



1. Project Data

Project ID P145686	Project Name AR Buenos Aires Flood risk management	
Country Argentina	Practice Area(Lead) Water	
L/C/TF Number(s) IBRD-86280	Closing Date (Original) 01-Mar-2022	Total Project Cost (USD) 191,768,791.43
Bank Approval Date 22-Jun-2016	Closing Date (Actual) 01-Sep-2023	
	IBRD/IDA (USD)	Grants (USD)
Original Commitment	200,000,000.00	0.00
Revised Commitment	193,300,000.00	0.00
Actual	191,768,791.43	0.00

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2. Project Objectives and Components

a. Objectives

According to the Loan Agreement (Schedule 1), the Project Development Objective (PDO) was to strengthen the Autonomous City of Buenos Aires to efficiently manage flood risk and improve the drainage systems in the Cildáñez Basin, Maldonado Basin and Vega Basin. The PDO did not change during the life of the project, and this review has assessed the PDO achievement in terms of the following two objectives:

- I. Strengthen the Autonomous City of Buenos Aires to efficiently manage flood risk



II. Strengthen flood defenses in the Cildáñez Basin, Maldonado Basin, and Vega Basin

As per the Loan Agreement, the second PDO focused on the output level of improved drainage. For the purpose of this ICRR, IEG recommends that the second PDO be imputed to focus on the outcome level, which is restated as “Strengthened flood defenses in the Cildáñez Basin, Maldonado Basin, and Vega Basin.” The PDO outcome targets for the number of people benefiting from the project were expanded in scope during the second restructuring of the project. Since the targets were expanded no split evaluation is required.

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

Yes

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

No

c. Will a split evaluation be undertaken?

No

d. Components

Component 1: Institutional Development for Flood Risk Management. (US\$31.2 million at appraisal, and US\$24.8 million actual). This component financed:

Subcomponent 1.1. Hydrometeorological observation, surveillance, and alert system: The subcomponent was to be totally financed with counterpart funds and includes the design and implementation of an integrated hydro-meteorological observation, monitoring, alert, alarm, and response system (Sistema Hidrometeorológico de Observación, Vigilancia y Alerta - SIHVIGILIA) to increase the Borrower’s severe weather forecasting capacity and to improve its flood preparedness and emergency management and recovery. (PAD, p. 8)

Subcomponent 1.2. Flood Risk Financing and Protection Scheme: The subcomponent involved a strategy for flood risk financing and a program for the protection of homeowners and small and medium enterprises, including inter alia: (i) the design of a probabilistic flood risk model; (ii) the construction of flood exposure data bases; (iii) the design of an advanced claims management system; (iv) the development of an innovative financial mechanism for risk transfer; and (iv) the carrying out of a capacity building process aimed at the Autonomous City of Buenos Aires (CABA) officials and potential users of the financial mechanism of risk transfer. (PAD, p. 9)

Subcomponent 1.3. Flood Risk Social Communication and Education: (i) the provision of grants to NGOs with the purpose of raising awareness on flood hazard within local communities; (ii) the design and implementation of communication strategies for city dwellers to raise awareness on flood hazards; (iii) the carrying out of an education program on flood hazards, risks, vulnerability, and prevention for professionals in the education and construction sectors, and the provision of support to CABA to train communities in the poorest neighborhoods on emergency response; (iv) the provision of support for the update of the CABA’s regulatory frameworks (building norms); and (v) the carrying out of an international workshop for the exchange of experiences and sharing of knowledge on flood risk management. (PAD, p. 9)



Subcomponent 1.4. Capacity Building for Flood Risk Management: (i) the strengthening of the CABA's capacity for flood risk management, including support to the Flood Risk Management Council; (ii) the acquisition of equipment to increase CABA's capacity to respond and recover from flooding; and (iii) the provision of technical assistance to design and disseminate participatory contingency plans. (PAD, p. 9)

Component 2: Flood Mitigation Infrastructure. (US\$290 million at appraisal, and US\$278.5 million actual). This component financed three subcomponents:

