



1. Project Data

Project ID P112074	Project Name BR Sergipe Water	
Country Brazil	Practice Area(Lead) Water	
L/C/TF Number(s) IBRD-81130	Closing Date (Original) 30-Jun-2017	Total Project Cost (USD) 63,440,714.93
Bank Approval Date 26-Jan-2012	Closing Date (Actual) 30-Apr-2020	
	IBRD/IDA (USD)	Grants (USD)
Original Commitment	70,275,000.00	0.00
Revised Commitment	63,440,714.93	0.00
Actual	63,440,714.93	0.00

Prepared by Kishore Laxmikant Nadkarni	Reviewed by Fernando Manibog	ICR Review Coordinator Ramachandra Jammi	Group IEGSD (Unit 4)
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2. Project Objectives and Components

a. Objectives

The objective of the Project is to promote the efficient and sustainable use of water in the Sergipe Water Basin by strengthening the Borrower's sector management, enhancing soil management practices, and improving water quality (Loan Agreement dated September 13, 2012, Schedule 1). The Borrower was the State of Sergipe.

The objective of the project as stated in the Project Appraisal Document (PAD) is the same as above.



For the ICRR, the PDO is parsed as follows:

Objective 1: To promote the sustainable use of water.

Objective 2: To promote the efficient use of water.

The achievement of each objective is assessed under the sub-headings of (i) strengthening the Borrower' sector management, (ii) enhancing soil management practices, and (iii) improving water quality.

A split evaluation is carried out in assessing the efficacy of the project. Although the original development objective remained unchanged during the project implementation period, there were some significant changes during project restructuring in the formulation of one PDO indicator and some intermediate result indicators, and in associated output targets, which reduced the ambition of the project.

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

Yes

Did the Board approve the revised objectives/key associated outcome targets?

Yes

Date of Board Approval

14-Jun-2017

c. Will a split evaluation be undertaken?

Yes

d. Components

Reference: PAD paras.14 to 19.

Component 1: Integrated Water Resource Management and Institutional Development : (cost at appraisal US\$ 17.1 million; actual cost at completion US\$ 8.0 million).

This component was to support improvement of the Borrower's (State of Sergipe) water resources and environment management capacity through carrying out activities designed to promote an increased integration between policies and practices, coordination among related agencies addressing water resources planning, regulation, management and services provision including:

1. Integrated Water Resources Management

- preparatory work for design of an institutional model of an agency in charge of water resources management;
- development of water resources and environmental management procedures and instruments;
- improvement of soil management practices in the Sergipe River Basin (SRB);
- development and implementation of regional management models for provision of solid waste and water and sanitation services for rural and small towns



- carrying out of communications and environmental education programs.

2. Project Management

- Strengthening of the Borrower's capacity and overall project management, monitoring, evaluation, and dissemination.

Component 2: Water for Irrigation: (cost at appraisal US\$ 14.20 million; actual cost at completion US\$ 11.4 million).

This component was to (i) support improvement of the technical, institutional and environmental sustainability of the two irrigation perimeters of the Pocaço Da Ribeira and Jacarecica I dams, and provision of technical assistance to support future improvements of the Jacarecica II dam perimeter; and (ii) to promote improved environmental soil and water use practices within the targeted micro-basins of the Jacarecica sub-basin including:

- rehabilitation and modernization of public irrigation perimeters;
- promotion of environmental management through implementation of selected activities designed to promote soil and water conservation and more efficient irrigation methods for farmers;
- rehabilitation of existing tubular wells in the Sergipe River Basin and construction of small-scale rural and small-town water supply and sanitation solutions in selected localities of the Sergipe River Basin;
- minor rehabilitation of the following dams: Pocaço Da Ribeira, Jacarecica I and Jacarecica II, based on recommendations of the Independent Dam Safety Panel;
- capacity building and institutional strengthening of SEAGRI (Sergipe State Secretariat for Agriculture), COHIDRO (Sergipe State Water Resources and Irrigation Development Company), and EMDAGRO (Sergipe State Agriculture Development Company).

Component 3: Water for Cities: (cost at appraisal US\$ 83.6 million; actual cost at completion US\$ 90.8 million).

This component was to complement the Borrower's ongoing efforts to finance interventions aimed at improving the quality of life for residents of the targeted municipalities in the Sergipe River Basin as well as the quality of water and sustainability of the environment in these areas through expansion of water supply and sanitation services and urban drainage infrastructure, and improvement in the efficiency of services offered by DESO (Sergipe State Water Supply and Sanitation Company) including:

1. Sub-component: Services expansion and improvements in the MRA (Metropolitan Region of Aracaju):

- expansion of the existing wastewater systems and treatment plant in the municipality of Aracaju;
- construction of wastewater system and treatment plant for the municipality of Barra dos Coqueiros.

2. Sub-component: Services expansion and improvements in the Sergipe River Basin.

1. carrying out of activities for the expansion and optimization of water supply conveyance systems, and sanitation and drainage services in selected municipalities of the Sergipe River Basin outside of the MRA (water supply subprojects);



2. provision of technical assistance to DESO to (i) enhance corporate governance and strategic planning; (ii) raise the quality of water supply and sanitation services provision; and (iii) improve operational efficiency, including through carrying out studies for:
 - corporate management planning;
 - management plan for wastewater services;
 - institutional arrangements and instruments for services provision;
 - water loss control and energy efficiency programs;
 - integrated operation of water supply services in the metropolitan area to optimize costs and water reliability.

