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Report Number: ICRR0024111

1. Project Data

Project ID P124663	**Project Name** BR Caixa Solid Waste Mgt	
Country Brazil	**Practice Area(Lead)** Urban, Resilience and Land	
L/C/TF Number(s) TF-11236,TF-11237,TF-B0773,TF-B0774	**Closing Date (Original)** 30-Jun-2022	**Total Project Cost (USD)** 26,827,061.36
Bank Approval Date 05-Dec-2011	**Closing Date (Actual)** 31-May-2023	

	IBRD/IDA (USD)	Grants (USD)
Original Commitment	33,268,957.83	33,268,957.83
Revised Commitment	26,485,290.44	31,705,596.24
Actual	26,827,061.36	26,827,061.36

Prepared by	Reviewed by	ICR Review Coordinator	Group
Katharina Ferl	Vibecke Dixon	Avjeet Singh	IEGSD (Unit 4)

2. Project Objectives and Components

a. Objectives

Since the project was a Carbon Finance project it did not require a Project Appraisal Document (PAD) (according to the guidelines applicable at the time of approval). Also, the project did not have a financing agreement in which the objective was stated. Furthermore, it was blended with the Integrated Solid Waste Management and Carbon Finance Project (P106702) which PAD described the Carbon Finance activities as its component 2.2 (Technical Assistance to strengthen Caixa's institutional capacity to manage, supervise and monitor solid waste management investments).

Therefore, the objective of sub-component 2.2 “to strengthen Caixa’s institutional capacity to manage, supervise, and monitor solid waste management investments” will be used as the objective of the project.

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 included one component that aimed to strengthen Caixa’s institutional capacity to manage credits and design appropriate lending products for investment in the waste sector and blend these, wherever viable, with Carbon Finance. The World Bank was to provide the necessary technical support to build the Caixa team’s capacity to apply the necessary World Bank policies in sub-projects, to allow Caixa to serve as both a financial intermediary for future on-lending IBRD resources to the private and public sectors for finance investments, as well as for managing Carbon Finance Initiatives that generate carbon credits.

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

Project Cost: The project was estimated to cost US$28.05 million. Actual cost was US$26.83 million (due to exchange rate fluctuations).

Financing: The project was financed by a World Bank Trust Fund (TF-11237) in the amount of US$4.29 million (of which US$3.85 million disbursed), a Trust Fund (TF-11236) in the amount of US$21.47 million (of which US$21.32 million disbursed), a Trust Fund (TF-B0774) in the amount of US$2.08 million (of which US$1.59 million disbursed), and a Trust Fund (TF-B0773) in the amount of US$204,909 (of which US$43,317 disbursed).

Borrower: It was not planned for the Borrower to contribute to the project financing.

Dates: The project was approved on December 5, 2011, and became effective on the same day. The project’s original closing date was June 30, 2022. The actual closing date was May 31, 2023, i.e., the project was extended by 11 months.

- According to the World Bank team (May 17, 2024), until June 2020, the roadmap in the World Bank portal for CN projects was not operational. Therefore, following the Carbon Finance Guidelines at the time, two new Emissions Reductions Purchase Agreement (ERPAs) (TF0B0774 and TF0B0773) were processed and approved offline, without a project restructuring.
- On June 27, 2022, the project was restructured to change the loan’s closing date by 11 months from June 30, 2022, to May 31, 2023, due to the São Gonçalo Landfill and the Petrolina Landfill experiencing significant delays in verification due to their higher performance in landfill gas generation.

- The MTR was conducted in December 2014 together with the World Bank loan P106702. According to the World Bank team (May 17, 2024) at that time, implementation progress reports for the Carbon Finance operation were filed together under P106702.

3. Relevance of Objectives

Rationale

Country and sector context. According to the PAD (of project P106702) in 2007, 141,000 tons of waste were collected daily in Brazil. Only 39 percent of the country's 5564 municipalities adequately disposed of their waste. Approximately 32 percent of municipalities deposited waste in controlled landfills, and 30 percent of municipalities deposited waste in open dumps. Urban cleaning and solid waste management (SWM) services were the responsibility of municipalities. However, financial resources were generally inadequate, and municipalities spent a small proportion of their budgets on SWM. Many municipalities had limited investment capacity and access to credit for SWM services reinforcing the need for private sector involvement in SWM.

At the time of appraisal, Brazil was among the most proactive countries in the Latin American region in pursuing Clean Development Mechanism (CDM) opportunities. Both the private sector and civil society saw Carbon Finance as a suitable tool to help attract foreign investment and technology transfers. In the solid waste sector, carbon credits were seen as an important enabling factor for improvements in final disposal and treatment, as well as for making the closing of existing dumps financially viable.

