidade Econômica na Implantação dos Sistemas Integração Lavoura-Pecuária, Silvopastoril e Intensificação de Pastagem em Propriedades de Pecuária de Corte - CEPEA/ESALQ, 2012, Daniel Marcelo Velazco Bedoya, Mauro Osaki, Paulo Moraes Ozaki, Thiago Bernardino de Carvalho, published by CNA.

²² Source: Market price per ton for carbon offsets (Europe) July 2013 and 2012 median price (USD5.9/ton) evaluated by: Maneuvering the Mosaic: State of the Voluntary Carbon Markets 2013, Forest Trends, available at: <http://forest-trends.org>

provision of support to the Government for testing the training and technical assistance methodologies and evaluating outcomes on ABC technology adoption. The Bank helps SENAR to introduce a very detailed monitoring and evaluation system as well as a rigorous evaluation of the impacts of the training and technical assistance.

53. **Impact on GHG emissions.** A WB study²³ measures the impact of the ABC Plan technologies on GHG emissions. It estimates that a reduction of deforestation through degraded pasture recovery could account for 53 percent of Brazil's potential emissions reduction, representing 6 billion tCO_{2eq} over the 2010-2030 period. The increase of no-tillage cropping would account for 3 percent of the potential emissions reduction representing 355 Million tCO_{2eq}.

54. **Impact on deforestation.** The adoption of more productive ABC Plan technologies makes it possible to increase production without necessarily resorting to expansion into new land areas, thus helping to consolidate the agricultural frontier and decreasing pressure on remaining forests (see Annex 6).

B. Technical

55. The project promotes four ABC Plan technologies: (i) no-tillage farming systems; (ii) recovery of degraded pasture land; (iii) crop-livestock-forest integration (iLPF); and (iv) cultivated commercial forest. Since biological nitrogen fixation is already widely used in the Cerrado and treatment of animal waste is marginally relevant in the biome, these ABC Plan technologies are not included in the project.

56. **No-tillage**²⁴ (or no-till) is a complex farming system in which the seeds are directly deposited into untilled soil, which has retained the previous crop residues as mulch and permanent soil cover while reducing the time-intervals between crops. Special no-till seeding equipment is needed. Adequate weed management is essential, in particular during the first years. Farmers control weed using herbicides and adopting crop rotations. Some environmental positive effects, such as erosion control, water quality improvement, increased water infiltration and increased soil carbon sequestration, come into effect only after several years of continuous, uninterrupted application. Adoption is constrained by farm management complexity, the initial cost of seeding machinery and the annual cost of herbicides

57. **Recovery of degraded pasture**²⁵. Between 40 to 80% of 50 to 60 million hectares of cultivated pastures in central Brazil, accounting for 55% of national beef production, are estimated to be in some stage of degradation. Pasture degradation is an evolutionary loss of forage yield which culminates with soil degradation. Pastures degrade because of bad choices of forage species, lack of maintenance fertilization and grazing intensity. When degraded, pastures must be recovered (with same forage) or renewed (replacing forage). Pasture recovery or

²³ Brazil Low-Carbon Country Case Study - Chapter 7.

²⁴ Adapted from: Derpsch, R., Friedrich, T., Kassam, A. und Li, H.W., 2010. Current status of adoption of no-till farming in the world and some of its main benefits. Int. J. Agric. & Biol. Eng. Vol. 3. Nº 1.

²⁵ Source: Degradação e alternativas de recuperação e renovação de pastagens, Manuel Claudio Motta Macedo, Armando Neivo Kichel, Ademir Hugo Zimmer, EMBRAPA, Comunicado Técnico, No 62, 2000

renewal can reduce GHG emissions per animal by 15 percent, while more intensive livestock production can reduce them by up to 85 percent²⁶.

58. **Crop, livestock, forestry integrated systems**²⁷ (iLPF). The technology consists in the diversification and integration of agriculture, livestock and forestry systems within the same area through intercropping, succession or rotation. iLPF can be adopted in four modes of integration: (i) crops and livestock (agropastoral); (ii) livestock and forestry (silvopastoral); (iii) crops and forestry (silvoagriculture); and (iv) crops-livestock and forestry (agrosilvopastoral). These combinations increase farm productivity, reduce pressure for conversion of native forest areas and reduce GHG emissions. The technology also improves soils and water quality, reduces diseases and weeds, and lowers emissions of methane/kg of meat. iLPF provides the possibility for income generation throughout the year on the same property. The technology has still a low but growing application rate on some 2 million ha in Brazil.

59. **Cultivated commercial forest**. The replacement of pasture or agricultural land by commercial forest can lead to substantial CO₂ sequestration but requires, at the outset, substantial capital and labor for planting. The harvesting method depends on the use of the end product. For pulp, paper and charcoal, the first harvest is after seven years whereby the plantation is completely harvested or is thinned. In the latter case, the second harvest is after 14 years when thicker trunks are removed. This leaves the soil full of tree stumps and the land cannot be used for agriculture except after costly stump removal.

60. **SENAR training methodology**. SENAR uses a training methodology focused on the participation of trainees, valuing their experience and expectations. All SENAR agents, teachers, supervisors and technical staff are trained in the methodology. Trainers develop instructional plans to make the learning process efficient and effective. The plans include the educational goals, the content, instructional techniques and resources to be used. They stipulate the procedures for evaluation and calculate the load-time required for implementation. The instructional plan provides a roadmap for reaching instructional objectives based on the needs and expectations of the trainees.

C. Financial Management

60. The Bank performed a Financial Management (FM) assessment of SENAR, including its regional branches. The assessment was based on desk and field work and provided a comprehensive review of SENAR's financial management systems. The conclusion is that SENAR's systems meet the Bank's requirements and the project will be implemented using SENAR's own financial management systems.

61. Fiduciary risks have been rated as Moderate. A Financial Management Specialist/Coordinator will be appointed to coordinate all FM aspects of the Project, including the relationship with regional branches, and the production and monitoring of FM reports. SENAR will prepare FM reports reflecting project expenditures initially using the financial management information system (RM Núcleos system acquired from the firm TOTVS S/A). These financial reports meet the requirements to be used as Interim Unaudited Financial Reports (IFRs) under Bank-financed operations. An appropriate format for the reports has been agreed

²⁶ Cardoso, Abmael da Silva. Avaliação das emissões de gases de efeito estufa em diferentes cenários de intensificação de uso das pastagens no Brasil central, Instituto de Agronomia, Departamento de Solos, Universidade Federal Rural do Rio de Janeiro, Seropédica, RJ, 2012.

²⁷ Source: EMBRAPA at <http://www.agrosustentavel.com.br/downloads/iplf.pdf>.

and the ability of SENAR's Financial Department to generate them has been verified. The project's external audit will be carried out by independent auditors, satisfactory to the Bank, under Terms of Reference acceptable to the Bank. See Annex 3 for additional details on Financial Management.

D. Procurement

62. The Bank performed a procurement assessment of SENAR, whose central office in Brasilia will be directly responsible for the procurement of goods, services and non-consulting services, for selection of consulting services (in some cases in coordination with regional offices), for the respective management of the contracts, and for the overall supervision of regional branches involved in the project.

63. SENAR's central office will be reinforced with at least 1 procurement specialist experienced in execution of Bank-financed projects. The project procurement plan does not involve any high complex procurement transaction. There is marginal risk in ensuring the broad quality consistency in the quality to avoid unbiased preparation of tenders and evaluation of bids and proposals.

64. The assessment reviewed SENAR's organizational structure and the current operating environment for implementing the project. Procurement risks have been rated as Substantial. Most of the issues/risks have been identified and include: (a) weakness on capacity of the administrative staff; (b) lack of familiarity with procedures to select consultants as well as in procurement goods and services in accordance Bank's procurement policies; (c) lack of experience in implementing Bank-financed projects. Additional procurement details are provided in Annex 3.

E. Social (including Safeguards)

65. The project will not impact Indigenous Peoples and/or traditional communities as its activities will focus on privately run farms with secure tenure rights. The project's Environmental and Social Management Framework includes measures to ensure that (i) no impacts will occur on indigenous peoples and traditional communities and (ii) project activities will not take place on land whose ownership is disputed by indigenous peoples. Meanwhile, indirect benefits are expected for traditional communities and Indigenous Peoples as project activities may reach farming areas surrounding their lands and territories. Consequently, project activities may contribute to reduce pressures on remaining forests and/or native forest areas in which the livelihood of these traditional populations rely on, and to protect headwaters and riparian zones and improve the physical, chemical and biological conditions of the soil, reducing water and soil pollution. Project activities will not require land acquisition or imply creation of protected areas. Hence, involuntary population displacement and/or negative impacts on livelihoods due to land acquisition are not envisaged.

66. Key stakeholders (family and non-family farmers representative organizations, research, technical assistance, rural extension services, state and municipal governments, and other entities represented at the State Management Groups of the ABC Plan) have been consulted during project preparation through individual interviews and focus group as well as through a broadly disseminated process of consultation through MAPA and SENAR websites. The results of this process of consultation have been reported by MAPA and included as an Annex of the Project's Social and Environmental Assessment document. The State Management Groups of the ABC

Plan—which include representatives of all of the above-mentioned key stakeholders—will be fully engaged in Project implementation, monitoring and evaluation.

67. For handling grievances, the project will rely on the Ministry of Agriculture (MAPA) and SENAR systems, avoiding inefficient duplication of structures. MAPA keeps two main channels to get citizen feedback and complaints: A Citizen Engagement Services and a Grievance Redress Mechanism under the responsibility of the Ministry's Ombudsman.²⁸

F. Environment (including Safeguards)

68. The project is essentially an agricultural technology transfer project and thus an environmental category B is adopted. The project is expected to have an overall positive impact on the environment as it seeks to promote the reduction of the environmental impacts of agricultural activities mainly through training and capacity-building. Notwithstanding these positive impacts, the proposed project will be working in some sensitive biodiversity and semi-arid forest areas, and some of the supported low-carbon emissions production techniques can have environmental impacts. Hence, the following environmental safeguards are triggered: OP 4.01 – environmental assessment, OP 4.04 – natural habitats, and OP 4.36 – forests.

69. The agricultural technologies to be promoted are more environmentally sustainable than conventional production practices. Although project funds will not be applied to purchase any agricultural chemicals, those practices can, however, involve their use. Furthermore, the project will train rural extension agents to support producers in the agricultural technologies. Hence, OP 4.09 is triggered and the project's environmental and social management framework (ESMF) includes guidance on OP/BP 4.09 requirements for field interventions and for leveraging these requirements through extension agents trained under the project. The project's environmental and social management framework (ESMF), including social and environmental assessments, provides guidance on potential issues that could arise during project implementation. Potentially adverse social and environmental impacts are expected to be small, as they can be avoided or minimized through mitigation measures. This report contains a detailed description of the potential environmental impacts of project activities and supported production methodologies, particularly regarding natural habitats, forest resources and pest management, and identifies preventive/corrective measures. It includes screening procedures for identifying any adverse risks, and measures to promote careful and adequate management and use of agricultural chemicals. It also addresses the distributive impacts of the project as well as gender-related issues and includes an analysis of any economic or social impact that project activities might have on vulnerable groups, traditional communities or poor rural dwellers. The ESMF report has been disseminated through MAPA and SENAR websites and consulted with key stakeholders. The Bank-approved ESMF was disclosed in-country on December 8, 2013, and on the World Bank's external website on January 8, 2014.

²⁸ Citizens can access the Citizen Engagement Service through a hot-line (08007041995), a fax-simile line (61-32182401), by mail, through an electronic form available at MAPA's website, and in person. Additionally, complaints can be filed through MAPA's Ombudsman channels: an electronic form available at the following site <http://www.agricultura.gov.br/ouvidoria/contatos-com-a-ouvidoria/por-formulario-web/formulario> and the following e-mail address: ouvidoria@agricultura.gov.br. SENAR keeps a channel for citizen feedback through the website <http://www.senar.org.br/fale-conosco>.

Annex 1: Results Framework and Monitoring

Country: Brazil

SUSTAINABLE PRODUCTION IN AREAS PREVIOUSLY CONVERTED TO AGRICULTURAL USE (P143184)

Results Framework

Project Development Objectives

PDO Statement

To promote the adoption of selected sustainable low carbon emissions agricultural technologies by mid-sized producers in the Cerrado Region. This will be achieved through a pilot training and technical assistance program aimed at reducing the technological knowledge gap.

These results are at | Project Level

Project Development Objective Indicators

| Indicator Name | Core | Unit of Measure | Baseline | Cumulative Target Values | | | | | Frequency | Data Source/ Methodology | Responsibility for Data Collection |
|----------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|-----------------|----------|--------------------------|-----|------|------|------------|---------------------|--------------------------------------------|---------------------------------------|
| | | | | YR1 | YR2 | YR3 | YR4 | End Target | | | |
| Increase in the agricultural area using the technologies recommended by the ABC Plan in relation to the total productive area of the participating | <input type="checkbox"/> | Percentage | 0.0 | 0.0 | 0.0 | 10.0 | 15.0 | 15.0 | End of year 3 and 4 | Data collection at producer level / survey | SENAR |

| | | | | | | | | | | | |
|------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|----------------------------------|-----|-----|------|------|-------|-------|---------------------------|-------------------------------------------|----------------------|
| producers | | | | | | | | | | | |
| Increase in the number of participating producers adopting at least one selected technology compared with the control group | <input type="checkbox"/> | Percentage | 0.0 | 0.0 | 0.0 | 5 | 10 | 10 | End of project | Data collection at producer level /survey | SENAR |
| Direct project beneficiaries | <input checked="" type="checkbox"/> | Number | 0.0 | 0.0 | 6000 | 9000 | 12000 | 12000 | Yearly | Monitoring system. | SENAR |
| Female beneficiaries | <input checked="" type="checkbox"/> | Percentage Sub-Type Supplemental | 0.0 | | | | | 0.0 | YEARLY | Monitoring system. No targets. | SENAR |
| Sets of lessons learned from the project incorporated annually by MAPA, SENAR and EMBRAPA and disseminated to the rural extension institutions | <input type="checkbox"/> | Number | 0.0 | 1.0 | 2.0 | 3.0 | 4.0 | 4.0 | End of year 1, 2, 3 and 4 | Monitoring and evaluation system | SENAR, MAPA, EMBRAPA |

Intermediate Results Indicators

| Indicator Name | Core | Unit of Measure | Baseline | Cumulative Target Values | | | | | Frequency | Data Source/ Methodology | Responsibility for Data Collection |
|-------------------------------------------------------------------------------------|-------------------------------------|-----------------|----------|--------------------------|------|--------|--------|------------|----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|
| | | | | YR1 | YR2 | YR3 | YR4 | End Target | | | |
| Land area where sustainable land mgt. practices were adopted as a result of project | <input checked="" type="checkbox"/> | Hectare(Ha) | 0.0 | 0.0 | 0.0 | 450000 | 900000 | 900000 | End of year 3 and 4 | Data collection at producer level. Targets will be reviewed at mid-term. Based on an estimate that 30% of participating producers adopt ABC technologies on an average of 250 ha each. | SENAR |
| Clients who have adopted an improved agr. technology promoted by the project | <input checked="" type="checkbox"/> | Number | 0.0 | 0.0 | 1200 | 2400 | 3600 | 3600 | End of year 3 and 4. | Data collection at producer level. Target to be revised at mid-term. Participant producers have | SENAR |

| | | | | | | | | | | | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|---------------------------|-----|-----|------|------|-------|-------|----------------------|-------------------------------------------------------------------------------------------------------------------------|-------|
| | | | | | | | | | | attended at least one training module. | |
| Clients who adopted an improved agr. technology promoted by project – female | <input checked="" type="checkbox"/> | Number Sub-Type Breakdown | 0.0 | | | | | 0.0 | End of year 3 and 4. | Data collection at producer level. No target adopted. Participant producers have attended at least one training module. | SENAR |
| Differences between intervention and control groups in reductions of GHG emissions and increase in carbon sequestration (tCO2eq) by type of technology | <input type="checkbox"/> | Metric ton | 0.0 | | | | | 0.0 | End of year 3 and 4. | Data collection at producer level. | SENAR |
| Producers and technicians trained | <input type="checkbox"/> | Number | 0.0 | 0.0 | 6000 | 9000 | 12000 | 12000 | Yearly | Monitoring system | SENAR |
| Producers and technicians | <input type="checkbox"/> | Number Sub-Type | 0.0 | | | | | 0.0 | Yearly | Monitoring system | SENAR |

| | | | | | | | | | | | |
|--------------------------------------------------------------------------------------------------------------------------------|--------------------------|------------|-----|-----|-----|------|------|------|---------------------|-------------------------------------------------|-------|
| trained - female | | Breakdown | | | | | | | | | |
| The percentage of trained producers requesting credit through the ABC line of credit | <input type="checkbox"/> | Percentage | 0.0 | | 15 | 15 | 15 | 15 | Yearly | Sample data collection | SENAR |
| The percentage of training content retained by each cohort of producers and technicians six months after the training sessions | <input type="checkbox"/> | Percentage | 0.0 | 0.0 | 50 | 50 | 50 | 50 | Yearly | Sample data collection | SENAR |
| Number of persons visiting the URT during field days | <input type="checkbox"/> | Number | 0.0 | 0.0 | 0.0 | 2000 | 4000 | 6000 | End of year 3 and 4 | Data collection through lists of people present | SENAR |
| Increase in the provision of services related to ABC technologies by the 160 technicians trained under the project | <input type="checkbox"/> | Percentage | 0.0 | 0.0 | 0.0 | 10 | 15 | 25 | End of year 3 and 4 | Data collection from technicians | SENAR |