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

Project cost: The estimated cost at appraisal was US\$ 117.1 million. the actual cost at completion was US\$ 110.3 million (ICR Annex 3).

Project Financing: The project was financed through a World Bank loan in the amount of US\$ 70.3 million. Disbursements were US\$ 63.4 million (90%). The balance of US\$ 6.8 million was cancelled.

Borrower financing: The planned contribution from the State of Sergipe was US\$ 46.9 million. This contribution was made in full.

Dates: The project was approved on January 26, 2012 and became effective on December 11, 2012. The original closing date was June 30, 2017. It was extended twice - first, by 22 months to April 30, 2019, and later by 12 months to April 30, 2020. The two extensions totaled 34 months compared to the original planned implementation period of 54.5 months.

A Mid-Term Review (MTR) was carried out in May 2015.

Restructurings: The project had two restructurings. The first restructuring was more significant in terms of changes in scope, components, and indicators. The second restructuring focused on institutional arrangements and closing date extension.

First restructuring: (June 2017 - disbursed amount US\$ 25.24 million). (ICR Data Sheet).

This was a Level 2 restructuring. The PDO remained the same without any change. However, there were changes in the formulation of some PDO and Intermediate Results indicators and in output and indicator targets.

Changes in PDO indicators:

- Outcome Indicator 2 (efficiency improvement of 20% in use of water as measured by liters/second/hectare in 1,150 hectares that comprise the Pocaço da Ribeira and Jacarecica I irrigation perimeters" was considered unreliable and difficult to measure since it was formulated in terms of the percentage increase in efficiency and there was a lack of consistent measuring processes and monitoring data, including baseline values. Also, the original irrigated area was inaccurately presented in the PAD (ICR para. 17). It was replaced by "improved efficiency



techniques implemented in agricultural areas targeted by the project" (Restructuring Paper, Section III - Proposed Changes). Measuring the impacted area instead of the percentage increase in efficiency was considered a more appropriate indicator of results achieved. The target area was set at 800 hectares (ha).

- Outcome Indicator 3 ("pollution load discharged by municipalities targeted by the project's wastewater investments is reduced by BOD 5,620 tons per year in 2015") was changed to "pollution load discharged by the municipalities targeted by the project's wastewater investments is reduced by BOD 4,000 tons per year (tpy) by 2019". (BOD refers to biological oxygen demand).
- Two core indicators were introduced (i) number of people with access to improved sanitation practices and (ii) women provided with access to improved sanitation services.

Changes in components:

Component 1: Activities dropped: (i) improvement of soil management practices in the Sergipe River Basin; (ii) development and implementation of new regional management models for provision of solid waste and water and sanitation services in rural and small towns. Activities added: (i) development of regulatory capacity on water and sanitation services; (ii) protection and rehabilitation of water supply reservoirs in surrounding areas of the Sergipe River Basin. (ICR para. 17).

Component 2: Activities dropped: (i) rehabilitation of existing tubular wells in the Sergipe River Basin; (ii) construction of small-scale rural and small-town water supply and sanitation solutions in selected localities. Activities added: Rehabilitation activities for Poxim Dam (as recommended by the Independent Dam safety Panel). (ICR para.18).

Component 3: Activities dropped: Studies for (i) preparing management plan for wastewater services and (ii) institutional arrangements and instruments for service provision. Activities added: (i) component description was revised to include sanitation subprojects in addition to water supply subprojects; (ii) provision of technical assistance to DESO was expanded to include implementation of activities instead of studies. (ICR para. 19).

Changes in intermediate results indicators (IRIs): IRIs were modified as follows:

Component 1: (integrated Water Resource Management and Institutional Development)

- The indicator "Agency for water resources management created/designated" was replaced by "proposal to create or designate the state agency responsible for water resource management is submitted to the Government". The target date was extended from June 30, 2017 to April 30, 2019.
- The indicator " state environmental conservation areas in the SRB created/expanded and managed" was replaced by " demarcation and conservation and recovery of protected areas in water supply reservoirs in the Sergipe River Basin". The target was reduced from 2,355 ha to 266 ha and the target date was extended from June 30, 2017 to April 30, 2019.

Component 2: (Water for Irrigation)

- A new indicator "water users benefiting from improved irrigation systems" was added.



- The indicator "adoption of improved water and soil conservation practices by rural producers benefiting from irrigation kits" was modified to measure the actual number of producers benefiting by this activity under the project.

Component 3: Water for Cities

- For the indicator "number of domiciliary connections to wastewater connection services increased by 2018 in the municipalities of the SRB", the target was reduced from 143,000 to 127,000.
- The target for the indicator "DESO's EBITDA margin improved by 2018" was reduced from 17% to 12%.
- A new (core) indicator was added "number of people benefiting from improved water supply services".

Change in closing date: The original closing of June 30, 2017 was extended by 22 months to April 30, 2019 to allow for implementation of the third phase of the wastewater works for the city of Itabaiana and energy efficiency works for the irrigation perimeters under the project. (ICR para. 23).

