Report Number: ICRR0022960

## 1. Project Data

| Project ID | Project Name |
|---|---|
| P125120 | MZ:Greater Maputo Water Supply Expansion |
| **Country** | **Practice Area(Lead)** |
| Mozambique | Water |

| L/C/TF Number(s) | Closing Date (Original) | Total Project Cost (USD) |
|---|---|---|
| IDA-52900 | 30-Sep-2019 | 166,425,125.62 |
| **Bank Approval Date** | **Closing Date (Actual)** | |
| 25-Jul-2013 | 24-Sep-2021 | |

| | IBRD/IDA (USD) | Grants (USD) |
|---|---|---|
| Original Commitment | 178,000,000.00 | 0.00 |
| Revised Commitment | 178,000,000.00 | 0.00 |
| Actual | 166,461,783.71 | 0.00 |

| Prepared by | Reviewed by | ICR Review Coordinator | Group |
|---|---|---|---|
| Kishore Laxmikant Nadkarni | Vibecke Dixon | Ramachandra Jammi | IEGSD (Unit 4) |

## 2. Project Objectives and Components

### a. Objectives

The project development objective (PDO) was to increase access to clean water for residents in the Greater Maputo Area. (Financing Agreement, Schedule 1, dated January 31, 2014, and Project Appraisal Document, para. 17).

The PDO remained unchanged during project implementation.

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

No

### c. Will a split evaluation be undertaken?

No

### d. Components

(Reference PAD paras. 20 to 25 and ICR paras. 9 to 13).

**Component A: Investment in Water Supply Network System:** (estimated cost at appraisal US$133.0 million; actual cost at completion US$118.0 million).

This component was to enable the abstraction, treatment, and conveyance of water to the Machava distribution center in the Maputo water supply network. The component was to provide goods and civil works to: (i) construct the abstraction works for 120,000 m3/day of raw water from the Corumana Dam; (ii) piping to transmit 120,000 m3/day of raw water from the abstraction point to the water treatment plant (WTP); (iii) build a WTP of 60,000 m3/day; (iv) build 93 kilometers (kms) of transmission pipeline with transmission capacity of 120,000 m3/day; and (v) reservoirs, pumping stations, and ancillary works. In addition, offtakes from the main pipeline would allow provision of water to settlements located to the pipeline between the treatment plant and Machava. The main offtake, to be funded by ORIO (Netherlands Facility for Infrastructure Development), would supply treated water to the northern part of Greater Maputo and Matola.

**Component B: Investment in Water Supply Distribution System:** (estimated cost at appraisal US$27.0 million; actual cost at completion US$27.93 million).

This component was to install (i) around 100,000 new connections and associated meters in Greater Maputo and (ii) up to 300 km of network to serve the new connections. This component was to be complemented by ORIO and AfD (French Development Agency) financed programs to install distribution centers, primary distribution networks in new service areas, and 20,000 additional connections and household meters.

**Component C: Technical Assistance to FIPAG:** (estimated cost at appraisal US$13.0 million; actual cost at completion US$16.0 million).

This component was to provide technical assistance to FIPAG (Water Supply Assets Holding and Investment Fund) including: (i) supervision of project works, implementation of Environmental Management Plans (EMPs) and Resettlement Action Plans (RAPs); (ii) preparation of Phase II of the program to increase water available to GMMA (Greater Maputo Metropolitan Area) to meet residential demand to 2025, including technical assistance for engineering, dam safety, and safeguards and economic analyses; (iii) consulting services to support the preparation of a follow-on project to cover selected other cities; (iv) consulting services to FIPAG to support project implementation, including support for AdeM's (Maputo Regional Water Company) transition in 2014; (v) financial and technical audits; and (vi) capacity building and training.

**Component D: Capacity Building and Operational Support to CRA (Water Regulatory Council)**: (estimated cost appraisal US$5.0 million; actual cost at completion US$4.53 million).

This component was to fund operating expenses and technical assistance to CRA (Water Regulatory Council), aiming to support implementation of regulations on water and sanitation services in the country. It was to include support for (i) expansion of the regulatory framework and oversight, particularly in peri-urban areas and (ii) reviews of the structure and form of subsidies for low-income customers, and of financing means to extend water and sanitation services to the urban poor.

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

**Project Cost:** At appraisal, project cost was estimated at US$178.0 million; the actual cost at project completion was US$166.46 million.

**Financing:** At appraisal, the project was to be financed through an IDA grant of US$178.0 million. During the implementation period, due to rate changes between the SDR (Special Drawing Rights) and the US$, the amount of the grant reduced to US$166.46 million. This amount was fully disbursed by project closing.

**Borrower Contribution:** There was no financial contribution from the Borrower.

**Parallel Financing:** The project was supported by two complementary operations financed by grants of Euro 23 million from ORIO (Netherlands Facility for Infrastructure Development) and Euro 40 million from AfD (French Development Agency).

**Dates**: The project was approved on July 25, 2013. The planned effectiveness date was January 1, 2014. The actual effectiveness date was July 29, 2014, a delay of about seven months. The original closing date was September 30, 2019. It was extended twice by a total of 24 months. The actual closing date was September 24, 2021.