Subcomponent 2.1. Cildáñez Stream Basin: (i) works to develop flood retention areas in the basin to delay flows to the Riachuelo River; (ii) construction of networks to improve the water distribution and wastewater collection in low-income neighborhoods and informal settlements located in the basin; (iii) construction of drainage channels to improve the existing storm drainage infrastructure in the Basin by increasing its storage and flow capacity; and (iv) civil works to enhance the urban public space in the basin. (PAD, p. 9)

Subcomponent 2.2. Maldonado Stream Basin: The construction of approximately thirty-one kilometers of secondary and tertiary drainage networks in the Maldonado stream Basin. (PAD, p. 9)

Subcomponent 2.3. Vega Stream Basin: (i) the construction of a large drainage tunnel with an estimated length of 8.4 kilometers; and (ii) the construction of approximately 9.8 kilometers of secondary and tertiary drainage networks in the Vega Basin. This subcomponent would also finance the supervision of the tunnel works. (PAD, p. 9)

Component 3: Project Management. (US\$4.3 million at appraisal, and US\$8.8 million actual). This component financed: (i) the provision of support for project management, including audits, M&E, technical assistance, training, and operating costs; and (ii) the development and implementation of comprehensive baseline and post-project data collection and analysis to allow the monitoring of project results and impacts.

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

Project Cost: The total project cost was estimated at US\$326 million but the actual total cost was US \$312 million.

Financing: At appraisal, the IBRD financing was estimated at US\$200 million. The amount disbursed was US\$191.8 million, which was 96 percent of the loan. The project refunded the undisbursed amount to the World Bank.

Borrower Contribution: The Borrower committed and disbursed US \$120.8 million in counterpart financing.

Dates: The Project was approved on June 22, 2016, became effective on December 7, 2016, and was closed on September 1, 2023, following one extension that added 18 months to the project period. A Mid Term Review (MTR) was conducted from April 20-28, 2020. There were two restructurings of the project that included the following:

- On April 30, 2019, a level 2 restructuring modified: (i) the implementing agency and institutional arrangements, (ii) results framework, (iii) components and costs, and disbursement and



procurement arrangements. At the time of the first restructuring US\$138.27 million (69 percent) was disbursed.

- On November 15, 2021, a level 2 restructuring modified: (i) the implementing agency, institutional, and procurement arrangements, (ii) results framework, and (iii) extension of the loan closing date. At the time of the first restructuring US\$157.27 million (79 percent) was disbursed.

3. Relevance of Objectives

Rationale

The PDOs remained relevant to the World Bank's Country Partnership Framework (CPF FY19-FY22). The focus areas of the CPF are: (i) Supporting Argentina's Access to Long-term Private Financing; (ii) Addressing Key Institutional Constraints for Better Governance and Service Delivery; and (iii) Supporting Argentina to Implement its Nationally Determined Contributions (NDC). The PDOs supported the third focus area and specifically Objective 10 - Building Resilient and Low-Carbon Cities through investments in mitigation and adaptation activities to reduce the impact of flooding events. (CPF, p. 32).

The PDOs are aligned with the City of Buenos Aires 2018 Resiliency Strategy as well as the government's hydraulic master plan that was developed with previous World Bank financing of the Flood Protection Project (P006052) that closed in 2006. This project builds on lessons learned from a predecessor project - the Urban Flood Prevention and Drainage Project (P088220), which closed in 2012 and that highlighted the importance of investing in non-infrastructure activities such as preparedness and flood risk management systems in addition to infrastructure, which this project incorporated. (PAD, p. 4; ICR, p.13). The design of the project is aligned with the capacity of the client. While the Bank has been involved in flood mitigation since the early 2000s in CABA through two previous projects, the frequency and intensity of hydrometeorological events has increased with climate change. In 2013, the City of Buenos Aires experienced of the heaviest storms in nearly 50 years causing direct damages that amounted to US\$300 million. Additional hydrometeorological events in 2012 and 2013 caused an additional US\$50 million in damages. (PAD, p. 3) Given the most recent CPF, coupled with the City's resilience strategy, and increased climatic events, the project is rated as highly relevant.