Second restructuring (April 2019 - disbursed amount US\$ 44.08 million). (ICR Data Sheet).

This was a Level 2 restructuring. The original PDO remained the same without any change. However, there were changes in indicators and in one target as follows:

PDO indicators: There were changes in implementational arrangements due to changes within the Government and in its priorities. ADEMA (Sergipe State Administration for the Environment) was dropped and AGRESE (Regulatory Agency for Public Services in the State of Sergipe) added.

Intermediate result indicators: The target for "DESO's EBITDA margin", after being reduced from 17% to 12% during the first restructuring, was further reduced from 12% to 8%.

Closing date extension: The closing date was extended by a further 12 months from April 30, 2019 to April 30, 2020.

3. Relevance of Objectives

Rationale

Country and Sector Context: Water resources and associated infrastructure services are crucial elements for Brazil's sustainable and equitable development. At project appraisal in 2012, Brazil faced crucial water resource challenges related to scarcity, pollution in urban conurbations that did not have adequate wastewater collection and treatment services, and recurrent droughts and floods. The State of Sergipe was



emblematic of the water challenges facing Brazil. With a population of about 2 million, Sergipe was (and remains) the smallest state in the impoverished northeast of Brazil. Its per capita income was only 60% of the national average with enormous disparities in access to basic infrastructure and social services such as drinking water and proper sanitation. In 2010, about 19% of the population lacked access to water supply services and only about 14% had access to sewerage services. The Sergipe River Basin (SRB), which provided water to almost 50% of the state's population, was representative of the water scarcity and water quality issues facing the state. Inadequate water supply and sanitation services, and inappropriate disposal of solid waste, had polluted the SRB and negatively affected the local environment. Furthermore, development of irrigated agricultural potential in the SRB was limited by water scarcity, water pollution, and conflicts for water allocation due to rapid growth of urban demand. Within Brazil, the northeast region (including Sergipe State) may be the most affected by climate change. The State lacked an adequate institutional framework and tools to effectively plan, manage and regulate water resources and service provision in an integrated manner (PAD paras. 1 to 7 and ICR paras. 1 to 7).

Alignment with national priorities: The project objectives are consistent with national priorities at the central and state government levels. Brazil has passed a national Saneamento Law and a National Water Security Plan with the objective of extending water supply and sanitation services to reach a universal access level. In Sergipe's 2019-2022 Strategic Plan, the core themes include improvement of water supply and sanitation infrastructure, water resources security, and irrigation.

Country Partnership Framework (CPF): The project objectives are consistent with the CPF FY2018 to FY 2023 that is currently in effect. The CPF (para. 98) confirms that the World Bank Group (WBG) will emphasize an integrated approach for providing economic, environmental and social sustainability, including resolution of social conflicts, through better governance. Objective 3.2 of the CPF (para. 102) is to provide more inclusive and sustainable urban services. Focus Area 3 under the CPF regarding Inclusive and Sustainable Development emphasizes support for (i) achievement of Brazil's NDC with a particular focus on land use; (ii) provision of more inclusive and sustainable urban services; and (iii) promotion of socio-economic development of small rural producers and vulnerable groups. The CPF (para. 113) further confirms that the WBG will support authorities at the national and sub-national levels to increase the number of people with improved living conditions (water supply, sanitation, etc.).

Prior Bank experience: The project built on the experience gained from implementation of two earlier Bank-financed projects (i) Federal Water Resources Management Project (PROAGUA) and (ii) Phase II of the Water Sector Modernization Program. Both projects were with the Federal Government but included components that supported states including Sergipe; both projects included institutional strengthening components. (PAD para. 9).

Rating

High

4. Achievement of Objectives (Efficacy)



OBJECTIVE 1

Objective

To promote the sustainable use of water.

Rationale

The theory of change (TOC) was that, to promote the sustainable use of water in a coordinated manner, it was necessary to (i) strengthen institutional and implementation capacity in the main Sergipe State government agencies concerned; and (ii) improve irrigation, soil management, and environmental conservation policies and practices. The project would provide inputs in the form of (i) technical assistance through training, capacity building, provision of required software and hardware, and carrying out of studies; and (ii) financing of infrastructure improvements, including equipment, materials, and supplies. This would enable key required outputs to materialize as follows: (i) establishment of integrated procedures and tools for environmental licensing and defining of water rights; and (ii) improvements in irrigation, soil management and environmental conservation practices. The outcomes would be strengthening the institutional framework and the capacity of the Sergipe State government agencies to carry out integrated water resources management (IWRM), thereby contributing to the sustainable use of water and incentivization of the main stakeholders to improve irrigation, soil management and environmental conservation practices. The higher-level outcomes would be (i) improved quality of life and socio-economic benefits for farmers and other beneficiaries in the areas supported by the project and (ii) environmental benefits from improved water resources management.

Outputs/IRIs: (ICR Annex 1 - Results Framework)

Strengthening the Sergipe State government's capacity for water resources management.