**Mid-Term Review**: A Mid-Term Review (MTR) was carried out in November 2018.

**Restructurings**: The project underwent two restructurings. Under the first restructuring, approved on September 13, 2019, the closing date was extended by twelve months from September 30, 2019 to September 30, 2020 to allow for completion of works needed to achieve the PDO. Under the second restructuring, approved on September 24, 2020, the closing date was further extended by twelve months to allow for completion of activities further delayed by the impact of the COVID pandemic. The two restructurings accounted for a cumulative extension of nearly 24 months. There were no changes in the PDO, indicators, targets, or components. However, costs of the components were revised.

## 3. Relevance of Objectives

### Rationale

(Reference PAD paras. 1 to 12 and ICR paras. 1 to 5).

**Country Context**: Mozambique, in South Eastern Africa, is a country with an area of about 800,000 square kilometers (km2) and a population of around 28 million. At the time of appraisal in 2013, about 70 percent of the population lived in rural areas. The country has ample resources in terms of arable land, water, energy, gas and mineral resources. Between 1993 and 2013, the country experienced substantial economic growth with an average annual growth rate of about 8 percent. The growth was aided by investments in infrastructure and agriculture, and large foreign direct investments in the rapidly expanding extractive industries sector. However, the rapid growth did not significantly result in poverty reduction or expanded employment opportunities. At appraisal in 2013, Mozambique was one of the poorest countries in the world, ranking 184th out of 187 countries in the 2011 Human Development Index.

**Sector and Institutional Context**: Under the GOM's water sector policy initiated in 1998, water supply assets remained the property of the Government and were to be managed by a state-owned assets holding company. Water supply systems were to be operated under contract by independent providers operating on a commercial basis. Under this framework, the GoM established FIPAG (Fundo de Investimento e Patrimonio do Abasticimento de Agua) as the Water Supply Assets Holding and Investment Company, to manage the water supply assets in large urban areas. The GoM also established CRA (Conselho de Regulacao de Aguas) as the independent regulator for the water sector. In the case of the city of Maputo, the operations were leased to AdeM (Aguas de Regiao de Maputo) or Maputo Regional Water Company, a joint venture of domestic and foreign investors. While the water supply situation improved in some urban areas, it remained more problematic in the Greater Maputo Metropolitan Area (GMMA), the largest urban area in the country. The water system was not able to meet the needs of a metropolitan area with a population of more than two million people, growing at a rate of 2.7 percent per year. FIPAG and AdeM focused on increasing the number of connections but adequate water supply was constrained by the water production capacity. The number of hours of service declined from 14 hours a day in 2005 to 9 hours a day in 2011. At that time, water for the formal (FIPAG/AdeM) system came from a single source, the Umbeluzi River and there was a single water treatment plant (WTP) serving the system. The river and WTP were vulnerable to adverse climate-related conditions. The diversification of water sources, as well as an increase in total water supplied, therefore became a key priority.

**Alignment with the Country Partnership Strategy/Framework:** At appraisal, the project development objective (PDO) was consistent with the Country Partnership Strategy (CPS) for Fiscal Years 2011 to 2015 in effect at the time. Under the CPS, increased access to potable water was included as a CPS outcome indicator. The PDO remains consistent with the latest Country Partnership Framework (CPF) for Fiscal Years 2017 to 2021. The CPF observes (para. 49) that improving access to quality water, sanitation and hygiene is critical for fostering growth and tackling chronic poverty, including stunting. Of the CPF's three focus areas, Focus Area 2 refers to Investing in Human Capital. Objective 7 under the focus area refers to Improving Access to Water and Sanitation. The CPF confirms (para. 85) that the aim of World Bank Group (WBG) support is to reduce the incidence of water and sanitation related diseases by providing improved access to water and sanitation services to an additional 1.1 million people living in peri-urban areas and small towns. The PDO is also aligned with other aspects of the CPF including its Pillar III (Enhancing Sustainability and Resilience", and the objectives of improving management of climate risks and natural resources, and responding to natural disasters.

**Alignment with National Priorities:** At appraisal, the PDO was aligned with the national and sectoral priorities. The project supported Mozambique's 2015-2035 National Development Strategy and the 2013-2025 National Strategy for Adaptation and Mitigation to Climate Change. The PDO remains consistent with the currently prevailing national priorities in the GoM's Five Year Program for 2020 to 2024. Two of the

priorities under the Program are: (i) economic and social infrastructure development and (ii) sustainable and transparent management of natural and environmental resources.

**Prior Bank Experience:** The World Bank Group (WBG) has been involved in Mozambique's water supply and sanitation sector for several years. The Project was preceded by the IDA-financed National Water Resources Development Project (P107350) which was approved in September 2011. This project provided US$70 million in IDA grant financing to carry out selected investments related to the Corumana Dam. The project also financed feasibility studies for the investments to be undertaken in the GMWSEP.

**Relevance of Project Development Objectives**: Given the context described above, the PDO was consistent, and remains consistent, with the priorities in the national programs and the Country Partnership Strategy/Frameworks. The PDO was correctly pitched reflecting the GoM's priorities and implementation capacity. While "increased access to clean water" is in itself closer to an output than an outcome, the theory of change (TOC) in the ICR clearly shows that this is expected to lead to a higher-level objective of improved health and welfare of the beneficiaries.

