



1. Project Data

Project ID

P143184

Project Name

BR ABC Cerrado

Country

Brazil

Practice Area(Lead)

Environment, Natural Resources & the Blue Economy

L/C/TF Number(s)

TF-17368

Closing Date (Original)

20-Nov-2018

Total Project Cost (USD)

10,310,574.44

Bank Approval Date

18-Jul-2014

Closing Date (Actual)

20-Nov-2019

IBRD/IDA (USD)
Grants (USD)

Original Commitment

10,620,000.00

10,620,000.00

Revised Commitment

10,310,574.44

10,310,574.44

Actual

10,310,574.44

10,310,574.44

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2. Project Objectives and Components

a. Objectives

The Project Development Objective (PDO) of the Brazil Sustainable Production in Areas Previously Converted to Agricultural Use Project (ABC Cerrado Project) as stated in the Strategic Climate Fund Grant Agreement dated August 1, 2014 was "to promote the adoption of selected sustainable low carbon emissions agricultural technologies by mid-sized producers in the Cerrado Region" (GA, SCF-FIP GRANT No TF017368, page 5). The Project Appraisal Document (PAD) dated June 4, 2014 stated the same PDO (PAD, page 4, para 18). The PDO remained the same throughout project implementation. Hence, the



aforementioned PDO was adopted for the purpose of assessing the project's achievements in this Implementation Completion Report Review (ICRR).

It is important to note that the PAD was erroneously formatted, as it starts with paragraph 17 instead of 1, but then corrects the error starting from page 4 onwards. As a result, this ICRR refers to both page and paragraph number when citing the PAD.

b. Were the project objectives/key associated outcome targets revised during implementation?

No

c. Will a split evaluation be undertaken?

No

d. Components

The project area focused on the Cerrado biome, which is a “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 country” (PAD, para 18). It is of economic and environmental importance and experienced a “rapid expansion of cattle ranching, especially followed by the mechanized production of soybean” (ICR, para 2) which has driven deforestation. ABC technologies to be promoted based on the ABC Plan included (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, among others (PAD, page 5, para 22).

The ABC Cerrado Project had an experimental design comprised of three components, of which Components 1 and 2 were expected to generate two respective treatment groups: (i) Component 1: producers who received training on low carbon agricultural technologies, referred to as “ABC technologies” given its Portuguese acronym (Agricultura de Baixo Carbono) and (ii) Component 2: producers who received technical assistance on ABC technologies in addition to the training of Component 1. Additionally, information was collected from a control group.

Component 1: Producer Training (Appraisal estimate: US\$3.38 million; Actual cost at ICR: US\$2.82 million). This component aimed (i) to identify rural producers' and farm technicians' demand for low carbon emissions agricultural (ABC) technologies in nine of the eleven Cerrado States (Bahia, Distrito Federal, Goiás, Mato Grosso, Mato Grosso do Sul, Maranhão, Minas Gerais, Piauí e Tocantins). and (ii) to accordingly provide training in prioritized ABC technologies and farm management. To achieve this, key activities under Component 1 were divided into (i) support for the planning and preparation of dissemination events and training courses in the Cerrado States, including identification of demands, prioritized technologies and subregions, definition and preparation of training courses; (ii) a communication and dissemination campaign to inform potential stakeholders about the scope and rules of the ABC Plan, which had been developed in 2010 by Brazil's Ministry of Agriculture, Livestock and Food Supply (MAPA) and defined ABC technologies that were scientifically proven to be effective in reducing greenhouse gas (GHG) emissions and increasing carbon sequestration^[1] and to inform them also about the ABC Cerrado Project; and (iii) training to rural producers and farm technicians in ABC technologies and farm management (PAD, page 5, para 22 and ICR para 17). The training activities of Component 1 in the nine States were planned to make their beneficiaries the first treatment group in the Project's experimental design.



Component 2: Field Technical Assistance (Appraisal estimate: US\$5.46 million; Actual cost at ICR: US\$4.93 million). This component entailed the development and implementation of a technical assistance (TA) pilot project for selected rural producers located in four of the nine participating Cerrado States (Goiás, Tocantins, Mato Grosso do Sul and Minas Gerais). To achieve this, key activities under Component 1 were (i) the selection and training of technical supervisors and field technicians for the provision of technical assistance to rural producers on ABC Plan technologies, (ii) farm-specific technical assistance to rural producers on the implementation of ABC Plan technologies to selected farms; and (iii) the establishment of Technological Reference Units (URTs) in selected farms, as a basis for the dissemination of practical lessons learned and demonstration effects in the adoption of ABC Plan technologies to Project stakeholders (PAD, page 6, para 23 and ICR, para 18). The technical assistance activities of Component 2 were complementary to the training activities of Component 1 in these four States, making their beneficiaries the second treatment group in the project's experimental design.

Component 3: Project Management, Monitoring and Evaluation (Appraisal estimate: US\$2.29 million; Actual cost at ICR: US\$2.6 million). This component entailed the project implementation and coordination, as well as monitoring and evaluation (M&E) of project activities and impact based on its experimental design (PAD, page 6, para 24 and ICR para 19). According to the ICR (para 19), Component 3 also included activities on institutional learning and exchange of experiences among participants, as described in more detail under Efficacy.