- Integrated procedures for environmental licensing and water rights were established. However, the IRI regarding creation/designation of a state agency to be responsible for water resources management was not achieved as this was assessed to be beyond the influence of the project (Restructuring Paper, para. 6 and ICR para. 74). The agency was not created. The target was revised at restructuring to submission of a proposal, including a roadmap, to create or designate the state agency, to the state government.
- State environmental and conservation areas in the SRB are created/expanded and managed (target - 2,354 ha; actual achievement 266 ha; achievement level 11%). The target was not achieved. At restructuring, the achievement was assessed to be beyond the purview of the state government (Restructuring Paper, Section on Proposed Changes). The indicator was changed to "demarcation, preservation, conservation and recovery of protected areas in the water supply reservoirs in the SRB" and the revised target was set at 266 ha.
- Development of new regional models for provision and management of solid waste services in rural and small towns. The target was not achieved. The indicator was dropped at restructuring because of new priorities that had emerged, and was replaced by " water sources and water supply reservoirs protected and rehabilitated"

Enhancing soil management and conservation practices

Outputs/IRIs: (ICR Annex 1 - Results Framework)



- Adoption of improved water and soil conservation practices in areas supported by the project: The original target was 60% of the farmers in the irrigation perimeters of the Poca da Ribeira and Jacarecica I irrigation perimeters (target 300; actual 35; achievement level 11%). The target was not achieved. At the restructuring in June 2017, the indicator was replaced by "adoption of improved water and soil conservation practices by rural producers benefiting from irrigation kits supplied".

Outcomes: There were significant shortcomings regarding achievement of the originally targeted outcomes. The PDO indicator was "integrated procedures and tools for environmental licensing and water rights are implemented". This included establishment of a water resources management agency which was not achieved. The original target was therefore only partially achieved. The IRI regarding establishment and expansion of State designated conservation areas was not achieved as it was assessed at project restructuring to be beyond the purview of the State government. The IRI regarding adoption of improved water and soil conservation practices was not achieved.

Rating
Modest

OBJECTIVE 1 REVISION 1

Revised Objective

The objective to promote the sustainable use of water was not revised..

Revised Rationale

As indicated above in Section 2, the original PDO was not revised during project implementation, but there were significant changes in the formulation of some PDO indicators and IRIs, and in output/IRI targets during the project restructurings. The theory of change (TOC) remained essentially the same as under Objective 1 regarding inputs but reflected changes in outputs and IRIs indicated in Section 2.

Outputs/IRIs: (ICR Annex 1 - Results Framework).

Strengthening the Sergipe State government's capacity for water resources management.

- Proposal, including a roadmap, to create or designate the state agency responsible for water resources management was submitted to the government. The target was achieved.
- Demarcation, preservation, conservation and recovery of protected areas in the water reservoirs areas in the SRB (target 266 ha; actual 266 ha, achievement level 100%).
- Elaboration of water user registry in the SRB. 2,971 water users were successfully registered. The target was achieved.
- Water bodies of the SRB were classified according to applicable regulations governing surface water and underground water. The target was achieved.
- Integration of Water Granting processes and Environmental Licensing processes. The target was achieved.



- Institutional strengthening and integration among the state's institutions concerned with water resources management included coordination of environmental licensing and water rights. The changes were ratified by relevant State Government decrees. The target was achieved.

Enhancing soil management and conservation practices.

- Water users benefiting from improved irrigation systems (target 600; actual 593; achievement level 99%).
- Adoption of water and soil conservation practices by rural producers benefiting from irrigation kits supplied under the project (target 30; actual 42; achievement level 140%).
- Training of rural agricultural producers and rural technical assistance agents as replicators of technologies and practices of soil and water conservation (target 1,000; actual 1,090; achievement level 109%).
- Rehabilitation works (as recommended by the Independent Dam Safety Panel) were carried out for the Pocaço da Ribeira, Jacarecica I, Jacarecica II, and Poxim dams.
- 2,793 persons including farmers, irrigators, technicians and students were trained in the use of pesticides.
- Bathymetry was carried out for the Pocaço da Ribeira, Jacarecica I and Jacarecica II reservoirs to characterize sedimentation.
- Hydraulic model was developed to optimize operations, hydraulic capacity and water uptake from the reservoirs.
- Training and capacity building were provided to the main Sergipe State government agencies concerned - SEAGRI, COHIDRO and EMDAGRO, including new IT (information technology) software, hardware, vehicles and improved facilities.

Outcomes: Targets were achieved or substantially achieved for most outputs/IRIs. The revised PDO indicator was "improved efficiency irrigation techniques implemented in agricultural areas targeted by the project". The ICR reports that improved systems were implemented in 868 ha (overachieving the target of 800 ha) and adopted by 893 farmers in the Pocaço da Ribeira and Jacarecica I irrigation perimeters. One area that was pending at project completion was the preparation and submission of Dam Safety Plans for the four dams supported under the project. This is expected to be completed in 2021. The target was substantially achieved.