Alignment with the government strategy. The objective of the project supported the government's 2010 National Solid Waste Policy Law, which defined the responsibilities and tools for SWM by introducing concepts such as contaminated area, product life cycle, selective collection, social control, waste management etc. The project was also in line with the 2022 National Solid Waste Plan, which established strategies, guidelines, and targets for the sector over a 20-year timeline. Furthermore, the project supported Brazil's Nationally Determined Contribution (NDC) and policies on methane reduction. In April 2022, Brazil submitted its updated NDC objective which aims to reduce economy-wide emissions by 50 percent by 2030, compared to 2005 levels.

Alignment with the World Bank strategy. The objective of the project was in line with the World Bank's Brazil Country Partnership Framework (CPF) (FY18-23) under results area 12 (improved environmental management, biodiversity conservation and climate change mitigation). The CPF emphasized that the World Bank will support Brazil in designing and implementing policies and investments to reach its COP21 National Determined Contribution (NDC) targets.

The government requested the World Bank's assistance in mobilizing external resources by increasing access to climate finance and private sector investments for mitigation activities. Since the World Bank was the trustee of the Carbon Partnership Facility it was sought to bring together buyers and sellers of carbon credits under the CDM of the Kyoto Protocol.

The objective was pitched at a relative output level to address a key development issue and was in line with the government's policies as well as the World Bank's most recent CPF.

Rating
Substantial

4. Achievement of Objectives (Efficacy)

OBJECTIVE 1

Objective
To strengthen Caixa's institutional capacity to manage, supervise, and monitor solid waste management investments

Rationale
Theory of Change: The project's theory of change stated that project inputs/activities such as analyzing options to mainstream Carbon Finance in regular finance operations, developing a Program of Activities (PoA) under the SWM sector to incorporate individual landfill with mitigation potential, identifying SWM activities with mitigation potential for inclusion under the PoA, training key staff within Caixa as well as developing institutional norms within Caixa to support sound socioenvironmental practices were to result in several outputs. These outputs were to include a business model within Caixa being created for mainstreaming Carbon Finance operations, Carbon Finance operations being implemented and operationalized within Caixa's portfolio, and a social an environmental framework within Caixa for SWM operations being developed. These outputs were to result in the outcome of scaling up the implementation of Carbon Finance in the solid waste sector.

The project's theory of change was sound and logical. The following results were achieved:

Outputs:

- Three Components of Project Activities (CPAs) were registered by the United Nations Framework Convention on Climate Change (UNFCCC), achieving the target of three CPAs.
- PoA was registered by UNFCCC achieving the target of doing so.
- Caixa prepared an Environmental and Social Management Framework that set the guidelines for the development and implementation of Environmental and Social Management Plans for each landfill. This output did not have a target.

Outcomes:

- 2,831,016 emission reductions were generated by the Caixa PoA, exceeding the target of 2.5 million emission reductions.
- The Itaoca and Candeias landfills generated 546,581 emission reductions, exceeding the target of 500,000 emission reductions.

- The Sao Goncalo landfill generated 637,002 emission reductions between 2019 and 2020, exceeding the original target of 143,000 emissions reductions and not achieving the target of 817,180 emission reductions.
- The Petrolina landfill generated 9,707 emission reductions, not achieving the target of 45,000 emission reductions. According to the ICR (p. 36) the Petrolina landfill actually generated 14,966 emission reductions between August and December 2020. However, given the high number, not all emission reductions could be verified by the designated operational entity (DOE).

Rating

Substantial

OVERALL EFFICACY

Rationale

The project was able to create a program within Caixa to identify, prepare, and partially finance emission reduction activities under SWM projects. Also, the project was able to achieve the targets for emission reductions generated by the Caixa PoA as well as by the Itaoca and Candeias landfills. However, the project was not able to achieve the targets for the Sao Goncalo landfill and the Caruaru and Petrolina landfills. Overall, the project's efficacy is rated Substantial with moderate shortcomings.

Overall Efficacy Rating

Substantial

5. Efficiency

Economic efficiency:

No economic analysis was conducted at project appraisal. The ICR (p. 21-22) did not conduct a traditional economic analysis either but stated that the positive return on capital employed indicated that the project was efficient.

Operational efficiency:

During the initial phase of project implementation, the project encountered technical incidents that resulted in the landfills' operations being down. Once these technical issues were addressed, the monitored volumes at Santa Rosa and Sao Goncalo exceeded the estimates for 2017. The project was efficient when it came to the delivery of ERPA -2 (Santa Rosa, Sao Goncalo, and Barra Mansa) as the contract Certified Emissions Reductions (CER) volume was delivered more than one year ahead of the term end of the ERPA. According to the ICR (para. 45), the Program of Activities (PoA) showed that it was an efficient approach for managing multiple sub-projects since it saved time to register project-by-project with UNFCCC due to a single baseline and monitoring methodology. Also, the project adopted a programmatic structure and Caixa acted as the program entity to sign the ERPA with the Bank and the Coordinating/Management Entity of the (PoA), allowing to manage multiple SWM projects and ensuring consistency and quality across landfills.