### Rating
High

## 4. Achievement of Objectives (Efficacy)

### OBJECTIVE 1
#### Objective
To increase access to clean water for residents in the Greater Maputo Area.

#### Rationale
The ICR provides a diagrammatic presentation of the Theory of Change (TOC) and the causal Results Chain. To increase access to clean water for the residents of the Greater Maputo Area, it was necessary to (i) increase water abstraction from a new source (the Corumana Dam); (ii) increase water treatment capacity; (iii) rehabilitate and expand the water transmission and distribution network; (iv) increase the number of new/rehabilitated piped household water connections and community water points; and (v) strengthen the institutional capacity of FIPAG and AdeM to deliver water supply services. The Project would provide inputs for financing investment and technical assistance. The inputs for investment financing would directly lead to relevant physical outputs related to the supply of potable water including construction of : (i) a new water treatment plant; (ii) transmission mains and distribution networks; and (iii) piped water household and community connections. The inputs for technical assistance to FIPAG and AdeM would lead to capacity building outputs for strengthening their institutional capacity in regard to improved delivery of water supply services. The interventions under the Project would be supported in parallel by donor-financed (ORIO, AfD) investments related to expanding and improving distribution networks and increasing piped water connections for households and communities. The Project-financed and donor-financed investments would be mutually interlinked in ensuring achievement of the PDO. The outcomes would be improved quality of water supply and increased access to clean water for residents in the Greater Maputo Area. The longer-term outcome

would be enhanced human and social development through increased, sustainable and well-managed access to safe drinking water.

The causal links and full results chain in the TOC in regard to Objective 1 were clear. The PDO indicators and Intermediate Results Indicators (IRIs) adopted were generally relevant, measurable, and appropriate for assessing the achievement of the objective with some limitations. In regard to the PDO to increase access to clean water, greater clarity should have been provided in the definition of "clean water". For consumers, what matters is the quality of the water at the points of actual consumption (household and community connections). However, the definition that was used was "improved water sources" which refers to the quality of water provided by the water treatment plant (WTP). Specific water quality related indicators should have been included in the Results Framework. The ICR does confirm (para. 23) that the quality of the water was monitored at the WTP and found to be adequate, but this in itself does not confirm adequacy of water quality at the actual water consumption points. Also, in retrospect, in view of AdeM's weak operational performance in achieving reduction in non-revenue water (NRW) and improving reliability of supply (discussed later in Section 5), the IRIs should have included performance targets in these areas.

Key assumptions underlying the results chain were: (i) timely and adequate completion of the distribution-related investments to be provided through the ORIO and AdF donor financing; (ii) safe yield from the Corumana Dam is available to supply the WTP; (iii) institutional capacity is available in FIPAG and AdeM to manage and operate the new infrastructure; control water losses; and apply full-cost recovery through tariffs; and (iv) customers are willing and able to pay the higher water tariffs.

**Outputs and Intermediate Results Indicators** (as reported in the ICR paras. 21 to 28 and Annex 1 - Results Framework).

Water Abstraction: The planned facilities were completed with some delays. The abstraction works and 95 km long ductile iron transmission line with a capacity of transmitting 120,000 m3/day and diameters ranging between 800 and 1400 millimeters (mm) were installed and tested in September 2019. Related facilities including power lines and offtakes were completed and became operational by March 2021. The main offtake, supplying water to the northern part of Greater Maputo and the city of Matola, was funded by ORIO and became operational in June 2021.

Water Treatment: The planned construction of the Sabie WTP, with a capacity of 60,000 m3/da started in December 2018 and was completed with some delays in May 2021. The WTP became operational in June 2021. The WTP began with a production of 30,000 m3/day and had increased its output to 40,440 m3/day by November 2021. The ICR reports (para. 23) that daily water quality monitoring reports shared by FIPAG indicate that the treated water met the expected parameters for turbidity, pH, conductivity, total hardness, total alkalinity, organic materials content, and residual chlorine under Mozambican and World Health Organization (WHO) quality standards, thus conforming to the World Bank's definition of "improved water source". However, it should be noted that the water quality monitoring was performed for the water treated at the WTP, and does not in itself confirm the adequacy of the quality of water actually delivered at points of consumption (household and community connections). The Results Framework did not include water quality indicators either at the WTP level or actual water consumption points in the network.

Water Distribution Network: The planned construction of secondary and tertiary networks was completed with some delays by September 2021. Principal outputs were the following:

- 150 km of secondary and tertiary distribution network linked to the Intaka distribution center (IDA-finnaced)
- 155.4 km of secondary and tertiary distribution networks linked to the Matlemele and Guava distribution centers (IDA-financed)
- 82.6 km of tertiary distribution networks supplying Matola and Machava (IDA-financed)
- Improvement of Matlemele and Guava distribution centers (financed by ORIO)
- Improvement of Intaka distribution center (financed by AfD)
- 67 km of primary distribution network linked to Matlemele and Guava distribution centers (financed by ORIO)

Piped Water Connections: The Project installed 101,671 domiciliary connections in the Greater Maputo Area, exceeding the target of 100,000 connections. An additional 20,000 domiciliary connections planned to be installed under the ORIO funding was ongoing at project completion and the contract is expected to be awarded in 2022 (ICR para. 25).