Revised Rating

Substantial

OBJECTIVE 2

Objective

To promote the efficient use of water

Rationale



The theory of change was that improvements in (i) irrigation practices and (ii) water supply and sanitation infrastructure were necessary and causally linked to enhancing efficiency in the use of water. The project would provide inputs through financing of technical assistance, training, and infrastructure rehabilitation and modernization in (a) irrigation systems and (b) water supply and sanitation facilities. The outputs directly attributable to the utilization of the inputs would include: (a) in irrigation, improved, infrastructure, equipment, and water use practices; and (b) construction/expansion of (i) wastewater systems including treatment plants; (ii) drainage systems; (iii) water supply conveyance systems; and (c) strengthened institutional and implementational capacity in the key State government agencies including COHIDRO, EMDAGRO, and DESO. This would result in outcomes including: (i) increased efficiency in use of water in irrigation systems; (ii) reduction in pollution loads contributing thereby to improvement of water quality and sustainability of the environment; (iii) increased reliability in water supply; and (iv) strengthening the capacity of DESO to provide better water supply and sanitation services. The increased efficiency and reliability, as well as the reduction in pollution, are expected to lead to higher-level outcomes including (i) improved quality of life and socio-economic benefits for the population in the project-supported areas and (ii) environmental benefits from improved water quality and water resources management.

Outputs/IRIs (ICR Annex 1 - Results Framework)

Improving efficiency of water in irrigation.

- Establishment and implementation of water tariffs for farmers operating in the Pocado da Ribeira and Jacarecica I irrigation perimeters. The tariff framework was established and is expected to be implemented in 2021. The target was substantially achieved.
- Reduction in energy costs in irrigation perimeters supported by the project (target 40%; actual 29%; achievement level 71%). The target was substantially achieved.
- Water user associations were established in the Pocado da Ribeira and Jacarecica I irrigation perimeters. Training was provided in operations and maintenance, establishment of water tariffs, and promotion of water-efficient irrigation techniques.

Improving water quality and promoting efficient use of water in municipalities.

- Number of domiciliary connections to wastewater collection services increased in the municipalities supported by the project (baseline 55,000; target 143,000; actual 157,309; achievement level 110%).
- Number of people benefiting from improved water supply (target 290,000; actual 290,000; achievement level 100%). The target was achieved.
- Improvement in DESO's EBITDA margin (baseline 10%; target 16%; actual 8%; achievement level 50%). The target was not achieved.
- New wastewater treatment plants were constructed and in operation in the municipalities of Aracaju, Itabaiana, and Nossa Senhora das Dorres.
- Drainage system was implemented and operational in Itabaiana.
- Water supply interventions were carried out in Aracaju including replacement of obsolete meters and 30,000 household connections.
- Emergency recovery was successfully carried out for a major collapsed water supply pipe serving the city of Aracaju.
- Operational efficiency of DESO was improved through new equipment, facilities and vehicles.



- New environmental protocols for wastewater management were developed by DESO.

Outcomes: Two of the three PDO/IR indicators related to efficiency of water were not achieved. The PDO indicator for efficiency improvement in irrigation was "20% of efficiency improvements in the use of water as measured by liters/second/hectare in the Pocaço da Ribeira and Jacarecica I irrigation perimeters". At the project restructuring in 2017, it was assessed that this indicator was difficult to measure and dropped thereafter. One IRI that was not achieved was the improvement in DESO's EBITDA margin. This was assessed to require actions beyond the scope of the project. The PDO indicator "pollution load discharged by municipalities targeted by the project's wastewater investments is reduced" (expressed as reduction of tons per year of BOD) was underachieved as compared to the original target and overachieved as compared to the revised target (baseline 600; original target 5,600; revised target 4,000; actual 5,543).

Rating
Modest

OBJECTIVE 2 REVISION 1

Revised Objective

The objective to promote the efficient use of water was not revised.

Revised Rationale

As indicated above in Section 2, the PDO was not changed during implementation, but there were significant changes in some PDO and IR indicators reflecting the use of cost savings to scale up wastewater related investments and to better align project activities with changed State government priorities during implementation. The revised TOC was essentially the same as under the original Objective 2 regarding inputs but reflected changes in PDO/IR indicators and outputs as indicated in Section 2.

Outputs/IRIs: (ICR Annex 1 - Results Framework)

Improving efficiency of water in irrigation.

- Establishment and implementation of water tariffs for farmers operating in the Pocaço da Ribeira and Jacarecica I irrigation perimeters. The tariff framework was established and is expected to be implemented in 2021. The target was substantially achieved.
- Reduction in energy costs in irrigation perimeters supported by the project (target 40%; actual 29%; achievement level 71%). The target was substantially achieved.
- Water user associations were established in the Pocaço da Ribeira and Jacarecica I irrigation perimeters. Training was provided in operations and maintenance, establishment of water tariffs, and promotion of water-efficient irrigation techniques.

Improving water quality and promoting efficient use of water in municipalities.

- Number of domiciliary connections to wastewater collection services increased in the municipalities supported by the project (baseline 55,000; target 143,000; actual 157,309; achievement level 110%).



- Number of people benefiting from improved water supply (target 290,000; actual 290,000; achievement level 100%). The target was achieved.
- Improvement in DESO's EBITDA margin (baseline 10%; target 12%; actual 8%; achievement level 66%). The target was significantly underachieved.
- New wastewater treatment plants were constructed and in operation in the municipalities of Aracaju, Itabaiana, and Nossa Senhora das Dorres.
- Drainage system was implemented and operational in Itabaiana.
- Water supply interventions were carried out in Aracaju including replacement of obsolete meters and 30,000 household connections.
- Emergency recovery was successfully carried out for a major collapsed water supply pipe serving the city of Aracaju.
- Operational efficiency of DESO was improved through new equipment, facilities and vehicles.
- New environmental protocols for wastewater management were developed by DESO.