[1] In 2010 Brazil's 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, known as the ABC Plan from its Portuguese acronym. According to the ICR (para 5), "the ABC Plan promoted the adoption by rural producers of six agricultural technologies that had been scientifically proven effective in reducing GHG emissions and increasing carbon sequestration, while also producing broader benefits than mitigation such as increased profitability and adaptation to climate variability and change."

e. Comments on Project Cost, Financing, Borrower Contribution, and Dates

Project Cost and Financing. At appraisal in July 2014, the total project cost for was estimated at US\$11.13million, of which US\$10.62 million was expected from a Strategic Climate Trust Fund Grant and US\$0.51 million from Borrower co-financing. According to the ICR (page ii), the actual total financing at project closing amounted to US\$10.31 million (92 percent of appraisal estimate), mainly due to the lack of actual borrower co-financing by project completion.

Borrower Contribution. At appraisal, US\$0.51 million was expected from Borrower co-financing. However, at closing no borrower co-financing is reported in the ICR. The ICR provides as reason for this lacking borrower contribution that "estimated counterpart financing for Component 3 was not supposed to be met by a cash payment from government" but rather in-kind contributions through covering SENAR staff, infrastructure, and operational costs (ICR, para 97).

Dates and Restructuring. The Project became effective on August 13, 2014 and closed on November 2020, 2019. The original closing date was November 20, 2018, which was extended by 12 months through one Level-2 restructuring in April 2018 that involved:



- (i) changes in the project implementation schedule to respond to the higher than expected demand for technical assistance (Component 2 activities),
- (ii) a closing date extension of 12 months to allow for adequate implementation and disbursement of project-supported activities, and
- (ii) a revision of the project Results Framework (RF) to add a new PDO indicator, adapt the definition of PDO indicator #3, and revise several intermediary results indicators (IRI).

The adjustments to the indicators did not lower the project's level of ambition and therefore a split rating of objectives was not necessary

3. Relevance of Objectives

Rationale

Context at Appraisal. At appraisal, the project objective was strongly aligned with the Government of Brazil (GoB)'s development priorities described in the 2008 National Plan on Climate Change, the 2009 National Policy on Climate Change Law (NPCC), and the 2010 ABC Plan developed by the Ministry of Agriculture, Livestock and Food Supply (MAPA). The national plan and policy defined Brazil's voluntary commitments to reduce GHG emissions by 2020, including among others the reduction of deforestation in the Cerrado biome and promoting sustainable technologies in the agriculture sector,[1] while the ABC Plan promoted the adoption of GHG-reducing technologies among agricultural producers and to strengthen the adaptation capacity and resilience of agricultural production systems to climate change. The activities of the ABC Cerrado Project were designed to support the realization of these national commitments and the ABC Plan. It was designed and implemented as part of the Brazil Investment Plan (BIP) under the larger Forest Investment Program (FIP)[2], with the high-level objective to promote sustainable land use and improved forest management in the Cerrado (PAD, page 4, para 33).[3] Similarly, the project objective was consistent with the World Bank FY12-15 Country Partnership Strategy (CPS) for Brazil, which highlighted under its Strategic Objective 4 (Improving sustainable natural resource management and climate resilience) the priorities of (i) increasing the proportion of low carbon emissions (ABC) technologies in agriculture and livestock production; (ii) evaluating methodologies and generating knowledge about agricultural extension; and (iii) increasing agricultural sustainability in the Cerrado biome (PAD, page 4, para 32). Moreover, the World Bank had experience from lending projects and analytical work in the agriculture sector and low-carbon technologies in agriculture in the Latin America region and globally, and of the agriculture-environment nexus in Brazil, which was considered in the project design (ICR, para 6).

Context at Completion. At completion, the project objectives remained relevant in accordance with Brazil's commitment at the 2016 Paris Climate Conference on nationally determined contributions (NDC) to reduce 43 percent of GHG emissions (ICR, para 26). The ABC Cerrado Project explicitly contributed to this strategic objective, as its activities promoted the adoption of low carbon agricultural (ABC) technologies. Moreover, the ABC Cerrado Project was in line with the World Bank FY18-23 Country Partnership Framework (CPF) for Brazil, in particular with the objective of Focus Area 3 on "inclusive and sustainable development" to achieve the country's aforementioned NDC to reduce GHG emissions under the United Nations Framework Convention on Climate Change (UNFCCC) (ICR, para 26). The project promoted ABC practices in the Cerrado biome, which is vulnerable to climate change and land degradation, in line with the



CPF's recognition that agriculture is a key income source of the rural poor in the area. The CPF highlights its commitment to "further expand the low carbon agriculture (ABC) program" (CPF FY18-23, para 103) to increase agricultural resilience to climate change. The ICR further highlights that "the continued relevance of the Forest Investment Program-ABC objectives can also be inferred from recent approval of the latest FIP project in Brazil, Integrated Landscape Management in the Cerrado Biome [...], which [...] seeks to strengthen the adoption of environmental conservation and restoration practices as well as low-carbon emission agricultural practices in selected watersheds of the Cerrado biome" (ICR, para 29).

Based on the above, Relevance of Objectives was rated High given the clear intention of the PDO and its continued relevance and alignment with national and Bank strategies at completion.

[1] Specifically for the Cerrado biome, the Decree No. 7,390 from December 2010 established "specific targets for reducing GHG emissions, also including 40 percent reduction of deforestation in the Cerrado compared to the 1999-2008 average, recovery of 15 million ha of degraded pastures, expansion of crop, livestock and forestry integrated systems in 4 million ha, expansion of no-tillage farming systems in 8 million ha (ICR, para 4).

[2] The ICR explains that "the Forest Investment Program (FIP) is a funding window of the Climate Investment Funds (CIF) that provides grants and low-interest loans to partner countries to assist them in addressing the drivers of deforestation and forest degradation (ICR, para 8).