Results Framework

Project Development Objective Indicators

| Indicator Name | Description (indicator definition etc.) |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Increase in the agricultural area using the technologies recommended by the ABC Plan in relation to the total productive area of the participating producers | $(\Sigma \Delta \text{ area with ABC technologies on the properties of participating producers} / \Sigma \text{ total productive area of participant producers}) \times 100$. Compared with the control group. |
| Increase in the number of participating producers adopting at least one selected technology compared with the control group | A difference of +10 percent or more between the percentage of adopters in the intervention and control groups |
| Direct project beneficiaries | Direct beneficiaries are people or groups who directly derive benefits from an intervention (i.e., children who benefit from an immunization program; families that have a new piped water connection). Please note that this indicator requires supplemental information. Supplemental Value: Female beneficiaries (percentage). Based on the assessment and definition of direct project beneficiaries, specify what proportion of the direct project beneficiaries are female. This indicator is calculated as a percentage. |
| Female beneficiaries | Based on the assessment and definition of direct project beneficiaries, specify what percentage of the beneficiaries are female. |
| Sets of lessons learned from the project incorporated annually by MAPA, SENAR and EMBRAPA and disseminated to the rural extension institutions | At least one yearly report with lessons learned disseminated |

Intermediate Results Indicators

| Indicator Name | Description (indicator definition etc.) |
|----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Land area where sustainable land mgt. practices were adopted as a result of proj | This indicator measures the land area that as a result of the Bank project incorporated and/or improved sustainable land management practices. This indicator can track progress toward sustainability at farm scale and at landscape scales within agroecological zones, watersheds, or basins. The baseline value for this indicator is expected to be zero. |

| | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Clients who have adopted an improved agr. technology promoted by the project | This indicator measures the number of clients of the project who have adopted an improved agricultural technology promoted by the project. |
| Clients who adopted an improved agr. technology promoted by project – female | Specifies the percentage of female clients who have adopted an improved agricultural technology promoted by the project. |
| Differences between intervention and control groups in reduction of GHG emissions and increase in carbon sequestration (tCO ₂ eq) by type of technology | Reductions estimated by multiplying the incremental area (per technology) by standard conversion factors, measured for two intervention groups and one control group. Projections to total number of beneficiaries. For measuring purposes only; no targets adopted. |
| Producers and technicians trained | Number of training certificates issued |
| Producers and technicians trained - female | Number of training certificates issued. No targets included. |
| The percentage of trained producers requesting credit through the ABC line of credit | Number of trained producers requesting credit x 100/ total number of trained producers |
| The percentage of training content retained by each cohort of producers and technicians six months after the training sessions | Specifies the level of knowledge retention, as measured by SENAR's standard methodology. |
| Number of persons visiting the URT during field days | Count of the number of additional stakeholders who visit the URT. |
| Increase in the provision of services related to ABC technologies by the 160 technicians trained under the project | Measures the difference in the number of services provided by technicians after receiving project training. Data obtained through a survey. |

Annex 2: Detailed Project Description

BRAZIL SUSTAINABLE PRODUCTION IN AREAS PREVIOUSLY CONVERTED TO AGRICULTURAL USE PROJECT (P143184)

1. The project objective would be achieved through the implementation of a pilot training and technical assistance program aimed at reducing the technological knowledge gap. The project will have three components.

(a) Component 1: Producer training

(b) Component 2: Field technical assistance

(c) Component 3: Project management, monitoring and evaluation

2. Component structure is related to the project's experimental design, with components 1 and 2 generating two intervention groups (producers with training; and producers with training and technical assistance, a subset of the first group) as well as a control group. The intervention and control groups will be selected at random from the lists of producers who express a wish to participate.

3. The Project will focus on four ABC Plan technologies: (i) no-tillage farming systems; (ii) degraded pasture recovery; (iii) crop-livestock-forestry integration (iLPF); and (iv) cultivated commercial forests. A MAPA demand study has identified that producers are most interested in adopting these four technologies. The Project will be implemented over a four year period. The fourth year will focus on impact assessment.

4. SENAR (*Serviço Nacional de Aprendizagem Rural* - National Rural Learning Service) will be the Recipient and will implement the project under the umbrella of a Project Monitoring Committee (PMC) composed of MAPA, SENAR and EMBRAPA (*Empresa Brasileira de Pesquisa Agropecuária* – Brazilian Agricultural Research Corporation).

Component 1: Producer Training.

5. This component will finance goods, services and operational costs for the dissemination of ABC Plan technologies in nine of the eleven Cerrado States: Bahia, Distrito Federal, Goiás, Mato Grosso, Mato Grosso do Sul, Maranhão, Minas Gerais, Piauí e Tocantins²⁹. To reinforce complementarities with the FIP-financed Environmental Regularization of Rural Lands project (based upon the CAR) (under preparation), the component will take into account the 52 municipalities prioritized by the Ministry of the Environment in 2012 to monitor and control illegal deforestation, promote territorial management, encourage environmentally sustainable economic activities, maintain native areas and recover degraded ones³⁰.

6. SENAR (in cooperation with MAPA, EMBRAPA, State Governments and farmer organizations) will organize seminars and presentations on the ABC program to the target group and entities linked to the agricultural sector. The intention is to create interest and motivate the producers and farmer organizations to participate in ABC training.

²⁹ Paraná and Sao Paulo States are not included because of the low importance of the Cerrado biome in both States

³⁰ Portaria MMA no. 97/2012.

7. The component will also finance the selection of master ABC consultants³¹, training content development and the implementation for 12,000 farmers, ranchers and sector technicians in all aspects of the ABC Plan technologies and farm/ranch management. SENAR (in cooperation with EMBRAPA) will develop and implement a training program in the nine above mentioned states. SENAR and EMPRAPA will jointly prepare the content for dissemination fairs, the producer training and didactical materials.

8. The component comprises the following activities:

- (a) Provision of support for the planning and preparation of dissemination events and training courses in the Cerrado States, including, *inter alia*: (i) identification of demands, prioritized technologies and sub-regions in each of the Cerrado States; (ii) definition and preparation of training courses and production of printed and audiovisual course materials; and (iii) selection and training of course instructors.
- (b) Carrying out of a communication and dissemination campaign to inform potential stakeholders (farmers, farm technicians and rural institutions) about the scope and rules of the ABC Plan and the Project through dissemination events and mass-media outlets.
- (c) Provision of training of rural producers and farm technicians in ABC Plan technologies and farm management including courses on, *inter alia*: (i) no-tillage farming systems; (ii) recovery of degraded pasture land; (iii) crop-livestock-forestry integration; (iv) cultivated commercial forests; and (v) farm management and formulation of project proposals to be considered for funding under the ABC Plan.

Dissemination of ABC Plan technologies

9. The main dissemination strategy of the ABC Plan technologies will be the organization of 15 one-day seminars in the States. The GGE³²- State ABC Management Groups will conduct the seminars with support from the central and regional SENAR. The seminars will present the ABC Plan, the recommended technologies in the program, the expected benefits of the technology applications, the ABC-FIP project, the training program and the field technical assistance.

10. The objective of the ABC dissemination program is to reach the largest number of producers, technicians and entities linked to the agricultural sector. The expectation is to reach an audience of at least 7,500 people (500 per seminar) involved in the Brazilian agricultural production, encouraging them to adopt ABC Plan technologies.

Training program for rural producers and sector technicians

11. SENAR (in cooperation with EMBRAPA) will organize 600 short courses (duration about 56 hours each) for the producers, rural technicians, members of representative bodies such as unions, cooperatives, EMATER (Brazil's rural extension program), municipalities, etc. and

³¹ The Master ABC Consultants will have 3 basic functions: i) preparation of teaching materials, ii) training of trainers, and iii) technical training of technical supervisors.

³² The GGE are composed of representatives of the agricultural and livestock sector in each State and have the function of establishing an ABC technology introduction plan that meets the real needs of their State. The GGE assist farmers and ranchers with the introduction of sustainable practices and with access to credit offered by the ABC Program.

financial entities. There will be a maximum of 20 producers per course (12,000 in total). The prerequisites for participation are that the producers (or their technicians) have a production area of more than four fiscal modules, be older than 18 years and have completed primary education. Only one participant per agricultural production unit will be allowed to participate. Technicians of EMATER (Institute of Technical Assistance and Rural Extension) will also be allowed to participate.

12. SENAR-recruited “mobilizers” will identify and select the course participants. The “mobilizers” will conduct a survey of producers and technicians in the databases of SENAR, farmer organizations and other partner institutions. They will gauge the interest of potential interested farmers/ranchers/ technicians and pre-register them. The “mobilizers” will pre-register 30 participants for each course and select 20 participants randomly among the 30 pre-registered. The 10 pre-registrants who are not selected will comprise the control group that will be used for assessing the impact of component 1, as will be detailed in component 3, and they will have priority in upcoming courses.

13. SENAR (assisted by EMBRAPA) will recruit five master ABC consultants. Their function is to (i) prepare teaching materials; (ii) train technical supervisors in the proposed technologies through regular training courses, enabling them to spread and transfer these technologies to local technicians; and (iii) train SENAR recruited instructors in the implementation of ABC Plan technologies so that they can teach the short courses for producers and technicians effectively, striving for excellence in learning. There will be a master consultant in each of the four technologies plus a specialist in technical assistance and rural extension.

14. SENAR will recruit 63 instructors, 7 per State, selected on the basis of the instructor’s experience and qualifications. Their role is to administer the training courses and SENAR will monitor their performance. To standardize the training methodology, instructors must undergo 40 hours of training on SENAR’s instructional plan methodology and ABC Plan technologies. The instructors will use questionnaires to collect baseline data on the farm/ranch characteristics of the training participants to enable down the line monitoring of technology adoption. Each course will be followed by an evaluation of the course, the participant’s content retention and a training report.

15. Each course will include one ABC technology and will be divided into four modules with duration of 8 to 16 hours. The first module will address some concepts of ABC Plan and the environmental legislation applicable to each technology, and the dedication of an hour topics related to human development. Modules 2 and 3 will address issues specific to the technologies and to integrated pest management and the rational use of pesticides so as to promote the adoption of best practices and to minimize any negative environmental impacts. The last module is devoted exclusively to agricultural planning, which includes farm/ranch management and development of projects to obtain production financing. The idea is that with this module, each participant develops a project proposal that may serve as a bank credit application.

16. With an assumed adoption rate by 30 percent of trained producers, each on an area of 250 hectares, the training program could result in ABC technology adoption on some 900,000 hectares over four years. This figure is not a project objective, but reflects the potential project impact. This figure will be reviewed at mid-term. To be financially attractive for individual farmers/ranchers, the adoption rate should however be much higher than 250 ha per farm (see economic analysis).

Component 2: Field Technical Assistance

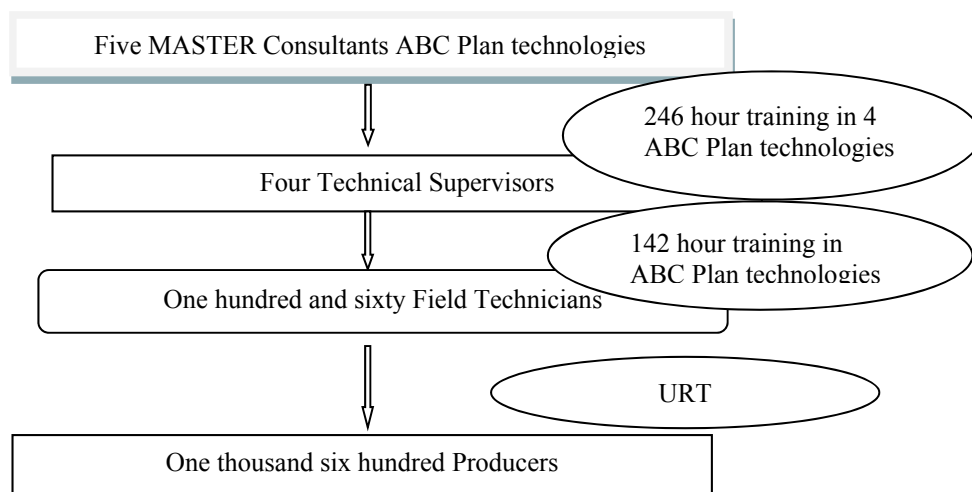
17. The component will provide funding for carrying out of pilot technical assistance program to selected rural producers located in four of the Cerrado States, including, *inter alia*:

- (a) the selection and training of technical supervisors and field technicians for the provision of technical assistance to rural producers on ABC Plan technologies;
- (b) the provision of technical assistance for the implementation of ABC Plan technologies to selected farms; and
- (c) the establishment of Technological Reference Units (URT) in selected farms, as a basis for the dissemination of practical lessons learned in the adoption of ABC Plan technologies to Project stakeholders.

18. This component will train 30 field technicians as well as 10 technicians of the EMATER in each State in ABC Plan technologies for each of the four strategic States³³: (i) Goiás; (ii) Tocantins; (iii) Mato Grosso do Sul; and (iv) Minas Gerais in the Cerrado biome – a total of 160 field technicians. MAPA and SENAR selected the States that will serve as a pilot for the project on the basis of the number of target producers, the ABC Plan technologies already applied; the number of extension agents; the area deforested in 2009/2010 and the institutional strength of SENAR in the states.

19. The professional training of the field technicians will cover two years. Each field technician will assist 10 farmers/ranchers and set-up a demonstration field (URT- Technical Reference Unit) on one of the farms/ranches (a total of 1,600 producers). At the end of the program, MAPA, SENAR and EMBRAPA will carry out a result evaluation and, if the results are within expectations, the program could be extended with additional funding to other States.

Diagram 1: Technical assistance scheme



20. Master Consultants are specialists in the ABC Plan technologies. They will provide 246

³³ In these states, on municipalities prioritized in MMA's Ordinance 97/2012, emphasis will be placed to provide advice for farmers to enroll in the Rural Environmental Registry (CAR).

hours of training to technical supervisors. The Master consultants will provide the supervisor technicians with the following training: (i) no tillage farming system (40 hours); (ii) recovery of degraded pasture (40 hours); (iii) cultivated commercial forests (40 hours); (iv) Crop, Livestock, Forestry Integrated Systems (40 hours); (v) farm and ranch management and entrepreneurship (46 hours); and (vi) technical assistance and rural extension techniques (40 hours).

21. Technical Supervisors. There will be four technical supervisors (one in each State). The technical supervisor will have a university degree in agricultural sciences. The main task of technical supervisors is to act as a supervising mentor of the field technicians. The supervisor will manage the work of all field technicians of their State, including accompanying them on visits to demonstration farms/ ranches of each technician. The technical supervisor will collect data on the degree and quality of the implementation of the technologies employed in each URT.

22. Field Technicians are professionals of the agricultural sector with technical or higher training in agricultural sciences participating in ABC technology training courses and will monitor the application of ABC Plan technologies on farms or ranches. SENAR will carry out an open State-wide selection process of 35 technicians per State. The technicians will follow a 142 hour course in ABC Plan technologies. After which SENAR will carry out tests and select the 30 most promising technicians. The technicians that are not selected will be part of a reserve cohort.

23. Field technicians will not receive wages, assuming that they already operate in the provision of technical services to the agricultural sector (farmer organizations, cooperatives, associations, companies and agricultural extension service, etc.). They will receive a monthly stipend as an incentive and to offset the additional expenses for transport costs and other related costs. All 140 trainee technicians will be paid during training (not the EMATER technicians), and only the 120 selected will continue to receive the above mentioned stipend. Moreover, the stipend will only be paid if the assisted producers are satisfied with the technician's services.