Outcomes: Targets were achieved or substantially achieved for most outputs/IRIs. One IRI that was underachieved was the improvement of DESO's EBITDA margin. This was assessed to require actions beyond the scope of the project. The revised PDO indicator "pollution load discharged by municipalities targeted by the project's wastewater investments is reduced" (expressed as reduction in tons per year of biological oxygen demand - BOD) was overachieved. (Baseline 600; revised target 4,0000; actual 5,543; achievement level 139%). The core indicator "number of people with access to improved sanitation service" was overachieved in total (baseline 102,000; target 230,000; actual 459,075; achievement level 200%). and female (baseline 54,300; target 122,000; actual 237,137; achievement level 195%).

Revised Rating

Substantial

OVERALL EFFICACY

Rationale

Although the PDO remained unchanged during project implementation, a split evaluation is carried out since changes made at project restructuring resulted in a reduction in the project's ambition and significant changes in the formulation of some PDO/IR indicators and output/IRI targets.

Pre-restructuring efficacy is rated Modest based on ratings of Modest for Objective 1 (to promote sustainable use of water) and Modest for Objective 2 (to promote efficient use of water). As discussed in Section 4, for Objective 1, there were significant shortcomings in the achievement of targets/IRIs related to the PDO regarding establishment of institutional procedures and tools, notably the failure to create or designate a State government agency for water resources management and the limited success in establishment and expansion of designated areas for environmental conservation. For Objective 2, there were significant shortcomings regarding achievement of the IRIs related to improvement of efficiency of water use in irrigation and in improvement in DESO's EBITDA margin.



Overall Efficacy Rating

Modest

Primary Reason

Low achievement

OVERALL EFFICACY REVISION 1
Overall Efficacy Revision 1 Rationale

Post-restructuring efficacy is rated Substantial as the project substantially achieved the targeted outcomes in regarding the project's objectives (i) to promote the sustainable use of water and (ii) to promote the efficient use of water.

Overall Efficacy Revision 1 Rating

Substantial

5. Efficiency

Administrative and Implementation Efficiency

Project cost: The estimated cost at appraisal was US\$117.1 million. The actual cost at completion was US\$110.3 million. (ICR Data Sheet). Part of the savings in cost was fortuitous - substantial changes in the exchange rate between the Brazilian Real and the US dollar resulted in savings of about US\$18 million which were utilized for additional investments under the project (Restructuring Paper, para. 11).

Project duration: The original closing date was June 30, 2017. It was extended twice, first by 22 months to April 30, 2019 and later, by 12 months to April 30, 2020 to compensate for delays in the early part of implementation and to allow sufficient time for completion of ongoing contracts. The actual implementation period was 88.5 months compared to the planned period of 54.5 months.

Economic Efficiency

Appraisal analysis: (PAD Annex 6). The indicators used for economic efficiency were the Economic Internal Rate of Return (EIRR) and the Economic Net Present Value (ENPV) estimated at a discount rate of 10% over a duration of 25 years. Estimates were made separately for the irrigation component and the water supply and sanitation component. For the irrigation component, the main benefits anticipated were (i) savings in water used and the incremental quantity available to be used for other purposes; and (ii) reduction in costs including use of chemicals and other materials. For the water supply and sanitation component, the benefits anticipated were (i) incremental quantity of water sold and (ii) incremental wastewater charges collected. The estimated economic viability indicators were:

- For the irrigation component, an EIRR of 32% and an ENPV of US\$16.2 million



- For the water supply and sanitation component, an EIRR of 23% and ENPV of US\$11.3 million.

Post-Completion analysis: (ICR Annex 4): Efficiency analysis was carried out separately for (i) the irrigation component (13% of project cost) and (ii) the water supply and sanitation component (77% of project cost).

Irrigation component: Estimates were prepared separately for the two irrigation schemes (i) Pocado da Ribeira system including 648 farms and (ii) Jacarecica I system including 248 farms. The cost benefit calculations were based on incremental (with and without project) analysis using 10 farm simulation models with different combinations of eight key crops. The assumptions in regard to intensity of land use were 70% without the project and 85% with the project. The estimated EIRRs are: 15% for the Pocado da Ribeira system and 14% for the Jacarecica I system.:

Water supply and sanitation component: The analysis was carried out on an incremental (without and with project) basis. Benefits included (i) incremental quantity of water sold; (ii) estimated average benefits for households from improved wastewater collection services - R\$2,040 per household per year based on a study carried out in 2018. The estimated EIRR was 38% with an ENPV of R\$334 million.

Assessment: The post-completion EIRR estimates were higher than the appraisal estimates for the water supply and sanitation component and lower for the irrigation component. However, in both cases, the post-completion EIRR are significantly higher than the discount rate of 6% to 8% currently prescribed under Bank guidelines for economic analysis of investment projects, and the ENPVs are positive. The project's efficiency is rated Substantial.