Rating

High

4. Achievement of Objectives (Efficacy)

OBJECTIVE 1 Objective



Strengthen the Autonomous City of Buenos Aires to efficiently manage flood risk.

Rationale

The theory of change (ToC) in the Implementation Completion Report (ICR, p. 8) identified that the outcome of interest was to strengthen the Autonomous City of Buenos Aires to efficiently manage flood risk. The mix of inputs identified are adequate to reach the outcome. These included the design and development of: (i) an integrated hydrometeorological observation, monitoring, alert and alarm system; (ii) financing of a strategy for flood risk financing; (iii) design of a flood risk education and communication strategy; (iv) training of communities in vulnerable neighborhoods; (v) support to the CABA in updating their regulatory frameworks, and (vi) financing knowledge exchanges with other countries on flood management.(ICR, p 21-22)

As a result, the expected outputs would have been an integrated hydrometeorological observation, monitoring, alert and alarm system built, a flood risk financing strategy developed, flood risk education and communications strategy and materials developed, vulnerable communities trained in flood risk reduction and response, new regulatory frameworks developed, and knowledge exchanges with other countries conducted.

As a result of these outputs, expected intermediate outcomes would have been: monitoring, alert, and alarm systems are in operation and functioning and information is being disseminated to the population in a timely manner, flood risk financing strategy being implemented, improved perceptions, knowledge, attitudes, and behaviors around flood risk mitigation and response among citizens as a result of education and communication efforts, vulnerable communities responding to alerts from city officials, clarified roles and responsibilities among authorities being implemented as a result of regulations, and increased knowledge and improved planning as a result of knowledge exchanges.

The result of these intermediate outcomes would be the PDO outcome of strengthened Autonomous City of Buenos Aires to efficiently manage flood risk thus contributing to higher level outcomes of reduced vulnerability to floods, increased resilience to climate change, and improved standard of living of low-income populations.

The ToC's activities, outputs, intermediate outcomes, and outcome provide a logical and properly sequenced causal chain to reach the PDO outcome target. The ToC was comprehensive in addressing both government capacity and its systems, as well as community capacity to manage flood risks. The project financing leveraged the government's own contributions to reach the PDO outcome.

OUTPUTS:

The output level indicators for this objective in the results framework included:

- 69 hydrometeorological stations installed and/or used to inform the Hydrometeorological Observation, Surveillance, and Alert System (SIHVIGILA). (Original target was 33). (**achieved**) (ICR, p.18). The SIHVIGILA started operating in 2018 with 33 stations that were installed by the project, and subsequently added 36 pre-existing stations that were incorporated to strengthen the robustness of the system.
- The counterpart amplified its communication and education efforts after the second restructuring through digital and in-person interactive platforms that included the construction of an environmental education center for schools and the general public to learn about water cycles and flood risk management. The inputs and scale of the outputs achieved are plausibly linked to the intermediate



outcome reported below on shifts in perceptions among the population related to management of flooding events.

- 45,000 people reached through communication campaigns on flood risk management. (Original target was 3,000 people, revised at second restructuring to 10,000 people). **(exceeded)** (ICR, p.18).
- 861 vulnerable people trained on flood risk management issues. (Original target was 670 people, revised at second restructuring to 800 people.) **(achieved)** (ICR, p. 18). These efforts focused on vulnerable neighborhoods in the city of Buenos Aires.
- 705 people participated in workshops related to flood risk management. (Original target 150 people, revised target during second restructuring to 600 people) **(achieved)** (ICR, p.18)
- 30,000 people benefited from educational programs in schools on flood risk management. (Original target was 400 people, revised target during second restructuring to 3,200) **(exceeded)** (ICR, p.18). The Ministry of Education incorporated flood risk management and disaster preparedness into their primary and secondary education sectors helping dramatically surpass this target. (ICRR interview)

The ICR reported the following additional outputs that did not have targets and were not included in the results framework, but are related to inputs in the ToC that would contribute to CABA's capacity to manage flood risk:

- The project supported the updating of CABA's regulatory framework for urban planning by introducing prevention criteria in planning and decision-making, incorporating essential water risk management concepts, and the delineation of water risk areas in the new urban planning code. The updates also included zoning regulations to restrict development in high-risk flood areas. In addition, the project provided guidance on flood resilient infrastructure, and advised on green infrastructure for retention and infiltration areas. Through these updates to the regulatory framework and their implementation, the project has contributed to the strengthening of CABA's capacity to manage flooding risks. (ICR, p. 17) During implementation, the project supported knowledge exchanges with other countries on the use of nature based solutions, which were adopted into CABA's city-wide planning strategies to help mitigate flood risks. (ICR, p. 23)

OUTCOMES:

The outcome level indicators for this objective in the results framework were:

- **Weather forecast warnings issued based on data from the hydrometeorological network:** The SIHVIGILA is generating forecast reports and alerts every 12 hours and detailed 7-day reports. Real-time information and short-term, precise weather forecasting alerts are issued up to 120 minutes in advance of a hydrometeorological event and are shared with Civil Defense, General Directorate of Rainwater System, Emergency Medical Care System, firefighters, and police, who in turn can articulate the necessary measures, coordinate among institutions, and optimize resources strengthening CABA's emergency response. **(achieved)** (ICR, p.16)
- **Flood Risk Management Council:** The Flood Risk Management Council was established by decree No. 287 in 2016. The evidence that the council is executing its designated functions includes: (i) convening interministerial quarterly meetings, (ii) defines actions and measures to be taken by stakeholders during planning exercises and during emergencies on a regular basis. **(achieved)** (ICR, p. 18 and ICRR interview). The council was the entity that determined the need for the Ministry of



Education to incorporate flood risk management and disaster preparedness into the primary and secondary education sectors which was done.

- **Perceptions on flood risk:** 3.37 index score of beneficiaries' perception towards flood events on a scale of 1-5. The baseline was 2.85 and the original target was 3.42. (**not achieved**). This is based on independent evaluations contracted by CABA at baseline, mid-term, and project close. The index is made up of a series of questions such as, (i) How prepared is the city to deal with floods?, (ii) How prepared do you feel you are to deal with a flooding event?; (iii) What is the probability that this area will currently flood? While the target of the index was not achieved, the perceptions of the population based on their experience shifted, on average, in a positive direction on how flooding events are handled and their perceptions of risk to flooding. This indicator is plausibly linked to the activities and outputs related to the education, communication, and training investments that were made by the project. Moreover, these perceptions are also likely influenced by the infrastructure that was constructed related to PDO 2.

The ICR reported the following additional outcomes that did not have targets and were not included in the results framework, but helped strengthen the capacity of CABA to manage flood risks:

- Flood maps were produced and are used part of the emergency planning exercises. (ICRR interview)

While the ICR's ToC adequately captured the causal chain, there were minor shortcomings that included: (i) measuring the PDO outcome, (ii) a lack of clarity on the methodology used for the perception index on the management of flooding events, and (iii) no critical assumptions were made in the ToC. Weaknesses in measuring the PDO outcome are discussed below in the M&E section. The lack of information on whose perceptions were changed given the broad range of the target audience from school children to adults was a minor weakness. The ICR's ToC did not specify its underlying assumptions that need to be in place to achieve the PDOs. Despite those shortcomings, based on the achievement of the outputs, intermediate outcomes, and final outcomes, it is highly likely that the Autonomous City Buenos Aires – authorities and citizens in the target basins – are better equipped to manage flood risk as a direct result of the project's activities, and thus the project's efficacy in achieving Objective 1 is rated **Substantial**.

Rating
Substantial

OBJECTIVE 2

Objective

Improve the drainage systems in the Cildáñez Basin, Maldonado Basin, and Vega Basin

Rationale

The ToC in the Implementation Completion Report (ICR, p. 8) identified that the outcome of interest was to improve drainage systems in the targeted basins. IEG has imputed a higher level of PDO outcome such as strengthen flood defenses in the Cildáñez Basin, Maldonado Basin, and Vega Basin.