**Outcomes:**

The Project achieved the planned targets for the Intermediate Results Indicators (as discussed above) albeit with some delays. The Project also achieved the three outcome targets as measured by the following PDO indicators:

PDO 1: Number of direct project beneficiaries (baseline 0; target 560,000; actual 565,356; target achieved).; of which percentage of female beneficiaries (baseline 0%; target 50%; actual 52%; target achieved).

PDO 2: Number of people in urban areas provided with access to improved water sources under the Project (baseline 0; target 560,000; actual 565,356; target achieved).

PDO 3: Increased capacity of the water supply system (cubic meters/day) (baseline 0; target 60,000 m3.day; actual 60,000 m3/day; target achieved).

As indicated above, the Project achieved the targets in regard to each of the three PDO indicators. Regarding increased access to clean water, the ICR confirms that the target for the indicator of "improved water sources" was met. While this confirms the adequacy of the quality of treated water at the WTP, it does not in itself confirm adequate quality of water actually delivered at the consumption points (household and community connections).

Based on the above, the efficacy of Objective 1 is rated Substantial with some shortcomings.

**Rating**
Substantial

## OVERALL EFFICACY

### Rationale

The Project substantially achieved its objectives. Planned works under the Project were completed albeit with some delays (as discussed below in Section 5 on Efficiency). Targets set for the PDO indicators and the Intermediate Results Indicators were achieved. Consequently, the Project achieved its targeted outputs of increased abstraction of water from a new source; increased capacity for water treatment; construction/rehabilitation of transmission mains and distribution networks; and installation of piped water household connections. These results enabled achievement of the targeted outcome of increased access to clean water for residents in the Greater Maputo Area by providing a total of 101,671 household connections (exceeding the target of 100,000) with a total of 560,356 beneficiaries (exceeding the target of 500,000). Water quality monitoring reports have confirmed that the treated water meets the relevant Mozambican and World Health Organization (WHO) standards, thereby meeting the World Bank's definition of "improved water source". The achievements under the Project were reinforced by the results secured in regard to distribution networks and household connections that were financed in parallel with the Project through grants received from ORIO and AfD. However, one limitation was that the adequacy of water quality was measured only at the point of the WTP and not at the actual points of water consumption (household and community connections).

Based on the above, the Project's overall efficacy is rated Substantial with some shortcomings.

### Overall Efficacy Rating

Substantial

## 5. Efficiency

(Reference ICR paras. 29 to 33).

**Economic Efficiency**

At Appraisal: The economic efficiency of the Project was assessed using a cost-benefit methodology based on an incremental net benefits approach i.e. incremental costs and benefits attributable to the Project derived from a comparison of the 'with-project' and 'without-project' scenarios. Economic costs included capital investment costs, estimated O&M (operations & maintenance) costs, and periodic re-investment costs. Economic benefits included (i) net operating revenues to the utility resulting from the Project; (ii) time savings to newly connected households; and (iii) new customers' consumer surplus based on the additional water they can consume as compared to that before the Project. All costs and benefits were estimated net of taxes and duties. The indicators of economic viability used were the Economic Internal Rate of Return (EIRR) and Economic Net Present Value (ENPV) at a discount rate of 10 percent. The PAD reported an EIRR of 20 percent and an ENPV of US$69 million at a discount rate of 10 percent.

At Completion: The ICR reports (para. 29) that the post-completion assessment has been carried out using the same methodology adopted at appraisal, but updated to reflect actual results and values observed during project implementation. On this basis, the ICR reports (para. 31) that the post-completion EIRR is estimated at 15 percent and the ENPV at US$44.7 million. The post-completion EIRR and ENPV are significantly lower than the appraisal estimates. Contributing factors leading to the lower results were: (i) the substantial delay (of about

24 months) in completion of the Project facilities; (ii) high levels of NRW including both technical and commercial losses; and (iii) problems in improving reliability of water supply which contributed to difficulties in improving revenue collection performance.

Rating of Economic Efficiency: Modest

**Implementation Efficiency**

Project Cost: Compared to the project cost of US$178 million estimated at appraisal, the actual cost at project completion was US$166.46 million. lower by about US$11.54 million as compared to the appraisal estimates. The reduction in cost was due to a reduction in the US dollar value of the IDA grant caused by exchange rate fluctuations between the SDR (Special Drawing Rights) and the US dollar. This reduced the IDA grant to US$166.46 million. While all planned physical works under the Project were completed (albeit with substantial delays in some cases), the reduction in the grant amount led to FIPAG not being able to carry out planned preparatory studies related to the envisaged Phase II of the Project.

Project Duration: The planned implementation period was 74 months (about 6 years). The actual implementation period was 98 months (about 8 years), 24 months (2 years) longer than planned. Effectiveness was delayed by six months due to delays in signing of the required subsidiary agreements. Further delays were caused by the need to complete detailed designs and lengthy procurement processes for some of the larger contracts, notably for the Sabie WTP, where the bidding process had to be cancelled and then relaunched; the Corumana-Machava transmission main; and in some of the distribution-related investments. The COVID Pandemic in 2020-2021 also contributed to some delays.

Rating of Implementation Efficiency: Modest

Rating of Efficiency: Based on the above, the Project's Efficiency is rated Modest (which is also the rating in the ICR - para. 33).