24. The field technician will act as a coach for dissemination of technologies acquired through research and their application in the field. The role of the field technicians is to: (i) provide technical assistance in ABC Plan technologies to farmers/ranchers; (ii) set up a technological reference unit (URT); (iii) assist producers to develop projects to access the ABC credit line; (iv) assist with the registration of farmers in the rural environmental registry (CAR); (v) collect soil samples for carbon quantification; and (vi) collect diagnostic data for the Sustainability Indicators for Agroecosystems -- SIA at the beginning and at the end of the technical assistance program. Each field technician will monitor and follow-up ten selected demonstration farms/ranches and transmit all training course content into field implementation. The field technician will accompany the technical supervisor during visits to the demonstration fields (URT) under their responsibility, verify the existence of possible flaws in the adoption of the ABC Plan technologies and take corrective action both in the demonstration farm/ranch and in other participating properties.

25. Demonstration farms/ranches (URT) and field days. Each field technician will be responsible for identifying a demonstration farm/ranch that is adopting the ABC Plan technologies to demonstrate the adoption techniques and the results. The technician will help organize eight field days per State (32 in total) in which some 500 producers are estimated to participate.

Component 3: Project management, monitoring and evaluation

26. This component finances activities related to provision of support for the technical and administrative management of the Project, including supervision, monitoring and evaluation activities, as well as Project audits.
27. Team coordination and management. The team in SENAR will include a project general manager, a technical manager, an administrative manager and support staff, as well as ad-hoc advisory services to management and specialist services. Managers and support staff will be paid by SENAR while special advisory and consultancy will be financed with funds from FIP. The general manager will be responsible for overall project implementation and for maintaining institutional relations with MAPA, EMBRAPA and with the regional SENAR and GGEs. The technical manager will oversee the programming of activities and their supervision. S(h)e will also take care of the monitoring of environmental and social aspects related to safeguard policies of the World Bank and technical cooperation between the team, the regional SENAR and EMBRAPA. The administrative manager and staff will be responsible for the administration of financial resources, the accounting system, procurement, financial reporting and the terms of reference of the financial audits. The administration will be paid for by SENAR.
28. Results Monitoring. The PMC in partnership with the management team will monitor project results. A computerized monitoring system will be fed with information collected during project implementation. The work will include the operational definition of the indicators and methods for their measurement, the creation and operation of a database interface, the data collection and measurement of the indicators through surveys, instructors' reports, technical reviews of a sample of activities and preparation of monthly reports (see below Annex 3).
29. Communication includes maintaining a project website by SENAR informing society and stakeholders on the project content, scheduled activities, events, project progress, monitoring results, results of exchange events, et cetera. Communication may also include the production and dissemination of printed materials (brochures, publications), videos, among others, including materials to be used in distance learning
30. Exchange of experiences among participants. SENAR will organize at least three annual workshops with project participants and stakeholders to discuss project issues and progress and ways to correct perceived deficiencies.
31. The lessons learned from the project will be evaluated and documented annually based on project monitoring and evaluation, interviews with stakeholders, and workshop reports focusing on "what worked, what did not work right, where, under what conditions, and why?" They will be disseminated to all extension institutions and agents in the Cerrado and beyond.
32. The 273 universities with agricultural faculties in the Cerrado biome could provide an important channel to spread ABC Plan technologies³⁴, but few faculties provide field services. Other relevant institutions include: the Brazilian Association of Rural Extension; the CNA, via rural syndicates; the Organization of Brazilian Cooperatives; EMBRAPA, the State Institutes of Technical Assistance and Rural Extension (EMATER) and the future National Agency for Technical Assistance and Rural Extension (ANATER). Altogether they represent 7,500 potential bases of support for the ABC Plan and this without considering consulting firms and NGOs. Altogether they represent a key public for the project's dissemination of information and lessons learned.

³⁴ <http://www.observatorioabc.com.br/paginas/um-longo-caminho-ate-2020#o-no-da-extensao-rural>.

Annex 3: Implementation Arrangements

BRAZIL SUSTAINABLE PRODUCTION IN AREAS PREVIOUSLY CONVERTED TO AGRICULTURAL USE PROJECT (P143184)

A. Project Institutional and Implementation Arrangements

1. A **Project Monitoring Committee** (PMC) will accompany project implementation. It will be composed of representatives of MAPA, EMBRAPA and SENAR and be created through a MAPA decree (*portaria*). The PMC will: (i) determine the overall implementation strategy and changes thereof; (ii) review and approve the operations manual; (iii) review and agree on annual project implementation plans and budgets; and (iv) review monitoring and evaluation reporting. PMC will receive monthly reports on the physical and financial progress of the project and the issues and challenges faced by SENAR during implementation. PMC may issue guidelines and proposals relating to project implementation, strategy, methodology and other aspects in an advisory capacity.
2. **SENAR** will be the implementing agency. Central SENAR will be the FIP grant recipient. SENAR acts as MAPA's partner under the terms of a Technical Cooperation Agreement signed on April 15, 2013. SENAR's central office will be responsible for all contracting and procurement and provide the procured goods and services to SENAR's regional offices for seminars, workshops, courses and other activities.
3. Central SENAR will finance from its own funds a project management and administration team. The team will include a project general manager, a technical manager, an administrative manager and support staff, as well as ad-hoc advisory services to management and specialist services. The general manager will be responsible for overall project implementation and for maintaining institutional relations with MAPA, EMBRAPA and with the regional SENAR and GGEs. The technical manager will oversee the programming of activities and their supervision. (S)he will also take care of the monitoring of environmental and social aspects related to safeguard policies of the World Bank and technical cooperation between the team, the regional SENAR and EMBRAPA. The administrative manager and staff will be responsible for the administration of financial resources, the accounting system, procurement, financial reporting and the terms of reference of the financial audits.
4. Regional SENAR offices are separate and independent legal entities. They will administer the training courses under "Declarations of Compliance" (containing targets and products) with Central SENAR. Operating expenses like consumables, food for events and daily expenditures will be made and justified by the regional SENAR offices and reimbursed by Central SENAR.
5. **GGE**. In each State there is a biome State Management Group (GGE) formed by stakeholders in the implementation of ABC Plan technologies in the State. Stakeholders include: State government, local governments, and representative bodies such as farmer organizations, cooperatives and associations. SENAR's regional superintendent is usually also a member of the group. GGE's role is to carry out a survey on the priority demands in the State with regard to ABC Plan technologies, identify the main regions or municipalities to be included in the project's program and propose selection criteria for producers participating in the project. The

GGEs of Goiás, Minas Gerais and Tocantins will also participate in the selection of supervisors and field technicians in component 2 of the project.

6. **EMBRAPA.** The Department of Technology Transfer, located at EMBRAPA Headquarters will participate in the FIP project and the results monitoring. EMBRAPA will be involved in the preparation of the technical content of the training courses and in training. All the technologies disseminated by the project will be validated by EMBRAPA research.

7. **MAPA.** The Ministry of Agriculture, Livestock and Food Supply will play a leadership role in the PMC and provide overall strategic advice and support.

8. **Project Operational Manual (POM).** SENAR will implement the project in accordance with a Project Operational Manual, satisfactory to the World Bank, which shall include the rules, methods, guidelines, standard documents and procedures for the carrying out of the project, including the following: (a) the detailed description of project implementation activities and the detailed institutional arrangements of the project; (b) guidelines for the adoption of an integrated pest management approach in all applicable activities to be developed under the Project; (c) the Project administrative, accounting, auditing, reporting, financial, procurement and disbursement procedures; (d) the monitoring indicators for the Project; (e) the evaluation strategy; and (f) the Environmental and Social Management Framework.

B. Financial Management, Disbursements and Procurement

9. Implementing Agency (Staffing and institutional arrangements): SENAR will have the financial management and fiduciary responsibility of the Project, including for the day-to-day financial management operations, budget execution and transaction processing. These responsibilities would be carried out by SENAR's FM department. The primary fiduciary responsibilities include: (i) preparing and obtaining approval of project FM arrangements; (ii) coordinating and supervising project implementation; (iii) submitting withdrawal requests and appropriate documentation of expenditures to the Bank as defined in the Disbursement Letter; (iv) preparing and submitting project financial reports (IFRs, Statements of Expenditures (SOE), and Summary Sheets (SS) to the Bank; (v) preparing and providing all financial documentation and project reports requested by external auditors and Bank staff; and (vi) preparing, updating and ensuring that all project executors are in compliance with the Project Operational Manual.

10. Staffing: SENAR's team is composed of qualified professionals that possess the education levels, experience, and knowledge to adequately execute the FM tasks. The team is not familiar with Bank policies and procedures, therefore training will be required. A Financial Management Specialist/Coordinator would be appointed to coordinate all FM aspects of the project, mainly the relationship with all regional branches, and the production and monitoring of the financial management reports required by the Bank.

11. Budgeting and Accounting: SENAR follows the Brazilian Accounting Rules, under Law 6404/76, which together with other rules, policies and procedures issued by STN, CFC (Conselho Federal de Contabilidade) and CPC (Comite de Pronunciamentos Contabeis³⁵) are aligned with international accounting standards. The RM Núcleos system is used by SENAR, which receives/transfers funds, and executes the respective payments, assuring observance of the budget.

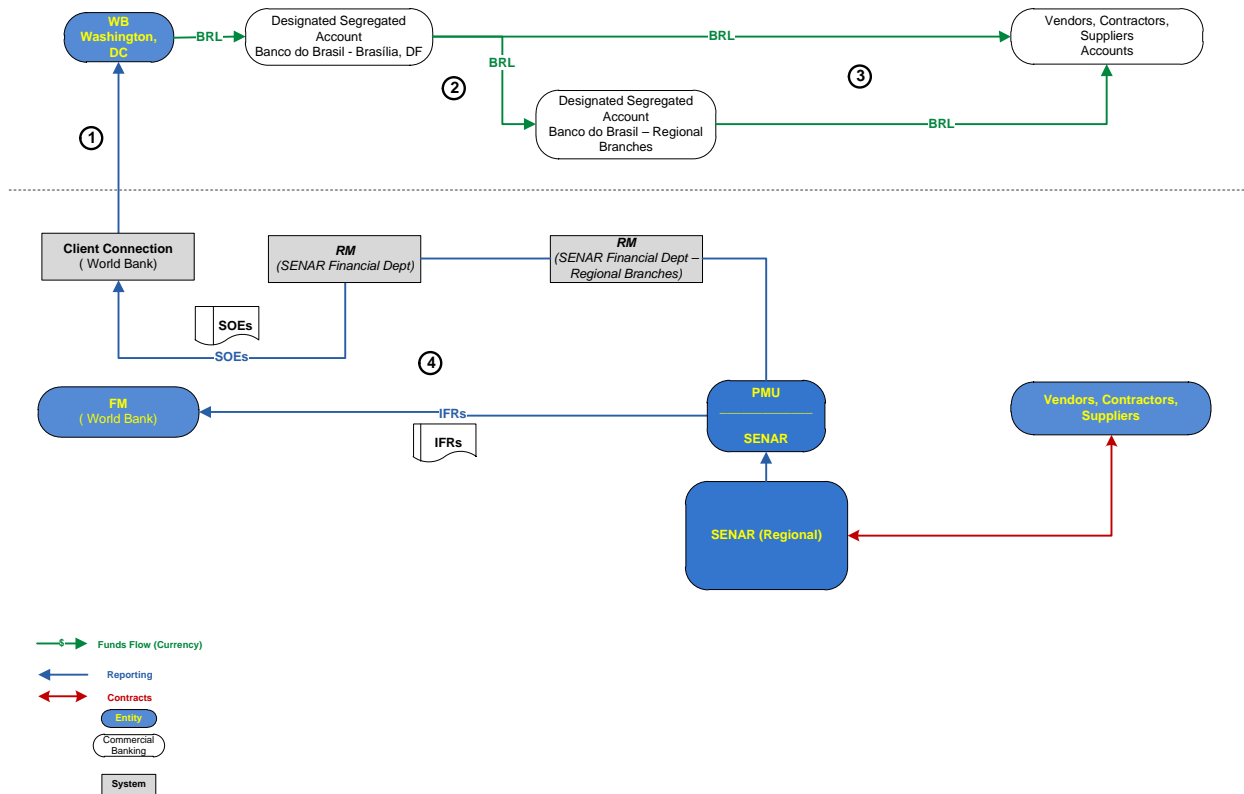
³⁵ Responsible for reviewing public sector accounting rules, procedures and policies.

12. Internal Controls: The internal control environment of the proposed Project is adequate. All project budgeting and accounting transactions will run through the accounting system (RM Núcleos). All payments will follow a commitment and payment routine. These functions are carried out by the Finance Department. All project costs are recorded according to the NBCs.

13. FM Systems and Flow of Funds: SENAR will be the primary responsible for project implementation. Funds are transferred from the Designated Account (DA) to Operational Accounts (OA) of the regional branches, where all payments will be made using the system, upon instructions from the SENAR, once expenditures have been incurred and properly documented. Payments will be made directly from the financial department of each regional office, to service providers and contractors. In order to make payments, the system requires that funds be committed by source, making possible the tracking of grant disbursements to project expenditures, due to this earmarking mechanism within the ERP. After definition of disbursement method (advances/reimbursements or direct payment), upon request from the Recipient, funds will be transferred from the grant account, in Reais, to the Designated Account specifically opened for the project. The Project will report quarterly on the use of grant funds using transaction-based arrangements through Statement of Expenditures (SOEs), Summary Sheets (SSs) and Records. To prepare the disbursement requests, SENAR will consolidate its execution and will request disbursements based only on actual expenditures. The Bank's FM review evaluated the robustness of RM, and concluded that it can provide financial information for the purpose of supporting the Bank-financed Project.

14. The Project flow of funds is presented schematically below. Additional details on these flows are provided in the disbursements section below.

Figure 1 – Project’s Flow of Funds



- (1) SENAR sends withdrawal applications to Bank together with SOEs accounting for advances from the Bank.
- (2) WB advances funds into Designated Account (DA) upon SENAR requests. SENAR transfers funds to Regional Branches
- (3) Finance Department of each regional branch (upon instructions from SENAR) makes direct payment to providers or contractors from regional DA
- (4) Supporting documentation submitted to SENAR, IFRs are formatted and sent to WB.

15. **Financial Reporting:** SENAR, with the support of the financial coordinator, will ensure the timely production of semester financial monitoring reports (IFRs) to be submitted to the Bank within 45 days of the period end. These IFRs will be produced from the FM system and will consolidate the project’s financial data for all components. Accordingly, the format and content of the IFRs, to be produced by the grantee will cover the following items:

- (a) IFR 1A - Sources and Uses of Funds (by disbursement category, with evidence of the Bank’s share in the financing of expenditures, cumulative (project to-date; year-to-date and for the period) vs. actual expenditures, including a variance analysis;
- (b) IFR 1B - Uses of Funds by Project Activity or Component, cumulative (project-to-date; year-to-date and for the period) vs. actual expenditures, including a variance analysis.

16. **External Auditing:** Annual financial statements will be audited by independent auditors, satisfactory to the Bank, in accordance with acceptable auditing standards. The external audit will be conducted according to Terms of Reference acceptable to the Bank. Auditors will be

required to issue a single opinion on project's financial statements, as per Bank guidelines. Auditors will also have to produce a management letter, where any internal control weaknesses will be identified, which will contribute to the strengthening of the control environment. The auditor's report will be submitted to the Bank no later than six months after the closing of the grant, and the audit will be financed out of grant proceeds.

17. Supervision Plan: The scope of project supervision would review the implementation of FM arrangements and FM performance, identify corrective actions, if necessary, and monitor fiduciary risk. It would take place every twelve months and include: (i) reviewing of semester IFRs, and Spending Reports (SOEs); (ii) reviewing of the auditors' reports and follow-up of any issues raised by auditors in the management letter, as appropriate; and (iii) updating the financial management rating in the Implementation Status Report (ISR).

Disbursements

18. A, Designated Account, in local currency, will be opened at Banco do Brasil, and funds will be directly deposited into this account. The Ceiling for the Designated Account will be fixed at USD 2,000,000.00 equivalent.