[3] According to the ICR (para 8), the BIP originally comprised six 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 intention behind the BIP was to generate synergies between different agencies and stakeholders at the biome level to enhance the efficiency and sustainability of forest management and land use in the Cerrado (ICR, para 8). Hence, the BIP projects were interdependent and so the success of the FIP-ABC relied on the success of the other projects. It is also important to note that the ABC Cerrado Project Trust Fund grant of US\$10.3 million was "a very small portion of the US\$4.0 billion ABC Plan" (ICR, para 8).

Rating

High

4. Achievement of Objectives (Efficacy)

OBJECTIVE 1

Objective

Objective 1: Promote the adoption of selected sustainable low-carbon emissions agricultural technologies by mid-sized producers in the Cerrado Region

Rationale



Based on the context at appraisal described above, the ABC Cerrado project was a pilot designed to focus on one objective -the PDO- to “promote the adoption of selected sustainable low-carbon emissions agricultural technologies by mid-sized producers in the Cerrado Region” (PAD, page 4, para 18), which was the basis for this ICR Review assessment. A related aspect under the same objective was institutional capacity-building to foster institutional learning and exchange of experiences to enhance the adoption of ABC technologies among producers, which was also assessed in this review.

Theory of Change. The ABC Cerrado Project intended to address the knowledge constraint behind low adoption of ABC technologies among agricultural producers in the Cerrado biome and to test whether the combination of training with technical field assistance was more effective than pure training interventions (ICR, para 9). As such, the Theory of Change (ToC) behind of the objective of the ABC Cerrado Project was that the provision of knowledge and familiarization of agricultural producers with ABC technologies and their benefits would lead to a strengthening of producers’ capacity and willingness to adopt ABC technologies on their agricultural land to disincentivize deforestation to expand agricultural production (ICR, para 54). The ultimate expected impacts were increased land productivity and reduction of GHG emissions/increase in carbon sequestration. Moreover, at the institutional level, the project’s design as an experimental pilot and focus on rigorous monitoring and evaluation (M&E) was expected to increase the capacity of sector institutions and foster the internalization of lessons for future projects and strategies for strengthening the sector’s adaptation capacity and resilience to climate change.

In light of the experimental nature of the project design with two treatment groups (Component 1 with provision of training only and Component 2 with training combined with technical assistance) and the complementary institutional strengthening, the outputs and outcomes towards the achievement of the project in these two aspects are listed below:

Outputs (based on ICR paras 33 to 43 and Annex 1)

- PDO indicator: 20,025 total direct beneficiaries (target: 12,000), including trained farmers and ranchers, family members of producers receiving TA, field day participants, and project trained collaborators.
- 9,824 producers and technicians enrolled in training (revised target: 6,000), i.e. treatment group 1. Of those, 7,798 producers and 246 technicians (79 percent) successfully graduated from the training and received certificate. The first figure includes 1,781 (target: 1,000) female producers and technicians enrolled in training.
- SENAR created distance-learning modules on ABC technologies to support knowledge also after project completion (the ICR provides no details on the number of modules or outreach).
- 1,908 producers received technical assistance (TA) in addition to training, i.e. treatment group 2 (no target, random selection) with a total of 184,628 hours of technical assistance provided (target: 177,360).
- 195 Technological Reference Units (URTs) with the purpose to advocate ABC technologies among broader audiences through demonstration farms registered among the TA properties (no target), where 32 field days were carried out (no target) and were attended by 8,644 participants (revised target: 3,800).
- PDO indicator: Increase in the number of producers adopting at least one ABC technology compared to control group was estimated at 15 percent (target> 10 percent) based on weighted average of the results in the training only (treatment group 1) and training plus TA (treatment group 2) interventions.



The more disaggregated results of the impact evaluation estimated an increase of 34.1 percent for treatment group 2 and 9 percent for treatment group 1.

- PDO indicator: Increase in agricultural area under ABC technologies estimated at 9 percent (target > 15 percent) based on a weighted average of the results in the training only (treatment group 1) and training plus TA (treatment group 2) interventions. The more disaggregated results of the impact evaluation estimated an increase of 16 percent for treatment group 2 (training plus TA) and 6.4 percent for treatment group 1 (training only).
- PDO indicator: 184,628 hours of technical assistance provided to beneficiaries (target: 177,360).
- PDO indicator: SENAR consolidated five major sets of practical lessons learned (target: 4) from the implementation of FIP-ABC into lessons reports.

Outcomes (based on ICR paras 33 to 43 and Annex 1)

Quality and retention of trained knowledge on ABC technologies. Overall, the quality of training and TA provided by the ABC Cerrado Project was rated high by participants and retention of training content significant and higher than expected at 6-month evaluation after training. Specifically, the training supported through the ABC Cerrado Project followed a curriculum of 56 hours of theory and practice/field classes delivered by certified instructors (ICR, para 11). Participants could choose which one of the six technologies of the ABC Plan to be trained in and the ICR reported that 82.5 percent of those to be trained on pasture rehabilitation (ICR, para 35). This was not surprising given that 82 percent of training beneficiaries were cattle ranchers (ICR, para 41) and that pasture degradation can significantly affect animal production (ICR, Annex 7b). The IEG interview with the Bank task team revealed that this high demand from livestock producers/cattle ranchers was identified early during project implementation, given the low adoption of ABC technologies among this group (compared to crop producers), and a welcome development given the potential for mitigation of environmental impacts and GHG emissions from livestock production (also described in ICR Annex 7b). The ICR reported that over 90 percent of training participants rated the training quality as excellent or good. On the outcome level, the ICR stated that six months after training all participants had retained 76 percent of training content on average, based on evaluations done by SENAR. This result was significantly above the target of 50 percent (ICR, para 35). A random sample of the training participants received additional technical assistance (treatment group 2) to implement ABC Plan technologies specific to their farm conditions (ICR, para 36). The ICR reported that 84 percent of TA beneficiaries rated the additional assistance as excellent or good (ICR, para 36). It did not provide the retention rate on TA specifically but reported the increase in the number of producers adopting at least one ABC technology (see next paragraph). Linked to TA activities, 86 percent of participants in demonstration events at the Technological Reference Units (URTs) stated that “URT days were crucial for their learning, as they enabled a practical experience of training content” (ICR, para 37).