## 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 | ✓ | 20.00 | 0<br>☐ Not Applicable |
| ICR Estimate | ✓ | 15.00 | 0<br>☐ Not Applicable |

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

## 6. Outcome

The Project's outcome is rated on the basis of underlying ratings for Relevance, Efficacy, and Efficiency.

As discussed in Section 3, the Project's Relevance is rated High.

As discussed in Section 4, the Project's Efficacy is rated Substantial.

As discussed in Section 5, the Project's Efficiency is rated Modest.

Based on the above, the Project's Outcome is rated Moderately Satisfactory.

### a. Outcome Rating

Moderately Satisfactory

## 7. Risk to Development Outcome

**Technical and Operational Risks:** These are rated Moderate. While FIPAG and AdeM have substantial technical and operational experience, they were not successful in reducing levels of NRW during the implementation period. Reliability of water supply was also an issue, contributing to difficulties in improving revenue collection performance. Overall, AdeM's ability to maintain efficient operations will depend upon the timely and adequate availability of funds to cover its operating and other costs. This will depend upon the GoM's continuing its policy of approving tariffs at full cost recovery levels.

**Financial Risks:** These are rated High. While the GoM has so far been following a policy of approving full cost recovery tariffs for the water sector, its willingness and ability to continue doing this could be influenced by social and political considerations in regard to impacting household consumers through the higher tariffs. This would particularly be the case if NRW levels (including both technical and commercial losses) are not reduced substantially from the current high levels of about 50 percent and reliability of water supply is not significantly improved. Increasing tariffs without satisfactorily addressing the NRW and reliability problems would place an unfair burden on customers who are willing to pay for the water services and could potentially create a backlash to raising tariffs in future.

**Macroeconomic Risks**: This is rated Moderate. As reported in the current CPF in effect, in recent years Mozambique has gone through a debt crisis with serious macroeconomic implications. The GoM's ability to financially support the water sector, if needed, could be constrained by these factors.

**Institutional Capacity Risks**: These are rated Moderate. The Project design assumed that the infrastructure assets would be owned by FIPAG but the facilities would be operated by a private operator engaged by FIPAG under a lease contract. After the lease contract with the original private operator was prematurely terminated in 2010, the facilities were operated by AdeM which then became wholly owned by FIPAG. FIPAG's stated intention was to seek a partnership with a private operator once the original lease contract expired in 2014. The contract with AdeM was extended to 2019 without involvement of a private

operator. Thereafter, FIPAG contracted IFC's Advisory Services to seek a suitable public-private partnership. This has been delayed; the current expectation is that a solution would be found in 2022. Pending a solution, AdeM would be required to continue to operate the facilities as currently contracted. While the Project has supported some institutional strengthening in FIPAG and AdeM, sustainability of these gains will depend upon continued commitment of their managements along with strong support from GoM. Lacking these, the gains could be progressively eroded.

## 8. Assessment of Bank Performance

### a. Quality-at-Entry

The strategic relevance was high and the PDO were well-aligned with the GoM's development agenda and the Bank's Country Partnership Strategy/Framework. Policy and institutional aspects were well covered, including a requirement for the GoM to set full cost recovery tariffs for the participating water utility. Assignment of responsibilities for implementation arrangements was generally satisfactory with FIPAG as the main implementation agency with support from AdeM and technical assistance was planned to be provided for capacity building in project implementation. Environmental aspects were addressed with the required assessments carried out in time. Fiduciary assessments and arrangements were well designed. Poverty, gender and social development aspects were duly taken into account. M&E design, including the theory of change and the Results Framework, was generally adequate to assess the achievement of the objectives and test the links in the results chain, but one omission was in regard to indicators for measuring water quality, particularly in view of the PDO of increasing access to clean water. The water quality was monitored only at the WTP but not at the points of water consumption. Also, there was no periodic reporting of the results of the water quality monitoring at the WTP. Further, the ICR (para. 58) identified some weaknesses including (i) indicators to test the development of institutional capacities were missing; (ii) there were no performance indicators in regard to operational weaknesses which were known to exist (NRW and reliability of water supply); and (iii) operational information for the overall Maputo water system was not included in the system. The risk assessment and proposed mitigation measures were adequate overall but two risks which were estimated as Low turned out to be higher than expected. Given that the lease contract with the original private sector operator ended problematically in 2010 (prior to appraisal), institutional risk was underestimated. No suitable private partner had been found until project closing, and FIPAG and AdeM had to assume the entire responsibility for operations. Implementation risk was also underestimated and did not adequately take into account the risks associated with the large works contracts involved, including the complex design and associated environmental issues. These resulted in long delays in completing civil works. While project preparation was generally based on robust analytic work, one area that was weak was in regard to preparation of detailed technical designs of the WTP and the pipeline from the Corumana Dam to Machava. This was deferred to the implementation phase and had a cascading effect that resulted in significant implementation delays (ICR para. 66). Although operational performance of AdeM at appraisal was weak in some important areas (high levels of NRW and weak reliability in water supply), the Results Framework did not include intermediate results indicators (IRIs) related to improved performance. The Project did include financial covenants, including those relating to setting of full-cost recovery tariffs. But in the absence of requirements for improving operational performance, these covenants required setting of higher levels of tariffs to provide full-cost recovery. This could have

impacted unfairly on those consumers who paid for their water supply (as compared to those who did not as reflected in AdeM's commercial losses).