19. The minimum value of application for reimbursement and direct payment is USD 250,000.00 equivalent.

20. Retroactive Financing of USD2 million was agreed at Negotiations.

Allocation of grant proceeds

| Category | Amount of the Grant Allocated (expressed in USD) | Percentage of Expenditures to be Financed (inclusive of Taxes) |
|-----------------------------------------------------------------------------------------------------------|-------------------------------------------------------------|-------------------------------------------------------------------------------|
| (1) Goods, non-consulting services, consultants' services, Training and Operating Costs under the Project | 10,620,000 | 100% |
| TOTAL AMOUNT | 10,620,000 | |

Procurement

21. Procurement for the proposed Project would be carried out in accordance with the World Bank's "Guidelines: Procurement under IBRD Loans and IDA Credits" dated January 2011; "Guidelines: Selection and Employment of Consultants by World Bank Borrowers" dated January 2011; and the provisions stipulated in the Grant Agreement.

22. The project includes the following types of contracts : (i) Individual consultations and consulting firms; (ii) equipment; (iii) training materials and operational costs (including per diems, food for training events, rentals, transport costs, utilities, brochures); (iv) technical services (printing, tickets, software, labor for events). The master consultants, technical supervisors and technicians needed to the Component 2 will be selected through competitive processes.

23. Procurement of goods. Procurement of goods should be done using the World Bank's

standard bidding document (SBD) for all international competitive bidding (ICB) and national SBD agreed with or satisfactory to the World Bank for all national competitive bidding (NCB). Small value contracts not to exceed USD100,000 would follow shopping procedures. The *pregão eletrônico* (e-reverse auction) defined in Brazilian law 10,520/2002 would be used as an alternative to shopping. Direct contracting would also be used when the conditions of paragraph 3.7 of the guidelines are met. Goods contracts estimated to cost less than USD1,000, 000 would follow NCB procedures. All contracts under NCB method and estimated to cost more than USD 250,000 equivalent per contract and the three first processes on shopping basis, regardless of the amount involved, would be subject to prior review by the World Bank.

24. Special provision for NCB: only the competitive procurement methods defined in Brazilian law 8,666/1993 and its amendments and the *pregão eletrônico* (e-reverse auction) as defined in law 10,520/2002 could be used. The other methods would not be acceptable. Provisions of the Bank's guidelines would apply to all other aspects of the procurement carried out following NCB procedures. Only standard bidding documents previously accepted by the Bank will be used for the methods under law 8,666/1993, as well as for the *pregão eletrônico* (e-reverse auction). Bidding documents must include anticorruption and right to audit clauses acceptable to the Bank and the legal agreement includes a provision that the NCB bidding documents shall be acceptable to the Bank.

25. Procurement of non-consultants services. Procurement of non-consulting services will be done using the Bank's SBD for all ICB and national SBD agreed with or satisfactory to the Bank for all NCB. Small value contracts not to exceed USD100,000 will follow shopping procedures. Direct contracting can be used when the conditions of paragraph 3.7 of the guidelines are met. Non-consulting services contracts estimated to cost less than USD1,000,000 would follow NCB procedures. Only the competitive procurement methods defined in Brazilian law 8,666/1993 and its amendments and the *pregão eletrônico* as defined in law 10,520/2002 could be used. Other methods would not be acceptable. Bank guidelines would apply to all other aspects of procurement carried out following NCB procedures. Only standard bidding documents previously accepted by the Bank will be used for the methods under law 8,666/1993, as well as for the *pregão eletrônico*. Bidding documents will include anticorruption and right to audit clauses acceptable to the Bank. All contracts estimated to cost more than USD250,000 equivalent per contract and the three first processes on shopping basis, regardless of the amount involved, will be subject to prior review.

26. Selection of consultants. Consulting services from firms and individuals required for the project include a wide array of technical assistances and advisory services. Short lists of consultants for services estimated to cost less than USD500,000 equivalent per contract may be composed entirely of national consultants in accordance with the provisions of the consultant guidelines. Quality and Cost Based Selection (QCBS) would be the default method for the selection of firms, but Quality-Based Selection (QBS), Least-Cost Selection (LCS), Selection Under a Fixed Budget (FBS), Selection Based on the Consultants' Qualifications (CQS), and Single Source Selection (SSS) could also be used if the requirements of the Guidelines are met. Individual consultants should be selected in accordance with procedures of Section V of the Bank's Consultant Guidelines. For selection of contracts under QCBS and QBS methods the prior review procedures should be applied for all contracts estimated to cost more than USD250,000 equivalent per contract and the first process under each selection method. When the contract is selected under LCS or FBS method the prior review is mandatory for those

contracts estimated to cost more than USD150,000 equivalent per contract and the first process under each selection method. For contracts under CQS method, the prior review should be applied for the two first processes. Any Single Source Selection of consulting services would be subject to prior review by the Bank.

27. Operational costs. Operational costs include office supplies, per diem, sundries, incidentals, costs for mobilization, administrative expenditures for SENAR and other project implementation related expenses which would be financed by the project and would be procured through shopping, e-reverse auction or using any implementing agency’s administrative procedures acceptable to the Bank and outlined in the project operations manual (POM).

28. Assessment of the agency’s capacity to implement procurement. A procurement assessment of SENAR’s capacity to implement procurement actions was carried out in June 2013. The assessment reviewed SENAR’s organizational structure and the current operation environment available for implementing the project. Most of the issues/risks concerning the procurement function for implementation of the project have been identified and include: (a) weakness on capacity of the administrative staff at SENAR; (b) lack of familiarity of SENAR’s staff with procedures to select consultants as well as in procurement goods and services in accordance Bank’s procurement policies; (c) lack of experience in implementing Bank-financed projects. In view of the identified issues/risks regarding procurement function the overall risk for procurement is rated as substantial.

29. The set of proposed mitigation measures for the project includes: i) training of procurement specialists working at SENAR with the responsibility in preparing Bidding Documents, ToR, specifications and evaluation of proposals. ii) Hiring of procurement specialist experienced on Bank financed projects to help prepare documents, supervise and support SENAR and to strengthen SENAR’s procurement capacity; iii) preparing and submission of a detailed procurement plan through SEPA System; iv) development of a procurement management system should be acquired to monitor the procurement activities of this project. V) development of a contract management system; vi) improvement of current conditions of filing.

Table 1: Procurement Risk Assessment and Mitigation Matrix

| | Risk Assessment | | | | Risk Mitigation Measures | Residual Risk |
|----------------|-----------------|---|---|---|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| | H | S | M | L | | |
| Project Level | | X | | | <ul style="list-style-type: none"> • Train all the procurement and technical staff on Bank-procurement policies; • Hire a procurement specialist to prepare documents, supervise and support SENAR and Regional Offices regarding procurement aspects and to strengthen SENAR’s procurement capacity. • prepare a detailed procurement plan through SEPA System; • Conduct procurement assessments of the selected Regional Offices. | M |
| Overall Rating | | X | | | | M |

30. **PROCUREMENT PLAN.** The procurement plan for implementation of the proposed project has been agreed between the Recipient and the Bank and formally approved on April 7, 2014. During project execution the plan will be updated annually or as required to reflect the actual project implementation needs and improvements in institutional capacity. The recommended thresholds for the use of the procurement methods specified in the grant agreement are identified in the following table.

Table 2: Thresholds for Procurement Methods and Prior Review

| Expenditure category | Contract value threshold (USD thousands) | Procurement method | Processes subject to prior review |
|---------------------------------------------|------------------------------------------|--------------------|-----------------------------------------------------------------------------------|
| Goods | < 1,000 | NCB | All processes above USD 250,000 |
| | <100 | Shopping | Three first processes |
| Non-consulting services | < 1,000 | NCB | All processes with estimate cost more than USD 250,000 |
| | < 100 | Shopping | Three first processes |
| Consulting Services (firms) | ≥ 200 | QCBS / QBS | The first process under each selection method and all processes above USD 250,000 |
| | < 200 ≥ 100 | LCS / FBS | The first process under each selection method and all processes above USD 150,000 |
| | < 100 | CQS | The two first process |
| Individual consultants | Section V in the Guidelines | | |
| Direct contracting/ Single Source Selection | Any | Any | All cases regardless of the amounts involved |

Note: NCB = National Competitive Bidding; QCBS = Quality- and Cost-Based Selection; QBS = Quality-Based Selection; FBS = Fixed Budget Selection; LCS = Least-Cost Selection; CQS = Selection Based on Consultants' Qualifications.

31. Frequency of procurement supervision: supervision of procurement would be carried out through prior review supplemented by supervision missions with post review at least once a year. A yearly external procurement audit satisfactory to the Bank or yearly independent procurement review (IPR) will be required to assess and verify a sample of processes carried out under this project. As a result of the post reviews, IPR or external audits, the Bank will be in a position to identify cases of noncompliance and apply remedies provided for in the grant agreement.

32. Exceptional cases of prior review can be indicated in the procurement plan and the SENAR should be instructed to submit the qualifications and experience of all evaluated candidates, the terms of reference, and the terms of employment of the individual consultant. With regard to prior review of terms of reference (TOR) alone, the general understanding is that drafting a TOR does not constitute a procurement action, but rather the first, purely technical, step in the consultant selection process. Consequently, it is recognized that the review of TOR alone is a project management issue and any requirement for ex-ante review of TOR might be more appropriately imbedded in the implementation arrangements of the project.

Environmental and Social (including safeguards)

33. The technical manager will be responsible for the monitoring of environmental and social aspects related to safeguard policies of the World Bank, ensuring compliance with the project's

safeguards documents and coordinating technical cooperation between the team, the regional SENAR and EMBRAPA.

34. Periodic Bank supervision missions to the project will verify project compliance with Bank safeguards and recommend corrective actions when applicable.

Social

35. Operational policies OP 4.10 (Indigenous Peoples) and OP 4.12 (Involuntary Resettlement) are not triggered. The project will not interfere with Indigenous Peoples and/or traditional communities as its activities will focus on privately run farms with secure tenure rights. The project's Environmental and Social Management Framework and the Environmental and Social Management Plan include measures to ensure that (i) no impacts will occur on indigenous peoples and traditional communities and (ii) project activities will not take place on land whose ownership is disputed by indigenous peoples. Meanwhile, indirect benefits are expected for traditional communities and Indigenous Peoples as project activities may reach farming areas surrounding their lands and territories. Consequently, project activities may contribute to reduce pressures on remaining forests and/or native forest areas in which the livelihood of these traditional populations rely on, and to protect headwaters and riparian zones and improve the physical, chemical and biological conditions of the soil, reducing water and soil pollution. Project activities will not require land acquisition or imply creation of Protected Areas. Hence, involuntary population displacement and/or negative impacts on livelihoods due to land acquisition are not envisaged.

36. Gender. A gender analysis was conducted during preparation in order to understand the role of women in the mid-sized farming systems in the Cerrado. According to the 2006 Agricultural Census (IBGE), 27 percent of landholders in the Cerrado area are women. Detailed data on ownership by farm size were not available but empirical evidence indicates that male ownership and professional management tends to increase with property size. In the context of training participation conducted by SENAR, nearly 30 percent of total participants are women. The participation of women increases significantly in nutrition, food safety, health, and handicraft courses provided by SENAR. Since 2010, SENAR promotes trainings specifically designed to women in rural areas aiming to strengthen their participation in the business decision making process, including topics in business and financial management, leadership, public relations and planning, as well as information on labor rights, environmental, and phyto and livestock sanitary issues. Since 2010, over 10,000 women participated in the above-mentioned trainings in 12 Brazilian states, 5 of which are part of the Project's targeted areas. Due to the environmental nature of the Project, which aims at increasing awareness and adoption of sustainable productive technologies and the reduction of deforestation pressures in the agricultural areas of the Cerrado, no concerns on gender issues are in place, therefore, no special targets on female participation have been adopted by the project and, therefore, no specific gender oriented interventions are contemplated in project design. However, given the importance of understanding the role of women in the adoption of low carbon technologies in mid-sized farms, SENAR's monitoring of participation, training, learning and adoption will be disaggregated by gender.

Environmental

37. The project is essentially an agricultural technology transfer project and thus an environmental category B is adopted. The project is expected to have an overall positive impact

on the environment as it seeks to promote the reduction of the environmental impacts of agricultural activities mainly through training and capacity-building. Notwithstanding these positive impacts, the proposed project will be working in some sensitive biodiversity and semi-arid forest areas, and some of the supported low-carbon emissions production techniques can involve the use of agricultural chemicals. Hence, the following environmental safeguards are triggered: OP 4.01 – environmental assessment, OP 4.04 – natural habitats, and OP 4.36 – forests.

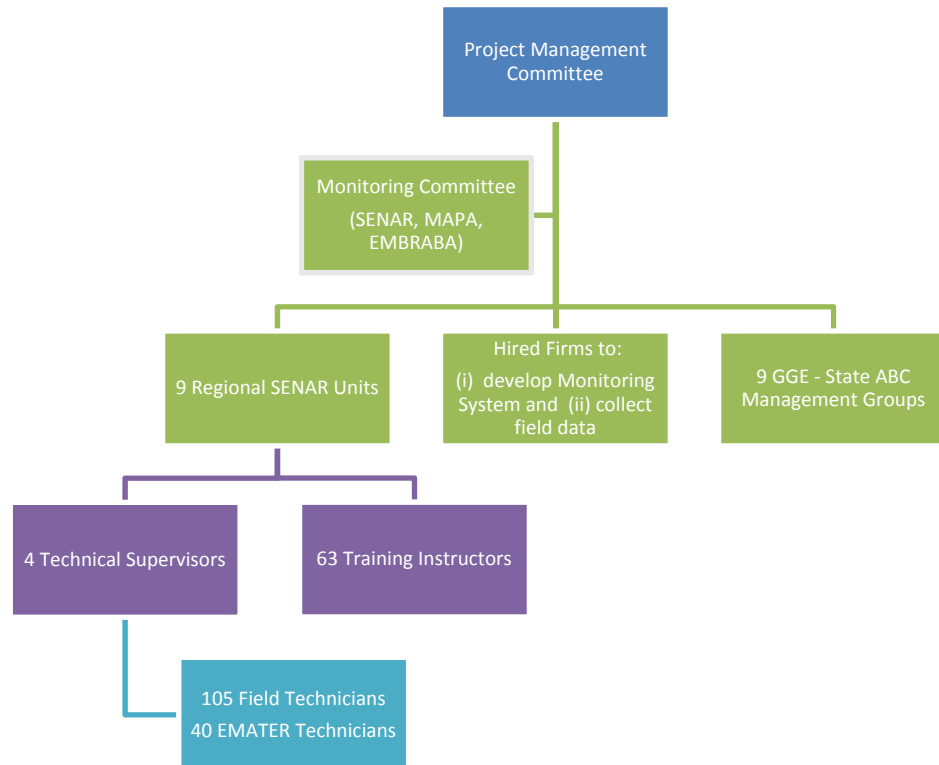
38. The agricultural technologies to be promoted are more environmentally sustainable than conventional production practices. Although project funds will not be applied to purchase any agricultural chemicals, those practices can, however, involve their use. Furthermore, the project will train rural extension agents to support producers in the agricultural technologies. Hence, OP 4.09 is triggered and the project's environmental and social management framework (ESMF) includes guidance on OP/BP 4.09 requirements for field interventions and for leveraging these requirements through extension agents trained under the project.

39. The project's environmental and social management framework (ESMF), including social and environmental assessments, provides guidance on potential issues that could arise during project implementation. Potentially adverse social and environmental impacts are expected to be small, as they can be avoided or minimized through mitigation measures. This report contains a detailed description of the potential environmental impacts of project activities and supported production methodologies, particularly regarding natural habitats, forest resources and pest management, and identifies preventive/corrective measures. It includes screening procedures identifying any adverse risks, and measures to promote careful and adequate management and use of agricultural chemicals. It also addresses the distributive impacts of the project as well as gender-related issues and includes an analysis of any economic or social impact that project activities might have on vulnerable groups, traditional communities or poor rural dwellers. The ESMF report has been disseminated through MAPA and SENAR websites and consulted with key stakeholders. The Bank-approved ESMF was disclosed in-country on December 8, 2013, and through the Bank's InfoShop on January 8, 2014.

Monitoring & Evaluation

40. Institutional Arrangements. The PMC will create a Monitoring Committee, constituted by specialists from SENAR, MAPA and EMBRAPA, to monitor and evaluate the Project's overall progress and results. The Monitoring Committee will be responsible to: (i) promote the early involvement of co-executors and stakeholders of the project in M&E discussions, (ii) oversee the computerized monitoring system; (iii) introduce data collection arrangements, including data sources and the reliability of the information provided and associated costs and responsibilities; and (iv) periodically report the progress on result indicators, procurement, financial management and social and environmental safeguards activities. The Regional SENAR units will assist the Monitoring Committee to collect data and measure the indicators on training and land use changes through participants' surveys and instructors' reports.