Adoption of ABC technologies. The key outcome indicators of the ABC Cerrado Project were the change in “agricultural area under ABC technologies” (PDO Indicator 1) and in the “number of producers adopting at least one ABC technology” (PDO Indicator 2). The ICR reported on the former that for treatment group 2 (training plus TA) the area under ABC technologies increased by 16 percentage points compared to the control group, while for treatment group 1 (training only) the increase was positive but only 6.4 percent. Hence, the average target value of 15 percent was not met. Yet, the experimental design of the pilot project generated the conclusion that the combination of training and TA could achieve such target values. To reiterate this, the ICR (Annex 7F) estimated the potential land area under ABC technologies if all project



beneficiaries had received training and TA would be 157,061 hectares (ICR, para 39 and Annex 7F). On the second PDO indicator, the ICR reported on impact evaluation results that the combination of training and TA (treatment group 2) increased the likelihood of producers adopting an ABC technology by 34 percentage points compared to the control group, while training only (treatment group 1) increased the likelihood by nine percentage points (ICR, para 40). The ICR does not specifically describe how adoption/land area were verified and the how the continued application of technologies will be monitored. The IEG interview with the Bank task team revealed that the information for these PDO indicators were based on the impact assessment surveys with a sample of beneficiary farmers, which provided information on which ABC technology was applied on what land area at the time of the survey.

Estimates on higher-level outcomes. The ToC described four expected higher-level outcomes from project activities (ICR, page 80): (i) reduction in GHG emissions, (ii) sustainable agricultural intensification, (iii) improved agricultural land productivity, and (iv) replication of ABC Cerrado interventions - with some estimates related to these based on studies by key institutions involved in the project: the National Rural Learning Service (SENAR) and the Brazilian Agricultural Research Corporation (EMBRAPA). Specifically, EMBRAPA estimated a CO₂-equivalent sequestration of 7.4 million tons over the 10 years after project completion; SENAR estimated a significant increase in cattle productivity/land use efficiency that can be expected to disincentivize additional deforestation (ICR, para 66). Furthermore, the ICR referred to findings of spillover effects in the Borrower Completion Report that neighboring producers of about 30 percent of project beneficiaries “reorient their production towards more sustainable agricultural practices” (ICR, para 43). This finding was interesting and in line with findings from other sector interventions, despite the lack of quantification of such spillovers in the project at hand.

Institutional learning from pilot activities. Another project outcome that was implicitly linked to the PDO and explicit in the activities of Component 3 and the formulation of PDO Indicator #4 was the testing and generation of lessons for institutional learning from the project pilot activities. The project rigorously tested the effectiveness of training in ABC technologies (treatment 1) versus training plus TA (treatment 2) through an impact evaluation. The evaluation found treatment 2 to be “consistently, substantially, and statistically significantly higher in magnitude than those for both the Training and Control groups” (ICR, para 45) in terms of promoting ABC technologies among producers. An important complement to this finding was the reported higher cost of treatment 2 compared to treatment 1 (ICR, Annex 7). Overall, the project generated five sets of practical lessons related to project management, M&E and monitoring systems, and better intra-institutional communication and resource coordination. These lessons were consolidated into four reports and disseminated among key stakeholders and institutions as well as the general public through workshops, studies, and communication campaigns (ICR, paras 58 to 62 and Annex 7G). The ICR did not provide many details on how these lessons will be incorporated in institutional decision-making after project completions, but highlighted the specific example of the follow-up FIP-Paisagens Project which became effective in March 2019 and jointly implemented by MAPA and SENAR, which will be “internalizing lessons learned from the FIP-ABC experience” (ICR, para 46). Further institutional learning and capacity-building took place through the project as SENAR adopted new services in technical and managerial assistance to producers, including the development of new learning modules and systems for field technicians, and enhanced internal coordination between its headquarter and regional centers (ICR, paras 76 and 77).

Rating
Substantial



OVERALL EFFICACY

Rationale

Based on the above-mentioned assessment, the evidence in the ICR (paras 33 to 43) points to the success of the project in the promotion of ABC technologies among beneficiary producers, despite some shortcomings in the demonstration of measurement and continued monitoring on uptake of these practices. There was also evidence of institutional learning and generation of relevant lessons based on the rigorous evaluation of two pilot approaches to overcome knowledge gaps in ABC technologies among agricultural producers. Based on this evidence and that the majority of targeted project results indicators were achieved or exceeded at project completion, the overall efficacy of this project's achievements was rated Substantial.