**Rating**: Based on the above, the Bank performance for Quality-at-Entry is rated Moderately Satisfactory.

### Quality-at-Entry Rating
Moderately Satisfactory

## b. Quality of supervision

Overall, the Project's supervision team was focused on development impact and worked proactively with the counterparts to anticipate and resolve issues affecting implementation progress. Shortcomings during project preparation (discussed above) required that the Project's implementation phase be divided de facto into two phases: (i) a design phase to prepare detailed designs for the proposed works and (ii) a construction phase. The design phase directly affected the overall implementation timeline. It required over two years due to procurement of complex consultancy studies and preparation of detailed designs (ICR para. 45). The division of responsibilities between different consultants (preparation of detailed designs and technical specifications; supervision of works; and works construction) was found to be problematic and resulted in delays and additional costs. The procurement process for the Sabie WTP was protracted and caused an implementation delay of nearly 24 months. The ICR reports (para. 48) that the decision-making process between the client and the World Bank regarding the required actions was cumbersome and protracted. One area that did not receive adequate attention was requiring and monitoring improvement in the operational performance of AdeM. While compliance with financial covenants was monitored, there was no monitoring of the operational performance of AdeM, particularly in regard to NRW and reliability of water supply. The PAD (paras.10 and 11) indicated that FIPAG and AdeM were taking measures to identify and reduce sources of NRW with assistance from AfD and Vitens (a Netherlands water utility) which were expected to reduce NRW levels from over 50 percent in 2013 to 35 percent in 2019. The ICR does not indicate whether and how the Project team interacted with FIPAG, AdeM , and the donors in following the progress of these activities.

The Project team carried out a total of 16 supervision missions over the implementation period of about eight years. The team had three TTLs over the implementation period, with the last two based in the field. The missions were adequately staffed with technical, safeguards and fiduciary specialists. Given the level of technical complexity, detailed engineering designs and two large construction contracts, the location of a large part of the team in the field allowed for closer supervision and implementation support. Back to office reporting was candid - the Project's DO (Development Outcome) and IP (Implementation Progress) were rated Moderately Unsatisfactory from time to time reflecting implementation delays due to protracted procurement processes. The Implementation Status and Results Reports (ISRs) were filed in a timely manner.

**Rating:** Based on the above, the Bank performance for Quality of Supervision is rated Moderately Satisfactory.

### Quality of Supervision Rating
Moderately Satisfactory

### Overall Bank Performance Rating
Moderately Satisfactory

## 9. M&E Design, Implementation, & Utilization

### a. M&E Design
Although not articulated in the PAD, the Project's theory of change (TOC) and results chain (as inferred in the ICR) were generally sound and well-covered in the Project's M&E system. The M&E system included a generally well-developed Results Framework (RF), While the selected PDO indicators were directly related to the planned outcomes, one significant PDO indicator missing was that related to water quality particularly since . increasing access to clean water was the objective of the Project. As mentioned earlier in Section 8, the Results Framework did not include indicators in regard to water quality monitoring either at the WTP or the actual water consumption points. The ICR indicates however (para. 23) that the water quality at the WTP met applicable national and WHO standards. The Intermediate Results Indicators (IRIs) were adequate to capture the contribution of the Project components and outputs towards achieving PDO-level outcomes. Subject to the lack of an indicator to assess water quality, the other indicators were relevant, measurable, and adequate for assessing attribution of the Project outcomes to the Project interventions. Baselines were specified where relevant. FIPAG had the overall responsibility for operating and maintaining the M&E system with support from AdeM. However, as reported in the ICR (para.58), the M&E system did not include indicators for assessing the development of institutional capacities and providing operational information for the overall Maputo water system. Importantly, no indicators and associated targets were set for reducing levels of NRW (technical and commercial losses) and improving reliability of water supply.

### b. M&E Implementation
During implementation, some adjustments were made to the M&E system to better collect and monitor relevant data. This included targeting of areas to expand the distribution system by better monitoring collection rates and linking them with distribution performance, including provision of household connections and adequate hours of service. However, the weaknesses mentioned above (under M&E design) were not addressed during implementation.

### c. M&E Utilization
The M&E system was used to monitor implementation progress, including procurement-related activities. Findings and results fed into the Project supervision team's assessments and reporting of Project progress. The system helped identify areas needing special attention, e.g. the Key Performance Indicators (KPI) adopted in connection with the GoM's Decentralized Management Framework (DMF) system helped to target areas to expand the distribution system including speeding up progress in installation of household connections and addressing issues related to inadequate service provision. The system was also used to track the incidence of non-revenue water (NRW) throughout the

implementation period. However, as reported in the ICR (para. 58), no adjustments were made to try to improve AdeM's operational performance in that respect.

Rating of M&E Quality: On balance, the M&E quality is rated Substantial with moderate shortcomings.

### M&E Quality Rating
Substantial

## 10. Other Issues

### a. Safeguards
(Reference ICR paras. 59 to 63).

**Environmental and Social Safeguards**

At appraisal, the Project was classified as Category A, requiring full assessment. The environmental and social safeguards policies triggered were: Environmental Assessment (EA) - OP/BP 4.01; Safety of Dams - OP/BP 4.37; Involuntary Resettlement - OP/BP 4.12; and International Waterways - OP/BP 7.50.