Figure 2 - M&E Institutional Arrangements



41. Monitoring. The PMC will monitor the Project at the technical, financial, social and environmental levels.

42. Monitoring at the technical level

(a) For component 1:

- (i) SENAR will conduct surveys to evaluate the impact of the dissemination seminars on the participants' awareness of ABC Plan technologies with the objective to improve the seminar's messages and their organization;
- (ii) SENAR will monitor the effect of the producer training. Training instructors will apply two questionnaires to course participants and report the results to the PMC, Regional SENAR or local GGE units. The first questionnaire will be applied at the beginning of the training to collect information on pre-existing knowledge of ABC Plan technologies and the general socio-economic conditions of the participants (size of property, economic activities, education level, etc.). The second questionnaire will be applied at the end of training to assess the immediate knowledge retention of training participants as well as the instructors' performance. During the fourth year of the project, a third questionnaire will be applied to participants to measure the long term knowledge retention of the training, ABC Plan technology adoption and land use conversion (in particular conversion of forest into agricultural land).

- (b) For component 2:
 - (i) Technical supervisors, in collaboration with field technicians, will collect monthly data on URTs' overall performance and activities, social and environmental safeguards compliance, and visiting participants during URT field days. These data will provide up-to-date information on field implementation of ABC Plan technologies, issues that may arise and solutions that need to be identified.
 - (ii) Field technicians will collect soil samples for carbon quantification which will be fed into an EMBRAPA data base to quantify more precisely the impact of the ABC Plan technologies on GHG emissions;

43. Project Progress Information System. To strengthen SENAR's M&E capacity, a firm will be hired to develop and implement a computerized monitoring system by the beginning of project year 1. The system will integrate the progress of all aspects of the Project and produce the required reporting documents, such as: Procurement Plans, Financial reporting, Annual Operational Plan, updated indicators for the Results and Monitoring Framework, among others.

44. Results and Indicators. A Results and Monitoring Framework was fully-developed, providing specificity in indicators, data collection methodology, reporting responsibilities and frequency of M&E activities (Annex 1). Three PDO indicators were selected to monitor: (i) the increase in the agricultural area using the technologies recommended by the ABC Plan in relation to the total productive area of the participating producers; (ii) the increase in the number of participating farmers adopting at least one selected technology compared with the control group; (iii) Number of direct beneficiaries (percentage female); and (iv) sets of lessons learned from the project incorporated annually by MAPA, SENAR and EMBRAPA and disseminated to the rural extension institutions of Brazil.

45. The following intermediate results indicators were selected to monitor progress in implementation and likelihood of achieving PDO targets:

- (a) Land area where sustainable land management. practices were adopted as a result of project;
- (b) Number of clients who have adopted an improved agricultural technology promoted by the project (percentage female);
- (c) Differences between intervention and control groups in reduction of GHG emissions and increase in carbon sequestration (tCO_{2eq}) by type of technology³⁶
- (d) Number of trained producers and technicians (percentage female);
- (e) Percentage of trained producers requesting credit through the ABC line of credit;
- (f) Percentage of training content retained by each cohort of producers and technicians 6 months after the training sessions;
- (g) Number of people visiting Technological Reference Units (URT - *Unidades de Referência Tecnológica*) during field days; and
- (h) Increase in the provision of services related to ABC Plan technologies by the 160 technicians trained under the project.

³⁶ For monitoring purposes only, no targets adopted.

46. Results monitoring will be based on semiannual reports, prepared by the PMC in order to keep track of potential problems identified and will be appropriately addressed. Also, the positive results of the project will be proposed to be internalized as public policies for MAPA and actions for SENAR, providing a basis for scaling-up discussions within the Government of Brazil.

47. GHG monitoring. As a default methodology to allow estimation of the direct GHG emissions reductions generated by the adoption of ABC Plan technologies, the project will monitor activity data (i.e. hectares adopted under each technology), which will be combined with emissions (i.e. conversion) factors provided by EMBRAPA. Over time, the project GHG monitoring methodology may be aligned with the MRV (Measurement, Reporting and Verification) plan being developed under the ABC Plan, which includes the creation and maintenance of "Multi-institutional Virtual Laboratory for Climate Change and Agriculture" (Lim-ABC), to be established through a partnership between EMBRAPA and members of the Climate Network³⁷. Under this MRV plan, each of the six ABC Plan technologies will have its own monitoring strategy, including the establishment of reference levels, measurement and accounting methodologies, data sources and collection, analysis, archive and quality control methods, and responsible institutions. Monitoring methods will include the use of satellite imagery, coupled with in situ field visits for ground truthing and sampling of carbon stocks.

48. Impact Evaluation. The project will evaluate impact at several levels:

(a) A first impact assessment will evaluate whether the project has a positive impact on the rate of adoption of ABC Plan technologies. A firm will be hired to carry out systematic field surveys (baseline, mid-term review, and final evaluation) to measure the adoption of ABC Plan technologies at the farm level. The evaluation will be based on a randomized experiment: For each course under component 1, 30 candidates will be eligible but, out of them, SENAR will randomly select 20 candidates to receive training. Those selected comprise the treatment group. The non-selected candidates will compose the control group³⁸. The randomized experiment will be performed in 3 of the 9 States where the project will be implemented. Moreover, in two of the three selected states, about 800 farmers will receive field technical assistance. Hence the project has three groups: a treatment group participating only in component 1, a second treatment group participating in components 1 and 2 and a control group. The difference in the rate of adoption between the control and treatment groups is the impact of the project on the rate of adoption. Baseline information including the treatment and the control group will be collected before the start of the courses. Follow-up information will be gathered 6 months after the conclusion of the first training round to the treatment group.

(b) A second impact evaluation will estimate the Project's impact on the quality of the ABC Plan technology adoption. The field surveys will cover the quality of the technology adoption through the introduction of adoption evaluation scorecards (to be

³⁷ The Climate Network (Brazilian Research Network on Global Climate Change) was established by the Ministry of Science and Technology (MCTI), consisting of a set of research institutions, headquartered at the National Institute for Space Research (INPE). Its mission is to generate and disseminate knowledge in order for Brazil to meet the challenges posed by the causes and effects of global climate change.

³⁸ Candidates from the control group will have priority to participate on upcoming courses, but only a year after the first training round.

developed in cooperation with EMBRAPA) allowing a comparison in the adoption quality between (i) producers adopting without SENAR training; (ii) producers who followed only component 1 training; and (iii) producers receiving technical assistance. These scorecards will provide data to measure the impact of component 1 and 2 on the implementation quality of the technologies adopted.

(c) Assessment of the Sustainability Indicators in Agroecosystems. A university or consulting firm (independent from the PMC institutions) will monitor the sustainability indicators in agroecosystems (SIA³⁹) in a limited sample of assisted farms. The SIA include economic indicators (farm income, profitability and productivity), environmental indicators (biodiversity, animal welfare, water use, soil health, waste) and social indicators (employment, community involvement, health, safety). Field technicians will assist with SIA data collection.

(d) Evaluation of impact on on-farm deforestation. The project will also experiment with different methodologies to assess the degree to which the adoption of ABC technologies has influenced producer intentions to convert additional forest land into agricultural use within the participating production units (apart from the legal reserves and the permanent preservation area on private land). This may include obtaining data from participating producers on (i) the number of hectares of forested farm land available before the producer's project participation and after and compared to the total farm size; (ii) on farm forest area (ha) converted to agriculture in the last 5 years before participating in the project; (iii) on farm forest area (if available) intended/planned to convert to agriculture in the next 5 years (after project participation); (iii) real and planned purchase of additional land under forest cover (ha) to convert to agriculture at later dates; (iv) producer perceptions on the degree to which the adoption of ABC technologies has affected land use decision making, in particular the future use of remaining on-farm forest resources.

49. Alignment with FIP reporting requirements. The Results Framework of the project will be integrated at the Program (BIP) level contributing to the annual reporting requirements under the FIP with selected indicators.

50. Relevant details for M&E methodology and implementation will be provided in the Project Operational Manual.

³⁹ For more information on SIA see Agroecosystems Sustainability Indicators Analysis – H. Gunsu Emesi, Iowa State University http://www.extension.iastate.edu/NR/rdonlyres/1067F46A-3C8B-4BBD-A9DB_678ED320C962/82665/9_ppp_gunsu08_421.pdf

Annex 4

Operational Risk Assessment Framework (ORAF)

Brazil: SUSTAINABLE PRODUCTION IN AREAS PREVIOUSLY CONVERTED TO AGRICULTURAL USE (P143184)

| Project Stakeholder Risks | | | | | | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|----------------|-------------------------------------|------------------|-------------------|
| Stakeholder Risk | Rating | Moderate | | | | |
| <p>Risk Description:</p> <p>Following stakeholder analysis during preparation, this risk is defined as Moderate overall, given the involvement of key actors and institutions (CNA, rural syndicates, state management groups) in project implementation.</p> | Risk Management: | | | | | |
| | Project monitoring and field visits | | | | | |
| | Resp: | Status: | Stage: | Recurrent: | Due Date: | Frequency: |
| | Both | Not Yet Due | Implementation | <input checked="" type="checkbox"/> | | Yearly |
| Implementing Agency (IA) Risks (including Fiduciary Risks) | | | | | | |
| Capacity | Rating | Moderate | | | | |
| <p>Risk Description:</p> <p>SENAR has twenty years of experience in planning, carrying out and supervising projects and programs aiming at the training and education of rural professionals in Brazil, including both large and small producers, extension and technical assistance staff, etc.</p> <p>Financial management: SENAR's team is composed of qualified professionals that possess the education levels, experience, and knowledge to adequately execute the FM tasks. The team is not familiar with Bank policies and procedures, therefore training will be required. FM risk rating is moderate.</p> | Risk Management: | | | | | |
| | <p>Financial management: A Financial Management Specialist/Coordinator would be appointed to coordinate all FM aspects of the project, mainly the relationship with all regional branches, and the production and monitoring of the financial management reports required by the Bank.</p> | | | | | |
| | Resp: | Status: | Stage: | Recurrent: | Due Date: | Frequency: |
| | Client | Not Yet Due | Implementation | <input type="checkbox"/> | 30-Jun-2014 | |
| | Risk Management: | | | | | |
| | <p>Procurement: The set of proposed mitigation measures for the project would include: i) Training of procurement specialists working at the PMU and in any agency involved in project execution or with the responsibility in preparing Bidding Documents, ToR, specifications and evaluation of proposals. ii) Hiring of procurement specialist experienced on Bank's financed project aiming to prepare documents, supervise and support SENAR and Regional Offices regarding procurement aspects and to strengthen</p> | | | | | |

| | | | | | | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|-----------------------|--------------------------------------------|-------------------------|--------------------------|
| <p>Procurement: Most of the issues/risks concerning the procurement function for implementation of the project have been identified and include: (a) weakness on capacity of the administrative staff; (b) lack of familiarity with procedures to select consultants as well as in procurement goods and services in accordance Bank's procurement policies; (c) lack of experience in implementing Bank-financed projects. Procurement risk is rated as substantial.</p> | <p>SENAR's procurement capacity; iii) preparing and submission of a detailed procurement plan through SEPA System; iv) development of a procurement management system should be acquired to monitor the procurement activities of this project. v) development of a contract management system; vi) improvement of current conditions of filing.</p> | | | | | |
| <p>Governance</p> | <p>Rating</p> | <p>Low</p> | | | | |
| <p>Risk Description: The agency has highly qualified staff in the fields of project planning, agronomy, training, technical assistance, financial administration and procurement. Its annual budget is currently about \$230 million. SENAR is used to working under high standards of governance and under close scrutiny of auditors. Weaknesses include low capacity for impact evaluation and, on the fiduciary side, lack of knowledge and experience of Bank rules and procedures. These weaknesses are being addressed through project design and specific fiduciary mitigation measures. Commitment to project execution and to building a relationship with the Bank contribute to mitigating overall governance risk.</p> | <p>Risk Management:</p> | | | | | |
| | <p>Resp:</p> | <p>Status:</p> | <p>Stage:</p> | <p>Recurrent:</p> | <p>Due Date:</p> | <p>Frequency:</p> |
| | | | | <p><input type="checkbox"/></p> | | |
| | <p>Risk Management:</p> | | | | | |
| | <p>Regular supervision of project implementation by task team (including fiduciary), audits and oversight by MAPA.</p> | | | | | |
| | <p>Resp:</p> | <p>Status:</p> | <p>Stage:</p> | <p>Recurrent:</p> | <p>Due Date:</p> | <p>Frequency:</p> |
| | <p>Bank</p> | <p>Not Yet Due</p> | <p>Implementation</p> | <p><input checked="" type="checkbox"/></p> | | <p>CONTINUOUS</p> |

| Project Risks | | | | | | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|----------------|--------------------------|-------------------|------------------|
| Design | Rating | Moderate | | | | |
| <p>Risk Description:</p> <p>Lack of co-financing. The main risk of this project is linked to the package that will be provided to producers. While the \$39.2 million IDB project provides financial incentives to adopt climate smart technologies, this US\$10.62 million project (without co-financing) relies almost entirely on training and capacity building (in other words: convincing) of farmers to adopt new technologies and cannot provide financial incentives to adopt climate smart technologies. The success of the project will therefore depend on the identification of innovators and early adopters, the quality of the information and the training professionals and on the effect of demonstration fields. This adoption package is somewhat incomplete, but the risk may be attenuated by access to ABC's subsidized credit line.</p> | Risk Management: | | | | | |
| | <p>Lack of co-financing: Mitigation measures adopted during preparation, include changes in scope (focusing mostly on producers) and reductions in area of intervention (only in four States for component 2).</p> | Resp: | Status: | Stage: | Recurrent: | Due Date: |
| | Both | Completed | Preparation | <input type="checkbox"/> | 02-Aug-2013 | |
| Social and Environmental | Rating | Low | | | | |
| <p>Risk Description:</p> <p>The proposed Project will be working in some sensitive biodiversity and dry forest areas. No negative impact is expected since all Project actions are intended to promote and consolidate the adoption of sustainable agricultural practices to reduce carbon emissions. The Project is expected to have a positive impact on the environment as it seeks to promote the reduction of the environmental impacts of agricultural activities mainly through capacity-building, and rural extension activities. The project will not interfere with Indigenous Peoples as its activities will focus on privately run farms. Activities supported by the project will not require land acquisition or imply on the creation of Protected Areas and, consequently, involuntary</p> | Risk Management: | | | | | |
| | <p>MAPA has prepared an Environmental and Social Management Framework (ESMF), including social and environmental assessments, to provide guidance on potential issues that could arise during project implementation. The ESMF contains a detailed description of the potential environmental and social impacts of project activities and supported production methodologies, particularly regarding natural habitats, forest resources and pest management, and identifies preventive/corrective measures. The ESMF includes screening procedures identifying any adverse risks as well as measures to promote careful management and use of agricultural chemicals. Furthermore, the project will train rural extension agents to support producers in the low carbon agricultural technologies.</p> <p>The ESMF was submitted to the Bank on December 9, 2013. The approved ESMF report was disclosed and disseminated through MAPA and SENAR websites and consulted with key stakeholders.</p> | | | | | |

| | | | | | | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|---------------------------------|----------------------------------------------------------|---------------------------------|-----------------------------|
| population displacement and/or negative impacts on livelihoods due to land acquisition are not envisaged. | Resp: Client | Status: Completed | Stage: Preparation | Recurrent: <input type="checkbox"/> | Due Date: 16-Aug-2013 | Frequency: |
| Program and Donor | Rating | | Low | | | |
| Risk Description: No risks have been identified, given that financing has already been endorsed by the FIP Sub-Committee on May 4, 2012. | Risk Management: Timely presentation of final project to FIP Sub-Committee to ensure approval. | | | | | |
| | Resp: Both | Status: Completed | Stage: Preparation | Recurrent: <input type="checkbox"/> | Due Date: 31-Mar-2014 | Frequency: |
| Delivery Monitoring and Sustainability | Rating | | Low | | | |
| Risk Description: A solid M&E system has been designed for the project, building on SENAR's monitoring capacity and MAPA's commitment to monitoring and evaluation of results. | Risk Management: Project design is experimental, and a solid monitoring and evaluation system will be deployed during implementation. The Bank will accompany the process closely, providing technical assistance as needed. | | | | | |
| Sustainability risks are low given that: at the producer level, ABC Plan technologies provide an opportunity to increase yields and financial return as well as a reduction in GHG emissions; and, at the institutional level, if the project achieves its results as expected, both SENAR and MAPA have the resources necessary to continue implementation. | Resp: Both | Status: Not Yet Due | Stage: Implementation | Recurrent: <input checked="" type="checkbox"/> | Due Date: | Frequency: Yearly |

| Overall Risk | | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|----------|
| Overall Implementation Risk: | Rating | Moderate |
| <p>Risk Description:</p> <p>The project's main risk is at the technical and economic levels. SENAR is used to provide technical training in the format proposed for the first component. The training of technical assistance professionals and field technical assistance, however, are new proposals in its portfolio, and will require some adjustments. Moreover SENAR will adopt a training impact evaluation methodology that will also require methodological modifications.</p> <p>Training and capacity building (even with a parallel credit line) may not be sufficient to significantly increase ABC Plan technology adoption. The promoted technologies need investments that show only financial returns in the medium-term (after 3-4 years). Hence only financially well established and credit-worthy farmers may be willing to adopt. Capacity building opens a road towards technology adoption; it as a key determining factor but not the only factor. Hence there is a risk that the Project may not produce the estimated results and outcomes.</p> <p>While procurement risk is rated as Substantial, the facts that FM risk is Moderate and that SENAR is a well-established institution managed by the private sector but which works under the close scrutiny of government auditors lead to an overall Implementing Agency Risk of Moderate.</p> <p>Summarizing Implementing Agency and Project Risks, the overall Project Implementation risk rating of the Project is Moderate.</p> | | |