Overall Efficacy Rating

Substantial

5. Efficiency

Ex-ante Economic and Financial Analysis. At appraisal, an economic and financial analysis (EFA) was prepared based on three sector and project preparation studies (PAD, para 47). The analysis assumed that ABC Plan technologies would be adapted on 900,000 ha. The overall financial rate of return (FIRR) was estimated at 14 percent and specific FIRR were estimated for main ABC technologies (PAD, para 48 and ICR, para 48). The overall economic rate of return (EIRR) was estimated at 17 percent (PAD, para 49). The PAD does not include an annex on the estimations of the EFA and related sensitivity analysis.

Ex-post Economic and Financial Analysis. At completion, the EFA was based on the cash flows of 30 illustrative properties in five Cerrado states that recovered degraded pastures to demonstrate the profitability of project investments. It estimated incremental net benefits by comparing this "with project" scenario with a simulated "without project" scenario of hypothetical reference farms with similar baseline characteristics to the project beneficiary properties (ICR, para 48). The results were extrapolated to the total project land area on which sustainable management practices were adopted, assuming a 10-year time horizon and 7 percent discount rate. The resulting FIRR was estimated at 15.73 percent and a net present value (NPV) of around US\$136 million. The economic analysis considered shadow prices and the value of carbon sequestration, resulting in an EIRR of 39.1 percent and economic NPV of US\$415 million (ICR, Annex 4). The ICR EFA sensitivity analysis tested a 10 percent price increase for the optimistic scenario and a 10 percent price decrease for the pessimistic scenario, resulting in viable IRRs/NPVs in both cases. The ICR highlighted that the EFA and estimated IRRs do not internalize expected positive externalities of ABC technologies, such as biodiversity conservation, improved water quality, and potential spillover effects in the project area (ICR, para 48).

Administrative Efficiency. The project closing date was extended by twelve months. The ICR states this extension to have been critical to make up for initial implementation delays and accommodate structural changes in the project interventions, in particular the higher than expected demand for TA (ICR, para 25). However, the proportionate cost of Component 3 for Project Management was 25.2 percent at project closure



(US\$2.6million of total project cost of US\$10.31 million) compared to the estimated 20.6 percent at appraisal (US\$2.3 million of US\$11.13 million). The IEG interview with the TTL revealed that the high appraisal costs of Component 3 were due to M&E costs related to the (unusual) experimental design of the project, which piloted a randomized controlled trial and associated impact evaluation study. Furthermore, during implementation the overall M&E strategy had to be revisited to ensure the feasibility of the impact evaluation, which implied some additional costs such as hiring a new data collection firm (ICR, para 86).

Given the adequate internal rates of return and robust results from the sensitivity analysis, the project's efficiency was rated Substantial acknowledging the relatively high cost of administration, monitoring and evaluation because it was a pilot operation

Efficiency Rating

Substantial

a. If available, enter the Economic Rate of Return (ERR) and/or Financial Rate of Return (FRR) at appraisal and the re-estimated value at evaluation:

| | Rate Available? | Point value (%) | *Coverage/Scope (%) |
|--------------|-----------------|-----------------|---|
| Appraisal | ✓ | 14.00 | 100.00 <input type="checkbox"/> Not Applicable |
| ICR Estimate | ✓ | 15.73 | 100.00 <input type="checkbox"/> Not Applicable |

* Refers to percent of total project cost for which ERR/FRR was calculated.

6. Outcome

Relevance of Objectives was rated High, as the ABC Cerrado objectives were relevant to national priorities and Bank sector strategies at the time of appraisal and closure. The achievement of the PDO to “promote the adoption of selected sustainable low-carbon emissions agricultural technologies by mid-sized producers in the Cerrado Region” was rated Substantial, given the evidence on the successful promotion and adoption of ABC technologies among beneficiary producers and the successful generation of institutional learning and relevant lessons. Efficiency was rated Substantial, given the project’s sound financial and economic rates of return and robust results of the sensitivity analysis, although the cost of the project’s management, monitoring and evaluation accounted for 25.2% of the project’s total costs. Overall this project had minor shortcomings in the achievement of its objectives, efficiency and relevance and its overall outcome was therefore rated Satisfactory.

a. Outcome Rating

Satisfactory

7. Risk to Development Outcome



The overall risk to the DO for this pilot was considered Modest. Sustainability of outcomes can be expected to result from improved institutional capacity in Brazil's agricultural sector and enhanced technical skills and practices of producers in ABC technologies. Yet, two main challenges to sustaining the DO among mid-sized farms in the longer term are:

1. Maintaining the application of ABC technologies among project beneficiaries and ensuring replication and scale-up for widespread improvements in agricultural intensification, land productivity, deforestation rates, and GHG emissions. This depends on adequate monitoring and inspection capacity (both technical and financial) of the sector agencies as well as further incentives (free training/TA and financing options) for non-beneficiary producers to invest in ABC technologies. These challenges can be expected to be at least partially addressed through (i) the continuation of training by SENAR through distance-learning classes on ABC technologies for mid-sized farms with access to required technologies (ICR, para 34), (ii) the profitability of ABC technologies (ICR, para 48 and Annex 4) and (iii) the follow-up project FIP-Paisagens that promotes low-carbon practices building on the lessons from the ABC Cerrado Project (ICR, para 50 and IEG interview with Bank task team).
2. Maintaining and strengthening the coordination and governance across the various sector institutions. The ICR mentioned challenges in the ownership and collaboration of the key sector institutional stakeholders -MAPA, EMBRAPA and SENAR- in the ABC Cerrado implementation (ICR, para 70). To ensure smooth continuation and scale-up of the outcomes achieved by the project, effective collaboration of sector institutions is considered a key aspect. The follow-on project FIP-Paisagens could play a role to foster such collaboration, but it is too early to tell.