The ICR reports (para. 60) that, given the nature, magnitude and sensitivity of the proposed investments, the Project included a standalone requirement dealing with compliance with World Bank safeguards requirements as well as applicable national regulations.

**Environmental**: To comply with the safeguards provisions, the GoM prepared an Environmental and Social Impact Assessment (ESIA) and Environmental and Social Management Plan (ESMP) in 2012 and 2013. Applicable environmental licenses, which expire after five years and have to be renewed, were issued under the national regulations. In 2015, specialists were hired to review and update the original ESIA and ESMP. The ICR reports (para. 61) that environmental and social safeguards performance was rated Satisfactory until mid-2019 but downgraded later to Moderately Satisfactory reflecting changes in the EA and Safety of Dams ratings. The change in performance rating was due to delays in the submission of environmental and social safeguards compliance reports. The risk was rated Substantial throughout the implementation period.

**Social:** The safeguards performance was rated Satisfactory until mid-2019 but subsequently downgraded to Moderately Satisfactory. A Resettlement Action Plan (RAP) was prepared in connection with implementation of the transmission line between Corumana and Machava. The ICR reports (para. 62) that the RAP was successfully implemented with adequate compensation for 387 people affected by the construction, and all the 93 claims received were properly addressed.

Grievance Resolution Mechanism: The ICR reports (para. 62) that the World Bank requested that a Gender-Based-Violence (GBV) Risk Assessment and Action Plan be prepared in 2020 along with a Grievance Resolution Mechanism (GRM) sensitive to GBV issues. The ICR does not elaborate on the issues that triggered the request. The Project Team clarified to IEG that that the GBV-related requirements were not triggered by any specific incidents in the Project context, but were added as a measure of prudence based on the experience in similar projects undertaken in other countries in the region, including Uganda and the

Democratic Republic of Congo (DRC). No significant GBV-related incidents were reported during the Project's implementation.

An environmental and social audit was carried out at the end of the Project by an independent consultant. It assessed that the Project's environmental and social safeguards measures were properly designed and allowed adequate management of environmental and social aspects. Works were implemented following the standards and procedures for environmental and social aspects. The audit was reviewed by the World Bank and found to be satisfactory (ICR para. 63).

The last ISR filed before project closing rates the safeguards risk as Substantial.

### b. Fiduciary Compliance

(Reference ICR paras. 64 and 65).

The ICR reports (para. 65) that the Project's overall fiduciary risk was rated low throughout the implementation period.

**Procurement**: The Project's procurement performance was rated Moderately Satisfactory until May 2020 and upgraded to Satisfactory thereafter. The fiduciary risk remained low throughout the implementation period. The established procurement arrangements were kept in place throughout the Project's implementation, including the extensions of the closing date. The ICR reports that there were no instances of non-compliance with World Bank policies. While smaller procurement packages were processed with relative efficiency, multiple issues were encountered that seriously delayed procurement processing and implementation of the two large infrastructure construction contracts (Sabie WTP and Corumana-Machava transmission main) . This contributed to the delay of nearly 24 months in project completion.

**Financial Management:** The ICR reports (para. 64) that the overall Financial Management risk remained low throughout the Project's implementation period. FM performance was consistently rated Satisfactory in the ISRs. Financial management, including audits, remained compliant with the World Bank's requirements in regard to fiduciary monitoring. The required reporting was carried out on a timely basis. Audit reports were submitted on time with unqualified opinions. The ICR reports that no cases of ineligible expenditures were encountered during project implementation.

### c. Unintended impacts (Positive or Negative)

The ICR does not report any significant unintended impacts.

### d. Other

(Reference paras. 35 to 38).

**Gender:** The Project was not specifically gender-tagged. The Project Team informed IEG that, while a Gender Based Violence Risk Assessment and Action Plan was prepared, no other specific gender-related studies or measurement of gender-related aspects were carried out during project implementation. The number of female beneficiaries under the Project was a part of the core indicator and the ICR confirms (para. 28) that women comprised a significant part (52 percent) of the overall beneficiary group. Although specific information in regard to impacts is not available, studies conducted in similar environments in other countries have shown that women tend to bear a high share of the burden of collecting water, caring for children, and cooking for their families. Therefore, despite lacking specific indicators, it is assumed that the increased access to clean water through household connections provided under the Project has possibly significantly benefited women by (i) reducing the time spent on fetching water; (ii) reducing the physical burden of transporting water; and (ii) reducing the need to care for sick children and relatives affected by water of inadequate quality.

**Institutional Strengthening:** Although institutional strengthening was not specifically targeted under the Project as either a PDO or an intermediate outcome, the Project provided capacity building and institutional strengthening technical assistance to FIPAG and AURA (Water Regulatory Authority). The assistance provided to FIPAG was directed to improving its capacity for supervision of project works, including implementation of Environmental Management Plans (EMPs) and Resettlement Action Plans (RAPs); carrying out preparatory activities for Phase II of the GMWSE Program; preparation of a follow-on project to cover other selected cities. Capacity building assistance to AURA included strengthening its capacity to collect and analyze performance of regional water utilities included under the Delegated Management Framework (DMF) established by the GoM. AURA confirmed that such data collection and analyses, including benchmarking, were regularly carried out since 2014, and reported in AURA's annual reports.