Annex 5: Implementation Support Plan

BRAZIL SUSTAINABLE PRODUCTION IN AREAS PREVIOUSLY CONVERTED TO AGRICULTURAL USE PROJECT (P143184)

1. The project will require support at several levels: (i) monitoring of training effectiveness and project progress; (ii) evaluation of training and technical assistance impact; and (iii) estimation of project impact on carbon stocks, GHG emissions and deforestation.
2. The project will receive support from a contracted monitoring and evaluation entity (firm or University) and this support is crucial for the success of the project.
3. Disbursement and financial management at the Project level will follow standard SENAR procedures and will not require extraordinary attention, except in the beginning of the project. Procurement may require some more attention, but apart from the recruitment of a firm to assist with monitoring and evaluation, all other procurement goes through shopping procedures and selection of consultants based on quality.
4. Safeguards management will most probably not require many specific interventions or mitigation actions except at the technical level where EMBRAPA will play an important role in the supervision of the technical assistance.
5. The WB office in Brasilia will be the main source of project support as it has qualified technical, safeguard and fiduciary staff available to follow-up on the project's implementation. During the first year two specific support missions may be required and during the following years at least one support mission could help with the yearly planning and analysis of project progress.

Table 1: Implementation support focus, skills, resources and origin

| Time | Focus | Skills needed | Resource Estimate |
|-------------|-------------------------------------------------------------|-----------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|
| Year 1 | - Project planning and programming - Fiduciary processes | - Training management - Fiduciary Management - Monitoring and evaluation | - 2 specific support missions - intense support from country office |
| Year 2- 3 | - Project implementation - Monitoring - Reporting | - Monitoring specialist - Training specialist - Fiduciary (FM, Procurement, Safeguards) | - 1-2 yearly support mission - support from country office at the technical and fiduciary level |
| Year 4 | - Monitoring and evaluation | - Monitoring and evaluation | - 2 follow-up missions by monitoring and evaluation specialists |

Table 2: Skills Mix Required

| Skills Needed | Number of Staff Weeks | Number of Trips |
|--------------------------------------------|--------------------------------------------------------------------------------------|------------------------------------------------------|
| Project management | - six staff weeks year 1; four staff weeks year 2 and 3 and eight staff weeks year 4 | - 2 in year 1 - 1 in year 2 to 3 - 2 in year 4 |
| Operational specialist | - 12 weeks per annum | - In country office |
| Fiduciary Specialists (FM and Procurement) | - 2 x 3 weeks per year | - In country office |
| Technical Specialists including M&E | - 8 weeks per year and 12 weeks in year 4 | - 2 trips per year and 3 trips in year 4 |

Annex 6: Relationship with the Forest Investment Program, the Brazil Investment Plan, Climate Change Potential and REDD-Plus Background

BRAZIL SUSTAINABLE PRODUCTION IN AREAS PREVIOUSLY CONVERTED TO AGRICULTURAL USE PROJECT (P143184)

A. The Forest Investment Program

1. The Forest Investment Program (FIP) is a targeted program under the Strategic Climate Fund (SCF), one of the two Climate Investment Funds (CIF) managed by the World Bank. The SCF provides financing for developing or up-scaling activities that seek to respond to specific challenges related to climate change or to provide a sector response through directed programs.

2. The main purpose of FIP is to support developing countries' REDD-plus efforts⁴⁰, providing up-front bridge financing for readiness reforms and public and private investments identified through national REDD readiness strategy building efforts, while taking into account opportunities to help them adapt to the impacts of climate change on forests and to contribute to multiple benefits such as biodiversity conservation, protection of the rights of indigenous peoples and local communities, poverty reduction and rural livelihoods enhancements. FIP finances efforts to address the underlying causes of deforestation and forest degradation and to overcome barriers that have hindered past efforts to do so.

3. The FIP was designed to achieve four specific objectives⁴¹: (i) initiate and facilitate steps towards transformational change in developing countries' forest related policies and practices; (ii) pilot replicable models to generate understanding and learning of the links between the implementation of forest-related investments, policies and measures and long-term emissions reductions from REDD-plus; (iii) facilitate the leveraging of additional financial resources for REDD, including through a possible UNFCCC forest mechanism; and (iv) provide valuable experience and feedback in the context of the UNFCCC deliberations on REDD.

4. To achieve these objectives, the FIP supports and promotes, inter alia, investments in the following areas: (a) institutional capacity, forest governance and information; (b) investments in forest mitigation measures, including forest ecosystem services; and (c) investments outside the forest sector necessary to reduce the pressure on forests.

B. The Brazil Investment Plan

5. **Overall objective.** The Brazil Investment Plan (BIP) under the FIP seeks to promote sustainable land use and forest management improvement in the Cerrado, the second largest biome in Brazil and South America, contributing to reducing pressure on the remaining forests, reducing GHG emissions and increasing CO₂ sequestration. It was approved by the FIP Sub-Committee in May 2012, agreeing to a range of funding for USD\$50-70 million in FIP resources.

⁴⁰ REDD-plus stands for "Reducing Emissions from Deforestation and forest Degradation, and the role of conservation, sustainable management of forests, and the enhancement of forest carbon stocks in developing countries". It is a policy mechanism being negotiated under the UNFCCC.

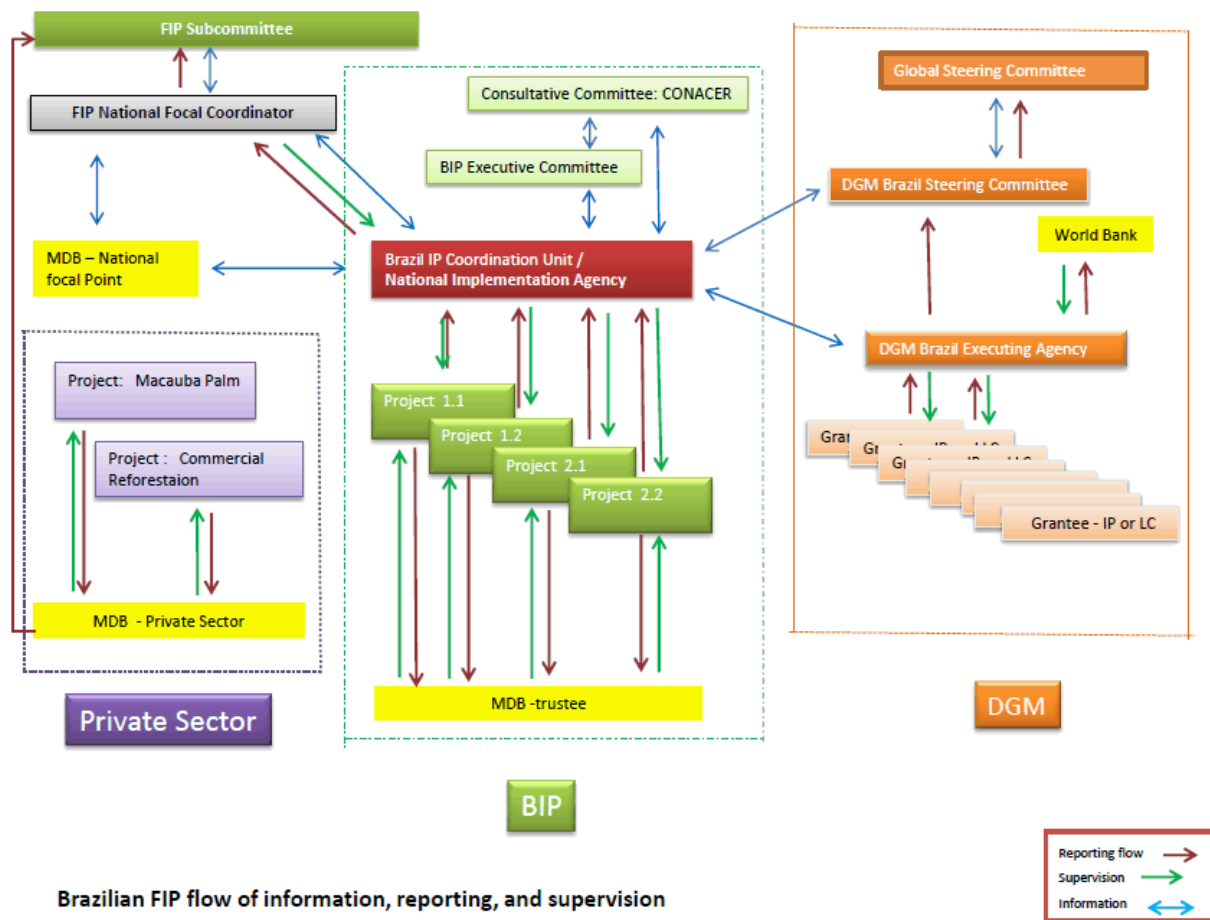
⁴¹ See FIP Design Document, available at: www.climateinvestmentfunds.org/cif/keydocuments/FIP

6. **Thematic areas.** BIP covers two thematic areas and includes four interrelated projects, as listed below. Theme 1: Management and Use of previously anthropized areas, aims at supporting producers in the biome comply with the Rural Environmental Cadaster (CAR) and access resources under the Low Carbon Emissions Agriculture (ABC) Plan. Theme 2: Production and Management of Forest Information, aims at generating and making available spatially and temporally consistent environmental information for the biome.

| Project and program concepts in the context of the Brazil Investment Plan (USD millions) | | | | | | |
|-------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|------|----------------------|-------|-----------------------|--------|
| Theme | Project Title | MDB | Requested FIP amount | | Expected co-financing | TOTAL |
| | | | Grants | Loan | | |
| Theme 1 – Management and Use of previously anthropized areas | 1.1- Environmental regularization of rural lands (based on the CAR). | IBRD | 1.00 | 32.48 | 17.50 | 50.98 |
| | 1.2- Sustainable production in areas previously converted to agricultural use (based on the ABC Plan). | IBRD | 10.72 | 0 | 25.00 | 35.72 |
| Theme 2 – Production and Management of Forest Information | 2.1- Forest information to support public and private sectors in managing initiatives focused on conservation and valorization of forest resources. | IDB | 16.55 | 0 | 8.00 | 24.55 |
| | 2.2- Implementation of an early-warning system for preventing forest fires and a system for monitoring the vegetation cover. | IBRD | 9.25 | 0 | 6.50 | 15.75 |
| TOTAL | | | 37.52 | 32.48 | 57.00 | 127.00 |

7. **BIP coordination, monitoring and reporting.** At the national level, the Secretariat of International Affairs of the Ministry of Finance (MF/SAIN) will play the role of FIP National Focal Coordinator. The National Commission for the Sustainable Cerrado Program (CONACER)--which promotes the integration of programs, projects and sector policies related to the Cerrado biome--will also work as the Advisory Committee for FIP. The BIP Executive Committee shall be responsible for coordination of the various ministries involved in implementing the program as well as the coordination with other government programs. The Executive Committee will have representation from MMA, MAPA and MCTI. It will be in charge of aggregating information (including project and BIP indicators); informing CONACER on implementation progress and results; and providing feedback to all implementing agencies. This arrangement will make sure that the various project activities under the BIP will build on each other and are mutually synergistic. It will also ensure a coordinated M&E approach including BIP-level reporting, information sharing and knowledge management. The following diagram⁴² illustrates these flows:

⁴² These arrangements and the diagram are still under discussion. Definitive arrangements will be incorporated into the BIP Coordination component to be included in the Environmental regularization of rural lands project (under preparation).



8. **Relationship with the specific objectives of the FIP.** The BIP clearly complies with the four specific objectives of the FIP. It builds on existing climate change related policies and practices in Brazil and supports the instruments that guide federal and state financing policies in the land use sector, particularly the CAR, ABC Plan, and PPCerrado, overcoming key barriers to their implementation. As such, the BIP invests in replicable models that will catalyze transformational changes in the AFOLU sector in the Cerrado biome, generating new knowledge and building the foundations for leveraging additional financial resources under an eventual future REDD+ mechanism under the UNFCCC.

9. **Relationship with the FIP investment areas.** The BIP strategy mainly targets the following FIP investment areas: investments outside the forest sector necessary to reduce the pressure on forests, **including** agricultural intensification; and institutional capacity, forest management and information. As a complementary measure, the Plan 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 landholdings⁴³.

⁴³ See FIP Design Document, available at: www.climateinvestmentfunds.org/cif/keydocuments/FIP

10. **Relationship with the FIP results framework.** The results expected from the implementation of the BIP are: sustainable management adopted in previously converted areas; 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; capacity for tackling the immediate and underlying causes of deforestation and increased degradation; new and additional resources for forests and projects related to forests; Incorporation of learning through the development of stakeholders thoroughly familiar with REDD-plus. The BIP therefore is fully consistent with and well in place to contribute to the FIP results framework at the programmatic level⁴⁴.

C. Project Relationship with BIP and FIP Investment Criteria

11. **Project Relationship with the BIP.** The project, together with a wider set of related initiatives and resources promoted by the Government of Brazil, seeks to contribute to the success of the broader adoption of the ABC Plan by rural landholdings in the Cerrado, with a view to reduce GHG emissions from agriculture, while also contributing to the consolidation of the agricultural frontier in the biome by reducing pressure on remaining forests. It is thus fully in line with the overall objective of the BIP, and falls under theme (1) Management and use of previously anthropized areas. The Results Framework of the project will be integrated at the Program (BIP) level contributing to the annual reporting requirements under the FIP.

12. One important contribution of the project to transformational impact arises from the synergies that will be generated between the ABC Plan and the Rural Environmental Registry (CAR)⁴⁵. Together, these programs will allow landowners to access the technical and financial support provided by the ABC Plan and other sources, which will enable them to use land in a more sustainable manner. In doing so, the Project will generate the conditions for addressing one of the major underlying drivers of deforestation in the Cerrado and globally, i.e. reducing the demand for additional land to accommodate agriculture and livestock activities by generating increases in productivity rather than increases in area expansion. Therefore, the Project is also expected to contribute to the objectives of the PPCerrado program, which is to support the national target of reducing deforestation in the Cerrado by 40% compared to the 1999-2008 average by 2020. This will be monitored through the projects included in Theme 2 of the BIP (Production and management of forest information), which will contribute largely to the improvement and institutionalization of systematic monitoring of Cerrado vegetation, providing more consistent information on forest carbon stocks and emissions from deforestation and forest degradation. Another contribution of the Project to transformational impact is that the training and dissemination materials and tools successfully deployed in the Cerrado will be used by MAPA to increase and strengthen its range of action to promote broader access to the ABC Plan in all other regions of Brazil. Thus, it will contribute to expand the adoption of low carbon emissions agriculture in the whole country.

13. **Project Relationship with the Brazil Dedicated Grant Mechanism.** Although the project will focus solely on private farms, it will have synergies and complementarity with the

⁴⁴ See FIP Results Framework, available at: www.climateinvestmentfunds.org/cif/keydocuments/FIP

⁴⁵ The regularization of rural properties under the CAR in 57 municipalities in the Cerrado is supported by a separate, but related FIP-financed and Bank-administered Environmental Regularization of Rural Lands (based upon the CAR) project (under preparation).