8. Assessment of Bank Performance

a. Quality-at-Entry

The World Bank task team ensured that the design of the ABC Cerrado and its PDO were fully aligned with the GoB's agricultural sector priorities and the World Bank's strategic focus in Brazil at the time. Lessons from relevant previous Bank lending operations and analytical work in the agriculture sector and low-carbon technologies were considered in the project design (ICR, para 6). Moreover, the World Bank task team was effective in convincing the counterparts of the potential benefits of the experimental design of the pilot project despite its innovative nature and initial hesitation by the implementing agency on the randomized selection of beneficiaries to different treatment groups (ICR, para 71).

A shortcoming in the Bank performance at entry was the insufficient focus on ensuring ownership and clarity on responsibilities for effective inter-institutional coordination, leading to lower than anticipated engagement of MAPA and EMBRAPA in the project (ICR, paras 70 and 78). Also, stronger engagement and/or monitoring in the development of SENAR's communications strategy from early on could have avoided initial disappointment and attrition of beneficiaries in project activities (ICR, para 75). Finally, while the Bank team recognized safeguards and fiduciary risks during project preparation, the Bank's guidance and identified mitigation measures were not sufficient to avoid knowledge gaps in particular among SENAR's regional centers and to prevent implementation delays (ICR, paras 25 and 100).



Overall, the Bank team's focus on conducting a rigorously designed impact evaluation to generate lessons and institutional learning for future interventions in Brazil and elsewhere was an important positive element of project design which outweighed the shortcomings mentioned above.

Quality-at-Entry Rating

Satisfactory

b. Quality of supervision

The project was implemented largely according to its design but extended by 12 months following implementation delays due to capacity constraints in safeguards and fiduciary issues. Especially at early implementation the World Bank Task Team provided technical advice to the implementing agency when needed. Supervision missions took place on a regular basis with adequate expertise in staffing and included site visits and mostly local Bank staff. The ICR highlighted that the continuous involvement and regional presence of one of the Bank's task team leaders and other project specialists ensured continuity and a responsiveness to the client implementing agency (ICR, para 101). A notable exception to this support was financial management assistance, which faced a very high turnover (four different Bank financial management staff during five years of project implementation) and the delay in restructuring (due to the change in task team leadership).

Quality of Supervision Rating

Moderately Satisfactory

Overall Bank Performance Rating

Moderately Satisfactory

9. M&E Design, Implementation, & Utilization

a. M&E Design

The Project can be commended for taking on a rigorous experimental approach with the objective to generate findings on impact and lessons for policymaking and future projects and potential scale-up. This design allowed for the generation of results on the effectiveness of training and training in combination with TA that were statistically significant and provide insights into the innovative concept of ABC technology promotion among agricultural producers. A Theory of Change (ToC) was not (required to be) prepared at appraisal, but the ICR presents an ex-post ToC with a logical rationale.

Regarding the Results Framework, the stated indicators were linked to the PDO and were measurable. However, shortcomings include that while the PDO and PDO indicators aimed at measuring behavior change (adoption of ABC technologies), this measure was set rather at a short-term/lower outcome-level. This might have been done purposefully by the task team given the pilot nature of the project and experimental approach. Yet, the project could have been slightly more ambitious in adding some medium-term indicators of the project's efficacy outlined in the ToC, such as reduced levels of deforestation or



increase in agricultural productivity. The ICR stated that the project M&E system was set up to cover also “effects on carbon sequestration” (para 80) - which would have been ambitious to fulfill given the project time frame- and eventually was only proxied by projected estimations presented in the ICR (para 66). Most indicators in the Results Framework (RF) were output-oriented towards number of training participants or TA recipients. The few that were more outcome-oriented focus rather on the short-term (such as knowledge retainment six months after training), were unclear in their definitions and/or verification process (such as how the agricultural area under ABC technologies was identified), or missed to measure changes in policy decision-making (leaving uncertainty on how the identified lessons are applied in practice by SENAR). Other shortcomings in the RF design that the ICR highlighted were (i) the dependence of many indicators on the impact assessment results available only late in project implementation, making results monitoring during implementation difficult (??) and (ii) the missed opportunity of measuring the quality of TA provided (ICR, para 81).

The overall responsibility of M&E activities was appropriately assigned at SENAR, which established the role of a central impact assessment manager to share oversight responsibilities on project results with the Project Management Committee, complemented by state-level M&E staff in the SENAR regional offices.

b. M&E Implementation

The uncommon experimental design of the pilot project and related unfamiliarity with how to implement this design in practice resulted in delays in the M&E implementation and avoidable misunderstandings (such as the SENAR communications strategy that received complaints from beneficiaries given the random assignment to the different treatment/control groups). These shortcomings were realized, and M&E was downgraded to moderately unsatisfactory in late 2016 (ICR, para 85). Shortly after the project mid-term review addressed key M&E quality issues by building capacity within SENAR to enhance M&E data collection and intra-institutional coordination, revise the RF, and ensure a quality impact assessment. M&E quality improved to a satisfactory level subsequently and the project information management system proved to be useful (ICR, para 86).

During project implementation several indicators/targets in the RF design were adjusted, most prominently the new PDO indicator measuring hours of technical assistance provided to beneficiaries” (ICR, para 21) with the project’s increased provision of TA. As discussed under Efficacy, this indicator was output-oriented and did not capture behavioral change in TA beneficiaries. In addition, target values of several intermediary results indicators were lowered due to changes in implementation and initial delays (ICR, paras 21 and 25). Most of these changes were appropriate to provide clarifications on definitions, adjustment to targets given implementation progress, and inclusion of measures to specific activities supported by the project.