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		0	0 <input type="checkbox"/> Not Applicable
ICR Estimate		0	0 <input type="checkbox"/> Not Applicable

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

6. Outcome

Table: Overall Outcome Ratings



Indicator	Before Restructuring	After Restructuring
Relevance of objectives	High	High
Efficacy	Modest	Substantial
Objective 1 (with original indicators and targets)	Modest	Not rated
Objective 1 (with revised indicators and targets)	Not rated	Substantial
Objective 2 (with original indicators and targets)	Modest	Not rated
Objective 2 (with revised indicators and targets)	Not rated	Substantial
Efficiency	Substantial	Substantial
Outcome rating	Moderately Unsatisfactory	Satisfactory
Outcome rating value	3	5
Amount disbursed (US\$ million)	25.24	38.20
Disbursement (%)	40%	60%
Weight value	1.2	3.0
Total weights	1.2+3.0 = 4.2 (rounded to 4.0)	
Overall outcome rating	Moderately Satisfactory	

a. Outcome Rating
Moderately Satisfactory

7. Risk to Development Outcome

Technical risks (Moderate): The state agencies concerned are familiar with the technologies employed under the irrigation and water supply and sanitation components. The Dam Safety Plans (DSPs) for the four dams supported under the project were not completed at the time of project closing. They are expected to be completed in 2021. There is a risk that these may be delayed.

Administrative risks (Moderate): Substantial changes were introduced under the project regarding definition of state agency responsibilities and inter-agency collaboration frameworks. Successful implementation of integrated resources management will require the establishment of a state agency in charge of water resources management. This has been delayed and was not accomplished at the time of project closing.



There is a risk that the establishment of the agency may be further delayed which will impact the implementation of integrated water resource management policies.

Policy risks (Moderate): Successful implementation of integrated water resources management will require continued focus and support on the part of the state government. There is a risk that the necessary resources may not be allocated to enable the agencies to carry out their functions effectively.

Financial risks (Moderate): Sustainability of the gains made under the project interventions will require continued support from DESO, COHIDRO, EMDAGRO, and other implementing agencies which, in turn, would depend upon availability of financial and other resources to operate and maintain the infrastructure and other facilities, and to provide support to participating farmers and other land users through technical assistance and supplies of materials. There is a risk that the necessary resources may not be available in a timely and sufficient manner.

8. Assessment of Bank Performance

a. Quality-at-Entry

The project design benefited, to some extent, from experience under earlier Bank-financed projects under which Sergipe State was a beneficiary (among other states) of funds made available to the Federal Government. The strategic relevance was, (and continues to be), high in terms of alignment with national priorities and those in the CPF. However, the project design was ambitious in terms of the project scope, taking into account the capacities of the main state government agencies involved and their lack of experience with Bank policies and procedures. Some PDO and Intermediate results indicators were not designed appropriately in terms of their formulation and/or basis of measurement. Baseline values were incorrect in some cases and had to be modified during implementation. Project implementation capacities in terms of procurement and financial management were not satisfactorily established at the start of project implementation which contributed to substantial delays in the early stages of implementation. Environmental and social safeguard implementation arrangements were satisfactory.

Quality-at-Entry Rating

Moderately Satisfactory

b. Quality of supervision

The project team carried out a total of 16 supervision missions over the implementation period. The project had two TTLs during implementation. The TTL was based in Brazil which contributed to more effective client interface and continuity. The supervision teams were adequately staffed with environmental, social safeguards, and fiduciary specialists.

The project team was proactive in reaching out to the multiple implementing agencies under the project. However, the team could have been more proactive in pursuing project restructuring, given the substantial delays in the early part of implementation and the weaknesses in the project's M&E system in terms of lack



of baseline data, inappropriate formulations for some PDO and intermediate results indicators, and measurement difficulties for some indicators. The first restructuring was carried out only in 2017 (the original closing date was June 30, 2017) when these deficiencies were addressed.

Performance reporting by the team was timely and candid. Supervision of fiduciary and safeguards aspects was timely and adequate.

Quality of Supervision Rating

Moderately Satisfactory

Overall Bank Performance Rating

Moderately Satisfactory

9. M&E Design, Implementation, & Utilization

a. M&E Design

There were some significant shortcomings in M&E design:

- Some of the original PDO indicators were not adequate to measure the two-part PDO formulation (sustainable and efficient use of water) and had to be modified during project restructuring.
- Some intermediate result indicators had to be re-formulated to better measure results and align them with project scope.
- Baseline values were missing and/or incorrect in some cases.
- The measurement methodologies prescribed for some indicators were impractical.
- Some indicators were missing in regard to achievement of interventions under Component 2 (water for irrigation).
- Indicators were not included to assess dam safety actions.

b. M&E Implementation

The deficiencies regarding the design of the M&E system were largely corrected during the project restructuring in 2017. The Project Management Unit (PMU) collected activity reports from the implementing agencies including bi-annual progress reports. The collected data was incorporated into the



M&E system and was available to gauge progress in implementation in terms of achievement of outputs, intermediate results, and outcomes.

c. M&E Utilization

The M&E system was used to report on project progress, including both positive and negative features. Results were communicated to the state government agencies involved and used for reporting of progress in the Implementation Status Reports (ISRs).

Overall rating of M&E: Although there were significant weaknesses in the M&E design, they were largely corrected during implementation. On balance, the rating for the project's M&E system is Substantial with moderate shortcomings.

M&E Quality Rating

Substantial

10. Other Issues

a. Safeguards

Environmental safeguards: The project was rated Category A (Full Assessment) at appraisal and continued to remain so classified. It triggered the following: Environmental Assessment (OP/BP 4.01); Natural Habitats (OP/BP 4.04); Forests (OP/BP 4.36); Pest Management (OP/BP 4.09); Physical Cultural Resources (OP/BP 4.11); and Safety of Dams (OP/BP 4.37).