Dedicated Grant Mechanism for Indigenous Peoples and Local Communities (BR-DGM, under preparation). The main objectives of the BR-DGM are to improve the sustainability and adaptive capacity of the livelihoods of indigenous peoples and traditional communities located in the Cerrado biome and to render them more resilient to anthropogenic pressures and climate change they face. The information available shows that indigenous peoples and traditional communities in the Cerrado face external and internal pressures that have compromised their traditional and low impact livelihoods as well as cost-effective conservation strategies. These pressures are threefold: (i) those arising from land uses outside their traditional territories, such as the expansion of monoculture cultivation, intensive cattle ranching and urbanization; (ii) those arising from the extraction of resources within their traditional territories by encroachers, such as logging, hunting, and prospecting for mineral wealth; and, (iii) those arising from the over exploitation of resources by the proper indigenous peoples and local inhabitants due to demographic growth, which increases the subsistence and commercialization needs. While the BR-DGM is being designed to address mostly the internal pressures faced by indigenous peoples and traditional communities, improving their livelihoods, coping and adaptive strategies, the Project will make a needed contribution to reduce external pressures arising from land uses outside their traditional territories. Its activities will lead to the adoption of selected sustainable low carbon emissions agricultural technologies by mid-sized producers in the Cerrado, the conversion of areas already legally occupied by the agro-business to low carbon emissions agriculture, the reduction of the environmental footprint of agro-business expansion and its pressure over forests and territories traditionally occupied by Indigenous Peoples and Local Communities. Additionally and insofar as its activities may reach farming areas surrounding indigenous lands, the project may lead to positive co-benefits for indigenous peoples as it might contribute to address some of the main concerns related with agricultural development that have been often voiced by indigenous peoples and traditional communities in the Cerrado, by reducing the pressure for converting new native forest areas and contributing for (i) the protection of headwaters and riparian zones, (ii) the improvement of the physical, chemical and biological conditions of the soil, and (iii) the better conservation of natural resources on which Indigenous Peoples' livelihoods rely.

14. **Project Relationship with the FIP investment criteria.** The project targets mainly the following FIP investment area: investments outside the forest sector necessary to reduce the pressure on forests, which includes agricultural intensification. It fully complies with the FIP investment criteria, as illustrated below⁴⁶:

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| <p><i>Climate change mitigation potential</i></p> | <p>The low carbon technologies promoted by the project have a proven effect on generating GHG emissions reductions in the agriculture sector, in particular through soil carbon sequestration. This is particularly important for the Cerrado biome, where soil organic carbon represents the most substantial carbon pool (estimated to account for up to 70% of total carbon stocks per hectare). Therefore, small changes in the soil organic carbon pool in the Cerrado could have dramatic impacts on the concentration of CO₂ in the atmosphere. Significant amounts of this carbon are emitted when forests are converted to cropland and pastures, while additional amounts are further released by the subsequent application of unsustainable land management practices. In 2010, the area deforested in the Cerrado was similar to the area deforested in the Amazon (6,400 km²), though representing a higher percentage in relative terms (0.32% vs. 0.15% respectively). Although deforestation in both biomes is on a declining trend, this situation could be reversed if current policy frameworks are not maintained and</p> |
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⁴⁶ See FIP Investment Criteria and Financing Modalities, available at: www.climateinvestmentfunds.org/cif/keydocuments/FIP

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| | <p>adequately enforced, as seen by the recent 28 percent increase in deforestation in the Brazilian Amazon over the last year⁴⁷.</p> <p>By increasing the adoption rate of ABC technologies in the Cerrado, the project will make a direct contribution to carbon sequestration in the Cerrado soils through the widespread expansion of improved agricultural practices, while also contributing to the stabilization of the agricultural frontier through increased productivity gains in existing lands. The WB Brazil Low Carbon study⁴⁸ concluded that reducing the main source of emissions in the country, deforestation, would require freeing up enough land from existing pastures to accommodate all new baseline activities, thus avoiding the conversion of additional native vegetation. According to the study's estimates, reducing deforestation through the recovery and renewal of pastures could account for 53 percent of Brazil's total potential emissions reduction over the 2010-2030 period, representing 6 billion tCO_{2e}, while increasing no-tillage cropping and expanding reforestation activities could account for 3% and 10% of the potential reductions, estimated at 355 and 1,000 million tCO_{2e} respectively. Preliminary estimates produced for this PAD indicate that the potential GHG mitigation potential of the project is in the order of 4.6 MtCO_{2e} when considering only the direct GHG emissions reductions generated through the application of improved agricultural practices⁴⁹.</p> |
| Demonstration potential at scale | <p>The project focuses on the Cerrado region, given its advanced stage of anthropization and the need to conserve its remaining natural areas. Agricultural activity is set to continue to increase in the Cerrado, given that it still possesses large areas with agricultural and forestry potential. The project will generate transformational impact by acting synergistically with project 1.1 of the BIP, which supports the regularization of rural lands in the Cerrado under the CAR. Together, these two projects will allow landowners to access the technical and financial support provided by the ABC Plan and other sources, which will enable them to use land in a more sustainable manner. In doing so, the project will generate the conditions for addressing one of the major underlying drivers of deforestation in the Cerrado and globally, i.e. reducing the demand for additional land to accommodate agriculture and livestock activities by generating increases in productivity rather than increases in area expansion. Another contribution of the project to transformational impact is that the training and dissemination materials and tools successfully deployed in the Cerrado by the project will be used by MAPA to promote broader access to the ABC Plan in all other regions of Brazil. Thus, it will contribute to expand the adoption of low carbon emissions agriculture in Brazil.</p> |
| Cost-effectiveness | <p>Based on the GHG estimates developed for this PAD, and considering only the direct GHG impacts of the project from 2014 to 2020, the cost-effectiveness is estimated at 2.56 US\$/tCO_{2e}. If these GHG impacts would be sustained over the following 10 years (from 2021 to 2030), then the cost per tCO_{2e} saved would only be 0.67 US\$/tCO_{2e}. This amount represents only the training and technical assistance costs related to project implementation though, and not the full cost of adopting the ABC Plan technologies. The economic analysis shows that the ABC Plan technologies are economically and financially feasible and attractive (compared to conventional technologies) and economically and environmentally sustainable. In addition, the World Bank Brazil Low Carbon Study (2010) estimated that at a social discount rate of 8%, pasture renewal and no tillage cropping had a marginal abatement cost of 0 US\$/tCO_{2e}. In other words, the economic net cost of reducing emissions per tCO₂ through these two technologies would be negligible.</p> <p>The main financial instrument of the ABC Plan is the provision of a differentiated credit line to assist farmers convert their conventional agricultural practices to the technologies promoted by the Plan. The total volume of funds to be allocated to the ABC Plan between 2011 and 2020 is R\$197 billion (approx. US\$90 billion). By helping farmers accessing the ABC credit line, thus, the project has the potential to leverage significant additional financial resources</p> |

⁴⁷ Based on data published by PRODES, accessed December 2013. See also: Nepstad et al., 2013. Why is Amazon deforestation rising? available at mongabay.com. Data on the Cerrado biome were available only up to 2010.

⁴⁸ Gouvello, C., B. Soares-Filho, A. Nassar, R. Schaeffer, F. Jorge, and W. Nogueira. 2010. Brazil Low-carbon Country Case Study. Washington, DC: World Bank.

⁴⁹ For a detailed description of these estimates see paragraph 19 of Annex 6.

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| | while providing continuity to the activities promoted by the project. |
| Implementation potential | <p>Although Brazil does not participate in the FCPF or UN-REDD programs, the actions supported by the project are fully in line with Brazil’s National Climate Change Policy (NPCC), which guides domestic policy operations with regards to climate change. The Sector Plan for the Mitigation and Adaptation of Climate Change for a Low Carbon Emissions Agriculture (the ABC Plan), is one of the sector plans stipulated by the NPCC in order to consolidate a low carbon economy and reach the voluntary mitigation targets announced by the policy. As such, it is expected to make a positive contribution to the country’s current REDD-plus efforts⁵⁰.</p> <p>The project has established clear institutional and implementation arrangements. MAPA has delegated the FIP grant to be managed and implemented by SENAR under a specific Cooperation Agreement. SENAR has twenty years of experience in planning, carrying out and supervising training programs and education of rural professionals in Brazil, including large and small producers, extension, technicians and technical assistance staff, etc. It works under high standards of governance and under close scrutiny of auditors. EMBRAPA will support SENAR at the technical level and train instructors and technicians in ABC Plan technologies and control the quality of the technology adoption. A tripartite Project Monitoring Committee (PMC composed of MAPA, EMBRAPA and SENAR) will accompany overall project implementation. Detailed implementation arrangements are provided in Annex 3. If the dissemination and training program promoted by the project is considered successful, SENAR and MAPA have the necessary budget to ensure continuity of the project activities.</p> |
| Integrating sustainable development (co-benefits) | <p>The project is expected to generate several environmental, socio-economic, and institutional co-benefits, as described below. These are likely to be limited due to the small scale of the project compared to the size of the Cerrado biome, though are indicative of the nature of co-benefits that could be achieved through large-scale implementation of the ABC program supported by the transformational impacts of the project.</p> <p><i>Environmental:</i> a) reduced GHG emissions and increased carbon sequestration from soil conservation and sustainable land management practices applied in the agriculture sector in the Cerrado; b) reduced pressure for the conversion of new native forest areas to agricultural use, thereby protecting existing biodiversity and ecosystem services; c) reduction of erosion on cultivated land; d) increase in rainwater infiltration; e) improvement of the physical, chemical and biological conditions of the soil; f) reduced incidence of fires.</p> <p><i>Socio-economic:</i> a) decrease in production costs and consequent increase in landholdings’ income through increased productivity gains; b) increased job creation through the application of more labor intensive technologies; c) increased capacity and knowledge retained at the farmer level for the application of improved agricultural land use management practices and production systems.</p> <p><i>Institutional:</i> a) enhanced efficiency and management of the ABC Plan nationwide, as well as monitoring and evaluation of its implementation; b) the project will also support other actions such as fine-tuning the recommended technologies, undertaking studies focused on improving the operational and economic/financial efficiency of the ABC Plan from both the producer and social standpoints.</p> |
| Safeguards | <p>The project has been publicly submitted for the consideration of a diverse range of stakeholders (including representatives of the private sector, academia, NGOs, social movements and State environmental agencies, as well as indigenous peoples and traditional communities) as part of the BIP design, in line with Annex III of the FIP Design Document. The project is expected to have an overall positive impact as it seeks to reduce the negative effects of agricultural activities on the environment mainly through capacity-building and rural extension activities. Potentially adverse social and environmental impacts are expected to be small, and they can be avoided or minimized through mitigation measures. As such, the project prepared an environmental and social management framework (ESMF) to assess any</p> |

⁵⁰ For detailed information on REDD-plus background in Brazil, refer to Annex 6, E

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| | <p>potential issues that could arise during project implementation and guide the application of World Bank Safeguard Policies. The ESMF contains a detailed description of the potential environmental impacts of project activities and supported production methodologies, particularly regarding natural habitats, forest resources and pest management, and identify preventive/corrective measures. It also addresses the distributive impacts of the project as well as gender-related issues and include an analysis of any economic or social impact that project activities might have on vulnerable groups, traditional communities or poor rural dwellers. The application of World Bank Safeguards Policies through the ESMF should be sufficient to promote and support the REDD-plus safeguards agreed in Cancun under the UNFCCC (Decision 1/CP.16, appendix I), as noted in a recent note by the Facility Management Team of the FCPF⁵¹. Detailed information on the safeguards to be applied to the project are provided in sections VI-E and VI-F of the PAD.</p> |
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D. Climate change mitigation potential

15. **Greenhouse** gas emissions from both land use change activities and agriculture are large in Brazil. In 2005, 57% of national GHG emissions originated from the LUCF sector, and 20% from agriculture⁵². However, the sharp declines in the rates of deforestation (particularly in the Amazon) in recent years are changing the role of the LUCF sector in the country's overall GHG profile. Recent estimates from the MCTI suggest a substantial decrease in Brazil's GHG emissions in 2010 (1,246 MtCO₂e, compared to 2,032 MtCO₂e in 2005), with agriculture becoming the country's main source of GHG emissions (35%), followed by the energy (32%) and the LUCF (22%) sectors⁵³. In 2010, agricultural emissions in Brazil were mainly due to enteric fermentation (56%) and agricultural soils (35%), and to a lesser extent due to animal waste management (5%), rice cultivation (2%) and burning of agricultural residues (1.5%).

16. From a climate perspective, the Cerrado forests are important due to the substantial carbon stored in its biomass and soils. The structural diversity of vegetation types in the Cerrado involves a wide spectrum of total biomass amounts. However, the organic matter in the soil represents the most substantial carbon stock in the biome, as shown by Abdala (1993) in his study of carbon stocks in different segments of a typical Cerrado area. The total estimated carbon stock amounts to 265 Mg/ha, with soil organic matter comprising 70% (185 Mg/ha), when considering the vegetation and the soil up to 1m depth. In a meta-analysis made by Don et al. (2011) using data from land use in the tropics, the highest soil organic carbon (SOC) losses were caused by conversion of primary forest into cropland (-25%) and perennial crops (-30%), while conversion into grassland also reduced SOC by 12%. The subsequent application of unsustainable land management practices leads to further degradation of soil carbon stocks. Data from EMBRAPA illustrate that the difference in SOC stocks between degraded and restored pastures can be significant (21.5 vs. 101.7 tC/ha, respectively). Therefore, small changes in the soil organic carbon pool in the Cerrado could have dramatic impacts on the concentration of CO₂ in the atmosphere.

17. In relative terms, deforestation in the Cerrado is more severe than in the Amazon. During the 2002-2008 period, Amazon deforestation represented 3.2% of the area of the biome (18,954 km²/yr), with 82% of the original forested area remaining, while over the same period the

⁵¹ FMT Note CF-2013-3 "World Bank Safeguard Policies and the UNFCCC REDD+ Safeguards". August 28, 2013. Available at: <https://www.forestcarbonpartnership.org>

⁵² Second National Communication to the UNFCCC. Available at: www.mcti.gov.br/index.php/content/view/326984.html#lista

⁵³ Ministério da Ciência, Tecnologia e Inovação (MCTI), 2013. Estimativas anuais de emissões de gases de efeito estufa no Brasil. Available at: <http://gvc.es.com.br/arquivos/177/EstimativasClima.pdf>

Cerrado biome lost 4.1% of its cover (14,200 km²/yr), and only 52% of the area covered by native vegetation remains (around 1 million km²). Deforestation however is on a declining trend in both biomes, in absolute terms; in 2010, the area deforested in the Cerrado was similar to the area deforested in the Amazon (6,400 km²), though still representing a higher percentage in relative terms (0.32% in the Cerrado vs. 0.15% in the Amazon).

18. Emissions in the Cerrado accounted for 22% of the total LUCF sector emissions in Brazil in 2005, compared to 50.3% in the Amazon. The relative contribution of the Cerrado however has increased since then, given that since 2005 deforestation levels in the Amazon have fallen more steeply than in the Cerrado. In 2010, emissions in the Cerrado accounted for 39% of total LUCF sector, compared to 50% in the Amazon.

19. The Brazil Low carbon study conducted by the World Bank in 2010⁵⁴, concluded that reducing the main source of emissions in the country, deforestation, would require freeing up enough land from existing pastures to accommodate all new activities, thus avoiding the conversion of native vegetation (provided it is accompanied by complementary policies and measures). Increased carrying-capacity rates associated with greater herd productivity as a combined effect of the recovery of degraded areas and the adoption of more intensive livestock stocking and finishing systems (integration of crop-livestock systems and feedlots) would result in an accentuated reduction in demand for land, projected at about 137.82 million ha in the low-carbon scenario, compared to 207.06 million ha in the reference scenario for the year 2030. The difference (69 Mha) would be sufficient to absorb the demand for additional land associated with both expansion of agriculture and livestock activities in the reference scenario, as well as the expansion of mitigation and carbon uptake activities in the low-carbon scenario.

20. The study's model-based projections indicate that under the low-carbon scenario, deforestation would be reduced by more than two-thirds (68%) compared to the reference scenario, with the Cerrado region seeing reductions of up to 65%. According to the study's estimates, reducing deforestation through the recovery and renewal of pastures could account for 53 percent of Brazil's total potential emissions reduction over the 2010-2030 period, representing 6 billion tCO_{2e}, while increasing no-tillage cropping and expanding reforestation activities could account for 3% and 10% of the potential reductions, estimated at 355 and 1,000 million tCO_{2e} respectively.