Given the lack of an economic analysis, the project's overall efficiency is rated Modest.

Efficiency Rating

Modest

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		0	0 ☐ Not Applicable
ICR Estimate		0	0 ☐ Not Applicable

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

6. Outcome

Relevance of the objective was Substantial given the project's alignment with the World Bank's Brazil Country Partnership Framework (CPF) (FY18-23). Efficacy was Substantial with moderate shortcomings and Efficiency was Modest due to the lack of an economic analysis. The project's overall outcome rating is thus Moderately Satisfactory.

a. Outcome Rating

Moderately Satisfactory

7. Risk to Development Outcome

Government commitment risk: According to the World Bank team (May 17, 2024) the current administration displays significant renewed commitment to implementation of the national Solid Waste Management policy, and specifically the contribution that emissions reducing investments in the sector can contribute to Brazil's Nationally Determined Contribution, as demonstrated by the targets included in their 2022 update. This risk is thus considered to be low to moderate.

Technical capacity risk: According to the ICR (para. 25) while the Caixa team implementing the project was able to increase its knowledge in Carbon Finance, institutional capacity within Caixa diminished throughout project implementation due to institutional changes and centralization of knowledge in a small number of staff. As a result, Caixa faced challenges in providing support to landfill operators on technical issues such as CDM supervision and verification processes. Furthermore, local specialists in regional offices closer to the landfills were key for the Caixa team. However, during project implementation, they were let go, resulting in a lack of support and oversight. Therefore, continuous lack of technical support at the regional level as well as at Caixa might negatively affect the sustainability of development outcomes.

Financial risk: Currently, it is not clear if there will be future external financing in this area to allow for scaling up project activities, which is key to the sustainability of development outcomes.

8. Assessment of Bank Performance

a. Quality-at-Entry

According to the World Bank team (May 17, 2024) the project design was built on lessons learned from previous SWM projects in the country as well as in Argentina, Colombia, and Mexico. These lessons included: i) as the economic costs of waste disposal are found less in the construction of disposal sites than in their maintenance, it is essential to have an appropriate cost recovery mechanism; and ii) carbon finance is important for providing an additional revenue stream and supports operating expenses of sanitary landfills.

Also, during project preparation, the World Bank team supported Caixa in identifying a pipeline of potential sub-projects to be implemented, conducted an analysis to estimate the target for emission reductions as well as an evaluation to ensure that the sub-projects were to comply with the relevant clean development mechanism methodology. Furthermore, the World Bank team carried out a financial analysis that focused on the rentability of the investments that the landfill operators made into the emission reduction systems by looking at the unit price defined in the ERPAs and the expected emission reduction volumes calculated based on the CDM methodology used in the approved PoA Design Document.

The project's Results Framework was adequate (see section 9a for more details).

Quality-at-Entry Rating

Satisfactory

b. Quality of supervision

According to the ICR (para. 68) the World Bank team conducted on average two supervision missions per year combined with the supervision of the Integrated Solid Waste and Carbon Finance Project (P106702). During the COVID-19 pandemic, supervision missions were conducted virtually. Supervision missions included appropriate expertise. When the Caixa requested additional technical assistance for the CDM processes, the World Bank team addressed this request and provided the Caixa and landfill operators with support in key areas such as CDM project proposal, validation, registration, and verification.

As a result of the World Bank's support, the project was able to deliver additional CERs under the new ERPAs.

The ICR (para. 70) stated that the project would have benefitted from the targets in the Results Framework being restructured when it became clear that Caruaru landfill was not being included in ERPA-4 (which was meant to include Caruaru and Petrolina landfills). Also, the target for the Sao Goncalo landfill was not revised even though it was likely that the landfill could not deliver the maximum contract volume.

Quality of Supervision Rating

Moderately Satisfactory

Overall Bank Performance Rating

Moderately Satisfactory

9. M&E Design, Implementation, & Utilization

a. M&E Design

The project's theory of change and how key activities and outputs were to lead to the intended outcome was sound and reflected in the Results Framework. While the PDO indicators and intermediate outcome indicators were adequate to capture the contribution of the project activities towards achieving the objective, the project would have benefitted from including indicators measuring capacity built within Caixa to "identify, prepare, and partially finance emission reduction activities under solid waste management projects".