The ICR reports (para. 64) that there were no significant environmental impacts throughout project implementation. At project closing, the ratings were Satisfactory for all triggers except Safety of Dams (OP/BP 4.37) due to non-completion of the required Dam Safety Plans prior to project closing. (These are expected to be completed in 2021). At project closing, the overall rating for Environmental Compliance was Moderately Satisfactory.

Social safeguards: The ICR reports (para. 67) that Resettlement Planning Frameworks (RPFs) were prepared and disclosed for the project sites. There was no involuntary resettlement of persons. Some land acquisition was required, but all the areas were acquired, and compensated for, in compliance with OP 4.12. Overall, there were no non-compliance issues in regard to social safeguards.

The ICR reports (para. 67) that a Social Action Plan was implemented with success, but it was not possible to prevent advances in irregular occupation in the dam areas, and that there is a risk that this may compromise future water quality and pose a risk to occupants in areas close to the dam reservoirs. The ICR reports (para. 68) that a Grievance Redress Mechanism (GRM) was set up. It received more than 40,000 calls monthly and responses were provided in the agreed timeframe (24 hours or 5 days as applicable).



b. Fiduciary Compliance

Financial Management (FM): Ratings were Satisfactory in the first two years of implementation; downgraded to Moderately Unsatisfactory in November 2014 due to an outdated Operations Manual and discrepancies in unaudited Interim Financial Reports (IFRs); upgraded to Moderately Satisfactory in April 2016; downgraded to Moderately Unsatisfactory in August 2016 due to inconsistencies in IFRs; upgraded subsequently to Satisfactory in August 2017; and downgraded to Moderately Satisfactory in October 2019 due to withholding of designated accounts by the State treasury. The rating at closing was Moderately Satisfactory.

The ICR reports (para. 56) that auditors expressed clean opinions for most years except 2015. All IFRs were acceptable and mostly on time. There were no cases of ineligible expenditures.

Procurement: The ICR reports (paras. 58 to 61) that procurement ratings varied from Moderately Unsatisfactory to Moderately Satisfactory during the implementation period. The project's implementation arrangements, as designed, did not address the procurement challenges caused by multiple implementing agencies and lack of compatibility between Bank procurement systems and requirements under state and federal government regulations. The situation was more difficult up to 2015 but improved subsequently. The rating for Procurement was Moderately Satisfactory in the last two years of project implementation.

The ICR does not indicate what were the fiduciary (procurement and financial management) ratings in the last ISR before project closing.

c. Unintended impacts (Positive or Negative)

There were no significant unintended impacts reported.

d. Other

Gender: There were no gender-specific activities included in the project design. However, the project's PDO indicator did include a core indicator on number of beneficiaries which included a target for women beneficiaries. The target was reported to be achieved.

Poverty Reduction: The project included the introduction of a framework for water tariffs for irrigation purposes which included the introduction of socially targeted tariffs based on income levels of households.

11. Ratings

Ratings	ICR	IEG	Reason for Disagreements/Comment
Outcome	Moderately Satisfactory	Moderately Satisfactory	



Bank Performance	Moderately Satisfactory	Moderately Satisfactory
Quality of M&E	Substantial	Substantial
Quality of ICR	---	Substantial

12. Lessons

The ICR (paras. 79 to 89) lists a number of lessons that have relevance for projects implemented in similar environments:

1. Client capacity needs to be realistically assessed early on in project design: The experience under this project has shown that, when designing the project, it is essential to make a realistic assessment of the client's implementing capacity, particularly when it is a first-time client not adequately familiar with Bank fiduciary procedures and requirements. Basic training in procurement, financial management, and safeguards procedures needs to be provided early on in the implementation process.
2. Interventions in irrigation related improvements need to be undertaken at an early stage of project implementation: Capacity building activities aimed at improved soil management and conservation practices need to be implemented after the new irrigation systems are in place to maximize the demonstration effects and increase ownership. Improved practices are more likely to be accepted and used after the physical investments are in place.
3. Training of rural producers in improved techniques and practices requires close and continuing contact: The experience under the project has shown that close and continuing contact and social action with the targeted beneficiaries is essential to motivate participants and keep them engaged.
4. Projects should be designed to have sufficient flexibility to adapt to changing priorities: An important priority that emerged during project implementation was the emergency response that was required to address the collapse of a major water supply pipe supplying water to the city of Aracaju. Project funds had to be re-allocated to address this need.

13. Assessment Recommended?

No

14. Comments on Quality of ICR

The ICR exceeds the prescribed length for ICRs under the OPCS guidelines, but this is considered justified in view of the scope and complexity of this project. The ICR is clearly written, candid, and follows other applicable OPCS guidelines. It presents a clear theory of change. The analysis and reporting are outcome focused and evidence based. The ICR draws on information from the project's M&E system supplemented by data from other official sources. The narrative and analysis in the main text are supplemented by detailed information in



supporting annexes. The ICR provides relevant lessons learned from the project experience. Overall, the ICR provides a good basis for assessing the project's outcome.

a. Quality of ICR Rating
Substantial