21. In line with the WB Low carbon study, the ABC Plan supported by the current project aims to help meet agricultural development needs in the Cerrado by increasing productivity through low-carbon emissions techniques (e.g. livestock intensification, no-till agriculture, crop-livestock integration, etc.). As such, the project is expected to result in direct GHG emissions reductions mainly from the agriculture and land use sectors. The project is also expected to contribute to reducing the pressure for converting new forest areas into agricultural use, to the extent to which some of the baseline demand for land will be met through increases in productivity (i.e. higher yields per ha) rather than an expansion in cultivated areas. Such indirect REDD-plus impacts however will also depend on a range of external factors (e.g. market demand, commodity prices, effectiveness of enforcement, etc.), as well as from the synergistic effect of a number of other related policies and programs in the land use sector, including other BIP project components.

⁵⁴ Gouvello, C., B. Soares-Filho, A. Nassar, R. Schaeffer, F. Jorge, and W. Nogueira. 2010. Brazil Low-carbon Country Case Study. Washington, DC: World Bank.

22. The table below indicates the potential direct GHG emissions reductions generated by the project through the adoption of ABC technologies by participating producers. It represents the potential contribution of the project to the Government of Brazil's related objectives to 2020, based on the reference levels and mitigation targets outlined in the National Climate Change Policy.

| ABC Plan technologies | Agriculture objective to 2020 ⁵⁵ | | Potential direct project contribution ⁵⁶ | |
|--------------------------------------|---------------------------------------------|------------------------------------|-----------------------------------------------------|--------------------------------|
| | Area (Mha) | MtCO ₂ _{eq/vr} | Area (ha) | tCO ₂ _{eq} |
| 1. Recovery of degraded pasture land | 15.0 | 104.0 | 450,000 | 3,120,000 |
| 2. Crop-livestock-forest integration | 4.0 | 22.0 | 117,000 | 572,000 |
| 3. No-tillage farming system | 8.0 | 20.0 | 243,000 | 643,500 |
| 4. Cultivated commercial forests | 3.0 | 10.0 | 90,000 | 300,000 |
| 5. Biological nitrogen fixation | 5.5 | 10.0 | n/a | n/a |
| 6. Treatment of animal waste | 4.4 (M m ³) | 7.0 | n/a | n/a |
| Total | 35.5 | 173 | 900,000 | 4,635,500 |

Assumption: the direct project contribution is proportional to the agricultural objective.

23. The indirect impacts of agricultural intensification on REDD-plus through land sparing (i.e. a reduction in the demand for cultivated areas), continues to be a subject of debate⁵⁷. In short, despite theoretical claims that an increase in productivity per hectare in existing cultivated areas can help limit agricultural expansion (also known as the Borlaug hypothesis), recent empirical evidence has shown little support for it⁵⁸. Rather, the evidence seems to indicate that the nature of impacts depends greatly on a number of external factors. In fact, an improvement in the profitability of agriculture in places with abundant labor and accessible forestland, under conditions of global markets and elastic demand, might even lead to opposite outcomes (i.e. a phenomenon known as the rebound effect). Thus, while an increased yield per hectare might be a necessary condition for sparing land, it does not in itself constitute a sufficient condition for success, and needs to be accompanied by additional, complimentary policies and measures. Some of the measures that have been suggested, include: harmonizing sector public policies, adopting the payment for environmental services principle, and acting on global demand, among others (Pirard et al., 2012). Brazil's ABC plan shows a strong policy alignment with broader government plans including climate, agricultural and overarching sustainable development strategies (including the PPCerrado and the Forest Code), and forms an integral part of GoB's strategic approach for meeting its voluntary GHG reduction commitments under the NPCC. As such, it is expected to make a positive contribution to the country's REDD-plus efforts. By evaluating the effect of the adoption of the ABC technologies on farmers'

⁵⁵ See Annex II of Copenhagen Accord: Nationally Appropriate Mitigation Actions (NAMAs) by developing countries. Available at: http://unfccc.int/meetings/cop_15/copenhagen_accord/items/5265.php

⁵⁶ Assumptions regarding adoption rates are based on the Economic analysis: 10% adoption rate of the 10,000 trainees on at least 800 ha of their property, resulting in 800,000 ha of land under ABC Plan technologies. The type of technological adoptions is assumed to be according to the objectives of the Brazilian government.

⁵⁷ For a recent overview on the matter, see Pirard et al., 2012. Agriculture and deforestation: is REDD+ rooted in evidence? Forest Policy and Economics 21 (2012) 62-70. For a comprehensive review, see Angelsen, A., Kaimowitz, D. (Eds.), 2001. Agricultural Technologies and Tropical Deforestation. CABI Publishing, New York.

⁵⁸ For example, see: Rudel et al., 2009. Agricultural intensification and changes in cultivated areas, 1970–2005. PNAS 106 (49), 20675–20680; and Ewers et al., 2009. Do increases in agricultural yield spare land for nature? Global Change Biology 15, 1716–1726.

perceptions on future land use management, the project is also well placed to make a valuable contribution to the broader land sparing debate.

24. The table below provides an estimate of the project’s potential indirect REDD-plus impacts, for illustrative reasons based on a number of assumptions. Providing such an ex-ante estimation is highly uncertain, due to a variety of reasons: i) REDD-plus is an indirect impact of the project expected to occur based on the land sparing effect, as discussed above, thus requiring the use of proxy indicators (e.g. hectares under ABC Plan technologies) ii) it requires making a number of assumptions with low scientific certainty (e.g. land sparing ratio) iii) the specific areas of intervention (i.e. farms) will be defined during project implementation, therefore limiting the possibility of establishing pre-defined baselines (i.e. site specific deforestation rates and carbon stocks); iv) the timeframe of the project is most likely too short in order to generate any observable REDD-plus outcomes (there is a time lag between the adoption of ABC Plan technologies and the generation of productivity increases leading to land sparing, which goes beyond project implementation); v) it assumes a closed system with no leakage; and vi) the attribution of any ex-post REDD-plus outcomes solely to the project’s activities is highly complex given the large numbers of external factors involved that fall outside the control of the project, and the synergistic contribution of complementary policies and programs that would be needed to support these results. Therefore, the numbers below should be considered as indicative.

| ABC Plan technologies | Potential indirect project contribution to REDD-plus | |
|---------------------------------------------------|------------------------------------------------------|-----------------------------------|
| | Area spared (ha) ¹ | MtCO _{2-eq} ⁶ |
| 1. Recovery of degraded pasture land ² | 80,000 | 12.4 |
| 2. Crop-livestock-forest integration ³ | 29,250 | 4.53 |
| 3. No-tillage farming system | 12,150 | 1.88 |
| 4. Cultivated commercial forests ⁵ | 45,000 | 2.58 |
| 5. Biological nitrogen fixation | n/a | n/a |
| 6. Treatment of animal waste | n/a | n/a |
| Total | 166,400 | 21.39 |

Assumptions:

(1) The area is calculated based on a land sparing ratio of 0.5, based on Table 3.5 of the Brazil Low Carbon Study. This is a mid-range between the 1.0 ratio assumed by Strassburg et al.’s Land Neutral Agricultural Expansion⁵⁹, and the ~0.1 ratio found by Ewers et al.’s review⁶⁰.

(2) Productivity increase of animal units from 0.4 per ha to 0.6 per ha and increase of weight of 450 to 500 kg per animal. This is conservative given that EMBRAPA estimates of productivity increase can reach up to 1 unit per ha.

(3) Half of the converted land area is used to plant additional cropland, while maintaining livestock productivity in a quarter of the original land. The rest of the quarter is devoted to forestry, not accounted here.

(4) 10% increase in productivity in the long term (reduced fertilizer use is not accounted)

(5) Commercial production forest, leading to avoided forest degradation from the iron & steel industry (25% avoided loss of original carbon stocks, based on Asner et al., 2005)

(6) Emission factor includes above and below ground biomass, as reported for the Cerrado in Brazil’s Second National Communication to the UNFCCC (simple average of the different strata), subtracting carbon stocks of grassland as replacement vegetation. Soil carbon is not included as baseline deforestation activity is pasture (based on VCS project boundaries standard). Value used: 155 tCO₂/ha.

⁵⁹ Strassburg et al., 2012. Increasing agricultural output while avoiding deforestation – a case study for Mato Grosso, Brazil. International Institute for Sustainability.

⁶⁰ Ewers et al., 2009. Do increases in agricultural yield spare land for nature? *Global Change Biology* 15, 1716–1726.

E. REDD-plus background in Brazil

25. Brazil's commitment with respect to climate change has been constant since 1992, when the country hosted the United Nations Conference on Environmental and Development in Rio. In the context of the 15th Conference of the Parties to the UNFCCC in Copenhagen in 2009, Brazil voluntarily committed to a GHG emissions reduction target between 36.1% and 38.9% of projected emissions by 2020, implying a reduction in emissions of around 1.2 billion tCO_{2eq}⁶¹. Shortly thereafter, Brazil instituted this goal in Law N^o. 12,187, December 2009, establishing the National Policy on Climate Change (NPCC). The NPCC, which includes the National Plan as one of its instruments, defines the objectives and guidelines for domestic operations in Brazil for dealing with climate change, and is the main reference points for Brazil's REDD+ type actions.

26. The set of mitigation actions stipulated by the NPCC to achieve its targets include reducing the rates of deforestation by biome, and initiating alternative processes in the agricultural, energy and steel manufacturing sectors. Decree No. 7,390, December 2010, which regulates the NPCC, establishes specific targets for reducing GHG emissions, such as: (i) 80% reduction of deforestation in Amazon compared to the 1996-2005 average (19,535 km²/yr); (ii) 40% reduction of deforestation in the Cerrado compared to the 1999-2008 average (15,700 km²/yr); (iii) recovery of 15 million ha of degraded pastures, (iv) expansion crop, livestock and forestry integrated systems in 4 million ha, (v) expansion of no-tillage farming systems in 8 million ha, (vi) expansion of planted commercial forests in 3 million ha, (vii) increase in 4.4 million m³ the treatment of animal waste and (viii) increased use of charcoal from planted forests in steelmaking.

27. The instruments stipulated by the NPCC for reducing deforestation build on the previous work under the Action Plan for the Protection and Control of Deforestation in the Legal Amazon (PPCDAm), and stipulate the launch of a new plan focused on the Cerrado region: the Action Plan to Prevent and Control Deforestation and Fires in the Cerrado Biome (PPCerrado). The PPCDAm, launched in March 2004, aims to promote the reduction of deforestation in the Amazon by focusing on land and territorial planning, monitoring, control and sustainable production activities. The PPCerrado, launched in September 2010, aims to promote sustained reduction in the rate of deforestation and forest degradation (including fires) in the biome by improving monitoring and control capabilities of federal agencies, while promoting the regularization of rural properties, sustainable production activities, and the restoration of degraded lands⁶².

28. Complementary to these plans, 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 farmers to preserve the most fragile areas of their property (Permanent Preservation Areas – APP), with an additional obligation to ensure that part of the original native vegetation is maintained (Legal Reserves –RL). The amendments made recently (2012) to the Forest Code involve the creation of the Rural Environmental Cadastre (CAR), which sets a deadline for

⁶¹ See Annex II of Copenhagen Accord: Nationally Appropriate Mitigation Actions (NAMAs) by developing countries. Available at: http://unfccc.int/meetings/cop_15/copenhagen_accord/items/5265.php

⁶² The PPCerrado is supported by a separate, but related, Bank-executed project as part of the Brazil Investment Plan under the FIP

farmers to register APPs and RLs 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; and currently over half of Brazilian properties (about 2.5 million farmers) are thought to be illegal⁶³. Compliance with the environmental legislation in the Forest Code is a prerequisite for small and medium producers to access rural credit available in the ABC Program.

29. In 2009 Brazil launched a program to promote environmental compliance by owners of private farmland as a cornerstone for improving land use practices. The Federal Program of Support to the Environmental Regularization of Rural Properties (*Programa Mais Ambiente*) aimed to ensure environmental compliance in rural properties and land occupied by squatters. The Program offered an opportunity for landowners and squatters to regularize the legal status of their properties in the event of having deforested land over and above the size of areas permitted by Law (Legal Reserves, RL), or of failing to maintain Areas of Permanent Preservation (APPs). Smallholders, land reform settlers, family farmers and traditional peoples/communities have been special beneficiaries of the Program, and received, free of charge, government support to restore the degraded APPs and RLs on their lands, through technical assistance, environmental education, provision of seeds/seedlings and appropriate training. All this was intended to help farmers generate employment and income, especially for small-scale family settlements and traditional populations, and keep local economies running. Decree 7.029, which stipulated the Mais Ambiente Program, has been superseded by the new Forest Code and Decree 7830, which regulates the CAR and establishes general rules for the Environmental Regularization Programs.

30. In addition to these plans, the NPCC also provides for the preparation of sectoral plans for mitigating and adapting to climate change, with a view to consolidate a low carbon economy and meeting the national voluntary commitments announced under its policy. As part of the objectives of reducing GHG emissions, some of these sector plans are also expected to make a direct or indirect contribution to reducing deforestation and increasing the value of standing forests. The Sector Plan for the Mitigation and Adaptation of Climate Change for a Low Carbon Emission Agriculture (ABC Plan), for example, seeks to ensure continuous and sustainable improvement of management practices which reduce greenhouse gas emissions and enhance atmospheric CO₂ uptake on vegetation and land used by the Brazilian farming sector. The plan is expected to help reduce pressure on forests by promoting greater productivity of existing agricultural systems, sustainable management practices and recovery of degraded areas.

31. The NPCC also provides financial mechanisms aimed at supporting the implementation of the planned initiatives. The Amazon Fund (*Fundo Amazônia*), launched in August 2008, shows that Brazil is a pioneer at world level in the development of mechanisms to support actions aimed at REDD-plus in developing countries. The Amazon Fund is a financial instrument aimed at raising grant funds, in Brazil and abroad, to help maintain the reduction of GHG emissions from deforestation in the Amazon. This initiative is a result of the Brazilian proposal to provide positive incentives for reducing deforestation emissions in developing countries presented at the 12th UNFCCC CoP, held in Nairobi in 2006. In 2008, Norway, which had already committed USD 244 million, announced its intention to contribute a total of

⁶³ The regularization of rural properties under the CAR in 47 municipalities in the Cerrado is supported by a separate, but related, Bank-executed project as part of the Brazil Investment Plan under the FIP.

USD 1 billion to the Amazon Fund. In December 2010, a new financial contribution worth EUR 21 million was received from the Federal Republic of Germany.

32. The National Fund on Climate Change was established to secure resources to support projects and studies aimed at climate change mitigation and adaptation to its effects. The Fund's income derives from 60% of the tax on crude oil production and sales designated to the Ministry of the Environment (MMA). This is an innovative financial arrangement in developing countries. In the first two years of its implementation, the initial budget was BRL 620 million (approximately USD 355 million). Of this total, BRL 560 million is from loans destined to the production sector, managed by the BNDES. The remaining BRL 60 million will be managed and invested by the MMA, and could be transferred to States, municipalities research institutions and non-governmental institutions on the basis of cooperation agreements and contracts. The Fund has already had projects approved in areas of sustainable forest management to the region of Caatinga. This year, the Fund will support the development of environmental management plans for Indigenous Lands in Caatinga and Cerrado, as well as more projects dealing with sustainable forest management in the region of Caatinga. Those target areas are the ones susceptible to desertification.

33. Brazil is not a member of the Forest Carbon Partnership Facility (FCPF) or the UN-REDD program. Nonetheless, the actions proposed under the BIP are a sub-set of the Brazil's National Climate Change Plan and are consistent with activities being considered under those two international initiatives, as well as under the REDD-plus mechanism under the UNFCCC.

34. The country is currently in the process of finalizing the assembly of all its existing initiatives around a National REDD-plus Strategy (ENREDD, for its acronyms in Portuguese)⁶⁴. Since June 2010, the MMA launched a participatory process where about 150 actors contributed with recommendations, summarized in the "Document summarizing recommendations of multiple actors to prepare for the National Strategy on REDD+" available on the MMA's REDD-plus Portal⁶⁵. Since then, the draft ENREDD has been subject to discussion at the ministerial level as well as within the Executive Group of the Interministerial Commission.

⁶⁴ <http://www.mma.gov.br/informma/item/9053-em-defesa-da-amaz%C3%B4nia>

⁶⁵ <http://www.mma.gov.br/redd/>