The ICR reported several missed opportunities during M&E implementation that had been foreseen at appraisal (ICR, para 87) but were not consistently measured namely, (i) single instead of multiple data collection of Monitoring of the Sustainability Indicators in Agroecosystems which happened only once in 2018 with that data not analyzed; (ii) the lack of ad hoc surveying and analysis on the quality of technology adoption among beneficiary farmers; and (iii) use of a safeguards-specific questionnaire, applied only once, in 2018, to properties receiving TA; and (iv) the delay in EMBRAPA’s estimate of the project’s GHG impact and its limitation to only pasture rehabilitation activities.. The ICR commented that “these studies were only supplementary to the core monitoring and reporting on the Results Framework and impact evaluation, the inadequate undertaking of these activities did not directly affect the reliability



and quality of reported project results. However, it represents a shortcoming with respect to the arrangements that had been decided at appraisal” (ICR, para 88). Despite the shortcomings in the RF and M&E implementation, the results of the impact assessment and related studies provided a sufficient basis for the presentation of evidence on the impact of most of project activities and achievements towards meeting the PDO.

c. M&E Utilization

The ICR described that M&E outputs were used to adapt project implementation and formulate results measurement using proxy indicators, utilizing the project-supported management information system (ICR, para 90). It stated that the results of the impact evaluation of the pilot activities have informed broader policy making in Brazil’s agriculture sector and led to an institutional change (especially within SENAR through lessons reports and stakeholder workshops) towards a more strategic M&E focus (ICR, para 92).

M&E Quality Rating

Substantial

10. Other Issues

a. Safeguards

Environmental Safeguards. The ABC Cerrado Project was classified as Environmental Category B. With its objective to promote the adoption of low carbon (ABC) technologies it was expected to not lead to any significant negative environmental changes but rather to reduce environmental impacts from agricultural activities. The Project triggered the environmental operational safeguard policies of Environmental Assessment (EA) (OP 4.10), Natural Habitats (OP 4.04), Pest Management (4.09) and Forests (OP 4.36) and the ICR states that it “complied with all relevant environmental requirements related to the safeguard policies triggered” (ICR, para 93).

The ICR reported that the project adopted mitigation measures to minimize negative environmental impacts, in particular from agricultural chemicals for pest management (ICR, para 93). Overall, the ICR did not report in detail on environmental performance of the supported beneficiaries, but the RF describes that based on the impact evaluation results agricultural producers adopted ABC technologies on 93,844 hectares (direct effect) and that -when considering indirect effects- on 378,513 hectare of land sustainable land management practices were adopted (IRI of Component 2), exceeding the (revised) target of 300,000 hectares. Moreover, the ICR highlighted the results of an EMBRAPA study that “estimates a difference in GHG emissions by 6.6 million tons CO₂ equivalent between treatment and control group farms” for pasture rehabilitation of the project (ICR, pages 38 and para 87).

The ICR did not provide details on the monitoring, reporting or training activities of the technical manager responsible for safeguards matters. While the ICR described that no significant adverse environmental issues or impacts were encountered during project implementation (ICR, para 93), it criticized that only one safeguards-specific questionnaire was conducted to beneficiaries receiving technical assistance (ICR, para 87) and that “more specific guidance could have been provided on compliance with social and



environmental safeguards” (ICR, para 100). Apart from these criticisms, according to the project ratings, environmental safeguard performance was consistently rated as satisfactory.

Social Safeguards. At appraisal, none of the social safeguards operational policies -Physical Cultural Resources (OP/BP 4.11), Indigenous Peoples (OP/BP 4.10) and Involuntary Resettlement (OP/BP 4.12)- were triggered, as the social risks of project activities were low and not expected to not interfere with those or include land acquisition with involuntary resettlement (PAD, page 36, para 35). As part of the project social assessment, the ESMF included a socio-economic analysis of potential impacts on vulnerable groups, traditional communities or poor rural dwellers and the Environmental and Social Management Plan (ESMP) included mitigation measures to avoid negative impacts on indigenous peoples and traditional communities or that project activities took place on land disputed by indigenous peoples (PAD, page 36, para 35 and page 37, para 39). During preparation, the project conducted consultations with key stakeholders such as including farmers’ organizations, NGOs, academia, research centers, and civil society organizations from the Cerrado biome (PAD, page 13, para 66 and ICR, para 94).

The ICR described that the project implemented a Gender Action Plan to promote the inclusion of female agricultural producers in training and technical assistance activities. Furthermore, it conducted assessments with participations of each training section done by the project (ICR, para 94). Overall, the ICR emphasized that no issues of non-compliance with social safeguard policies and no major complaints or grievances on social management were reported or filed during project implementation (ICR, paras 94 and 95).

b. Fiduciary Compliance

Financial Management. A Financial Management (FM) assessment at appraisal concluded that SENAR’s FM systems met the Bank’s requirements and would hence be used for project implementation with a dedicated Financial Management Specialist/Coordinator to coordinate all FM aspects of the Project (PAD, page 12, para 60). The ICR did not provide details on FM supervision missions, but throughout project implementation FM was rated as satisfactory and FM risks considered low. All interim financial reports were considered acceptable and financial audits were unqualified (ICR, para 96), which was confirmed in the IEG interview with the Bank task team. The ICR referred to very few cases of ineligible expenditures that did not affect the overall satisfactory FM performance.