Caixa was responsible for the project's M&E activities by consolidating progress reports submitted by operators.

b. M&E Implementation

According to the ICR (para. 59) Caixa submitted adequate progress reports and additional information requested by the World Bank on a regular basis. However, during the second phase of the project, Caixa found it challenging to obtain progress reports from operators. Including specific requirements in the contracts for monthly reports by operators might have been beneficial to ensure timely reporting.

The ICR (para. 59) stated that M&E reflected the terms of the ERPAs, and no additional data was collected and monitored in areas outside of the direct line to ERs.

Two indicators were added when the two additional ERPAs were included in the project. However, the project would have benefitted from the targets in the Results Framework being restructured when it became clear that Caruaru landfill was not being included in ERPA-4.

c. M&E Utilization

According to the ICR (para. 27) data collected by Caixa were used in quarterly progress reports which were submitted to the World Bank. This data allowed Caixa and the World Bank to assess implementation progress towards indicator targets, identify implementation bottlenecks, and address them adequately. According to the World Bank team (May 17, 2024) Caixa's M&E functions are likely to be sustained as their leadership is seeking to mainstream and embed carbon finance in a more strategic and cross-sectoral manner.

Given the shortcomings in design and implementation, the M&E quality is rated as Modest.

M&E Quality Rating

Modest

10. Other Issues

a. Safeguards

The project's Environmental Screening Category was FI (Financial Intermediary), as Bank funds were to be channeled through Caixa as a financial intermediary.

According to the World Bank team (May 17, 2024), the Carbon Finance project followed the IBRD loan to strengthen Caixa's capacity to manage carbon credits. Although the original loan triggered five Bank Operational Policies OP 4.01 (Environmental Assessment), OP 4.04 (Natural Habitats), OP 4.09 (Pest Management), OP 4.11 (Physical Cultural Resources), and OP 4.12 (Involuntary Resettlement) as relevant for the project, a new safeguards approach was proposed and approved by SAP and management for the loan and Carbon Finance operation, based on OP 4.00 (Use of Country Systems in lieu of Bank safeguards). Caixa prepared an Environmental and Social Management Framework (ESMF) for both the loan and the Carbon Finance Project, which considered the safeguards triggered in the context of the country's system.

Caixa was selected as a pilot for the use of Borrower system as it was adopting the framework for its entire solid waste portfolio. The Safeguards Diagnostic Review for the proposed Integrated Solid Waste Management and Carbon Finance Program in Brazil was reviewed and cleared by the Quality Assurance and Compliance Unit (OPCQC). The Bank continued to monitor the implementation of the agreed Socioenvironmental Plans for each ERPA.

b. Fiduciary Compliance

According to the World Bank team (May 17, 2024) as per Operational Memo – Supervision of Carbon Finance Operations dated December 1, 2011, 3(b) the supervision of Carbon Finance transactions excluded assessments relating to the application of the Bank's fiduciary (procurement, financial management, and disbursement) policies.

c. Unintended impacts (Positive or Negative)

NA

d. Other

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11. Ratings

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

12. Lessons

The ICR (p. 31-33) provided several lessons learned, which were adapted by IEG with some modification of language:

- **A programmatic approach implemented by a financial intermediary can be efficient for identifying and financing multiple Carbon Finance sub-projects at scale.** In this project, Caixa acted as an effective financial intermediary between the CPF and the companies generating the CERs. Also, it was more efficient for the Bank to deal with a single partner to implement multiple ERPAS. Furthermore, many Brazilian municipalities did not have the legal structure or institutional capacity to promote private sector participation. Private sector entities would have faced significant risks to engage directly with municipalities without having support from a financial institution such as Caixa.
- **Complementing Carbon Finance with other financing can allow for effective engagement with local stakeholders in the public and private sector**. After this project Caixa and landfill operators continue to show interest in expanding Carbon Finance operations within the SWM sector in Caixa and to develop alternative ways for trading carbon credits generated beyond the Carbon Partnership Facility.
- **Performance incentives or penalties might strengthen compliance with the deadlines of sales, purchase conditions and reporting and/or achieving targets in terms of CERs**. In this project, while there were contractual obligations between Caixa and the CPF,

as well as between Caixa and the landfill operators, remedial measures for lack of compliance at the ERPA as well as at the sub-ERPA level could have been applied immediately to allow for better program management.

13. Assessment Recommended?

No

14. Comments on Quality of ICR

The ICR provided an adequate overview of project preparation and implementation and included useful lessons learned. The ICR was internally consistent and sufficiently outcome driven. However, the ICR would have benefitted from providing more details about the project design since specific requirements apply to a Carbon Finance operation. Also, the ICR did not provide an economic analysis. Overall, the ICR is rated Substantial but only marginally so.

a. Quality of ICR Rating

Substantial