**Mobilizing Private Sector Financing:** Operations of the Maputo water service assets had been managed under a 14-year lease contract between FIPAG and AdM (Aguas de Mozambique) which began in 2000 and was planned to end in 2014. AdM was originally a joint venture between Aguas de Portugal (AdP) and Mozambican investors with AdP holding about 85 percent of the shares and being the primary partner. However, the ICR reports (para. 37) that the operational performance of AdM fell well below expectations and the relationship between FIPAG and AdM deteriorated. FIPAG bought out AdP's shares in 2010 and renamed the company AdeM (Aguas de Regiao de Maputo). AdeM (primarily publicly owned but operated on commercial principles) took over the existing lease contract for the Maputo service area with an end date of 2014. The lease agreement was subsequently extended by five years to 2019. Thereafter, the IFC's (International Finance Corporation) Advisory Services was contracted, financed by trust funds, to provide technical and transitional advice in the identification of potential private sector participation in the Greater Maputo water system. AdeM continues to operate the water system assets. The selection of a new private sector partner for the regional utilities is scheduled for 2022. (ICR para. 37).

**Poverty Reduction and Shared Prosperity**: The Project's proxy for poverty reduction was increasing urban families' access to clean water and improved services, the lack of which is a poverty marker. Providing access to piped water through household connections contributes to poverty reduction by reducing dependence on alternative sources which are higher-cost and freeing up time that could be used for gainful activities.

## 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. 77 to 82) lists a number of lessons and recommendations derived from the Project's experience. Based thereon, IEG derives the following lessons relevant for similar projects carried out in comparable environments:

**The benefits to the population from an increase in the supply of treated clean water (the PDO in the Project) can be constrained by a deterioration in water service reliability levels.** The number of hours per day supplied to the population in Greater Maputo in 2021 was below the levels at the start of the Project. This is ascribed in part to the rapid growth in population (about 40 percent) in the Greater Maputo area between 2013 and 2021 and the high incidence of non-revenue water (NRW) in the Project area that affected the operational performance of the utility. A lesson learned is that the Project design and implementation need to address these constraints in a holistic manner.

**The operational and financial performance of the water utility can be significantly affected if potential operational challenges for the service provider are not adequately anticipated and remedial measures provided through the project design**. In the case of the Project, high levels of NRW and weaknesses in reliability of supply remained a challenge through the implementation period and affected the operational and financial performance of the operator (AdeM). The Project did not include NRW reduction and reliability improvement components, or related activities. While the incidence of NRW and reliability of water supply were tracked throughout the implementation period, no remedial measures were provided through the Project. More consideration should be given to ensuring the sustainability of development outcomes through improvements in operational performance.

**Inadequate assessment of implementation risks and a lack of appropriate mitigation measures can lead to substantial delays in project completion and delay realization of the Project's benefits.** The Project's implementation risk was significantly underestimated given the need to carry out detailed designs, procurement processes, and environmental compliance for the

large construction contracts (Sabie WTP and Corumana-Machava transmission main). The issues with these large contracts delayed project completion by almost two years.

**Flexibility and careful consideration are required regarding the choice of implementation arrangements for larger works, taking into consideration the country context.** The Project's experience showed that use of multiple consultants (preparation of technical designs and specifications; supervision of works, and works construction) for implementation of transmission mains) proved to be complex and time consuming, with several flaws emerging in the construction phase. A Design and Build (DB) model was used for expansion of the distribution network. This did not yield the expected time savings and the client and World Bank specialists concluded that the country context required a single contract design-supervision for works like the transmission main and distribution network. However, in the case of complex activities like the WTP involving the provision and installation of high-tech equipment as well as civil works, the DB model rendered a better result.

**Financial covenants related to tariff reform and ensuring adequacy of tariffs cannot by themselves ensure improved financial performance by the project implementing entity unless accompanied by complementary requirements for the utility to improve its operational performance.** In the case of the Project, the utility's financial performance was affected by persistence of high levels of NRW and weaknesses in reliability of water supply which affected revenue collection. Under these circumstances, it would not be appropriate to simply raise tariffs to full-cost recovery levels as was required under the Project. The Project's experience showed that investment projects should also provide direct support for strengthening the utility's operations.

## 13. Assessment Recommended?

No

## 14. Comments on Quality of ICR

The ICR is well-written, candid, and generally follows the OPCS guidelines (except in regard to length - 27 pages compared to the recommended 15 pages or less). The ICR provides a clear theory of change in regard to the causal links and the full results chain, and the reporting is outcome-focused. The analysis is generally evidence based but constrained to some extent by weaknesses in the Project's M&E system. The ICR provides lessons derived from the Project's experience that also have relevance for similar projects carried out in comparable environments. The ICR does have some shortcomings. Given that the public-private partnership for operating the water facilities faced problems and was terminated in 2010, and that FIPAG and AdeM had to cope based on their own resources thereafter, a discussion of the problems encountered and how the companies coped would have been useful. In regard to NRW, which continued to be an issue through project implementation, the ICR indicates that this was intended to be addressed by FIPAG and AdeM in partnership with French and Netherlands donor support, but the ICR does not provide adequate information as to what transpired. The ICR also does not report on what measures, if any, were taken to improve reliability of water supply.

Based on the above, the quality of the ICR is rated Substantial with moderate shortcomings,

**a. Quality of ICR Rating**
Substantial