Procurement. A procurement assessment at appraisal concluded that substantial procurement risks were possible and that the procurement system in SENAR’s central office, which was to be responsible for project procurement, would need to be reinforced with at least one procurement specialist with experience in Bank-financed projects (PAD, page 13, page 62). The ICR noted that procurement capacity contributed to implementation delays (ICR, para 98), which were addressed quite late, as procurement performance ratings went up from moderately satisfactory to satisfactory only in the last year of implementation. The ICR did not report any major complaints during bidding processes, which was confirmed in IEG’s interview with the Bank task team.



c. Unintended impacts (Positive or Negative)

d. Other

Interest in private financing from livestock producers for ABC technology adoption. The ABC Cerrado Project included the option for beneficiary producers to apply to a subsidized ABC Plan Credit Line to “support the up-front costs of converting traditional agricultural practices to the above-mentioned technologies” (ICR, para 5). However, at project completion only one percent of trained producers (treatment group 1) had requested such credit (i.e., only seven percent of the expected target), and all of the producers who received training and TA (treatment group 2) had used their own financial resources to invest in their ABC technology adoption – amounting to US\$7.2 of their own funds (beneficiary contributions) for each US\$1 of project funds (ICR, para 63). The ICR explained the lack of demand for credit offered by the project on the fact that 82 percent of training beneficiaries were cattle ranchers (ICR, para 41), who were more likely to finance investments with cattle as their savings/investment mechanisms “rather than by resorting to formal credit” (ICR, para 40). This finding was relevant as it highlighted that knowledge gaps -and not financing constraints- were a key impediment to ABC technology adoption.

Increased openness towards sustainable production practices beyond ABC technologies. The ICR provided anecdotal evidence that its project beneficiaries had become generally more open to sustainable production practices. It further stated that in some project sites there were continued awareness-building activities around resource conservation and environmental sustainability, as well as examples of producer groups being established with the objective of “buying the necessary inputs for ABC technologies”, which reflects a community-driven interest in scaling-up project activities – albeit sporadic (ICR, paras 67 and 68). The occurrence of spillovers and increased interest in ABC technologies by agricultural producers in the Cerrado biome were reiterated in the IEG interview with the Bank task team.

11. Ratings

| Ratings | ICR | IEG | Reason for Disagreements/Comment |
|------------------|-------------------------|-------------------------|----------------------------------|
| Outcome | Satisfactory | Satisfactory | |
| Bank Performance | Moderately Satisfactory | Moderately Satisfactory | |
| Quality of M&E | Substantial | Substantial | |
| Quality of ICR | --- | High | |

12. Lessons

The following lessons were drawn from the ICR with some adjustments in language:



1. **The combination of training and customized technical assistance provides a significantly stronger incentive for producers to adopt ABC technologies than training alone.** The project conducted an experiment comparing the effectiveness of training only versus training in combination with customized technical assistance that was tailored to the needs of each agricultural producer. The impact assessment results showed that the combined approach was more effective to drive adoption as well as to increase the share of land converted to ABC technologies. Yet, the higher costs of 45 percent per hectare of adopted ABC technology of the combined approach compared to training only (ICR, Annex 7F) call for a careful comparison of expected benefits and costs for the specific country conditions.
2. **Training and technical assistance can be effective instruments to promote ABC technologies independent of financial incentives.** The project results demonstrated that knowledge gaps were key barriers to the adoption of ABC technologies among agricultural producers, which could be overcome by the provision of training and/or technical assistance. Financial barriers were also relevant, but largely overcome by the (predominantly cattle) producers themselves after realizing the financial (and environmental) profitability potential of the technology change. Future experiments could test if there are differences in overcoming knowledge and financial barriers among crop farmers.
3. **For experimental pilot project designs the identification and classification of potential beneficiary groups a priori is important to maximize relevance for scale-up.** The project at hand planned its design with the assumption that a portion of beneficiary producers would be interested in the project-supported credit line for investing in ABC technologies. However, the project implementation revealed the dominance of cattle farmers who did not take up such credit given preference for financing through private resources. Depending on the type of beneficiary group(s) targeted with the results of an experimental project, a careful identification and characterization of treatment/control groups during project preparation is essential to increase the potential for scale-up and external validity.
4. **Investing in rigorous impact evaluations is vital to prove the effectiveness of innovative concepts and address counterpart hesitations.** While the cost and technical capacity needed for a project-level impact evaluation are not justified in every case, they are worth it for pilot projects that aim to prove an innovative concept or technology in a new environment. As such, results of carefully implemented experiments provide invaluable findings that inform future policymaking and familiarize country counterparts with new concepts for potential scale-up.

13. Assessment Recommended?

No

14. Comments on Quality of ICR



The ICR was well-structured according to guidelines, and comprehensive but nevertheless quite concise and internally consistent for a complex project. The logic of the project was explained well in the ex-post Theory of Change and the important results from the experimental design were reflected in the lessons. The ICR provides the reader with a good technical understanding and rationale of the project's analysis of its main activities. The annexes were exceptionally detailed (in particular Annex 7 – “Complementary Information and Data”), providing lots of valuable information on and complementary to the project design and its implementation. Moreover, the ICR candidly identifies and discusses weaknesses, such as design issues which caused implementation delays and shortcomings in the Results Framework. A minor missed opportunity was for the ICR to summarize and present the key results from the impact assessment.

a. Quality of ICR Rating

High