The inputs identified are adequate to reach the outcome. These included the financing of: (i) flood retention areas, (ii) civil works to enhance urban public space, (iii) a large drainage tunnel, and (iv) construction of secondary and tertiary drainage networks.

As a result of these inputs, expected outputs would have been the completed construction of: (i) flood retention areas, (ii) civil works to enhance urban public space, (iii) a large drainage tunnel, and (iv) secondary and tertiary drainage networks.

As result of these outputs, expected intermediate outcomes would have been: (i) increased storage and flow capacity, and (ii) reduced urban flood-prone areas. As a result of these intermediate outcomes it is expected that the PDO outcome target would be strengthened flood defenses in the targeted basins contributing to longer-term, higher level outcomes of reduced vulnerability to floods, increased resilience to climate change, and improved standard of living of low-income populations.

The ToC was clear that vulnerable populations were expected to benefit from some of the investments. This pro-poor design element was explicit in the PAD, the results framework, and was monitored during implementation. Similar to PDO 1, there were no critical assumptions made in the ToC, which was a shortcoming. For example, one logical assumption would have been that the entity receiving the new drainage infrastructure responsible for operation and maintenance has increased budget.

OUTPUTS:

The output level indicators for this objective in the results framework included:

- 8.4 km of drainage tunnel constructed. This tunnel is over 5.3 meters in diameter and benefits more than 13 densely populated neighborhoods in the city. (Original target was 8.4 km) (**achieved**) (ICR, p. 19 and 20)
- 42.30 km of secondary and tertiary drainage conduits constructed. The baseline for secondary and tertiary systems was 11 km. New systems constructed under the project were 6.5 km in the Cildanez Stream Basin, and 24.75 km in the Maldonado and Vega Stream Basin totaling 42.3 km with baseline. The technical designs of infrastructure were updated during implementation due to changes in CABA's topography, leading to more efficient systems and increasing the benefits (protected land area and more beneficiaries with reduced impacts). At the time of ICR writing, CABA had 5.25 km that was under contract and being constructed adding to the area of land protected and new beneficiaries, which was estimated to be completed by March 2025. (ICR, p.19) (Original target was 41 km) (**achieved**) (ICR, p. 19 and 20)
- 60 m3/s increased drainage capacity in the targeted areas from constructed infrastructure. (Original target, 60 m3/s). (**achieved**) (ICR, p.20).
- 18 km² of land areas protected from flooding after rainstorm events with an intensity of up to the equivalent of $T_r=10$ years. (Original target was 3.5 km², revised at first restructuring to 8 km², revised again during second restructuring to 18 km²) (**achieved**) (ICR, p.19 and 20).

OUTCOMES:

The outcome level indicators for this objective in the results framework included:



- 3,001,287 people directly benefited from investments in infrastructure to mitigate floods. Additional people are expected to benefit from the 5.25 km of secondary and tertiary stormwater networks in the target basins that will leverage the investments from the project. (ICR, p.20) Beneficiary figures are based on two sources: (i) the 2022 census data for the population living in the target basins and (ii) mobility surveys for daily commuters who transit the basins. Census data provides the most accurate information for residents within the basin, and the mobility surveys estimates were proportioned to account for those transiting in and out of the intervention basins. (Original target was 3,000,000 people). **(achieved)**. Based on 2022 census data 54 percent of the population living in the basins were female. (ICR, p.19)
- 47,000 vulnerable people benefited from flood protection measures. (Original target was 20,000, revised target during second restructuring to 47,000 people.) **(achieved)**

The Project resulted in fully achieving the original PDO targets, resulting in **high** efficacy rating.

The project enhanced the flooding defense mechanisms for CABA by increasing the storm water system capacity to protect the population in the targeted basins. With the increase in storage and flow capacity it is expected that the completed works will reduce vulnerability to floods including low-income areas, limit damages to assets, and reduce interruptions to employment and transit.

The ICR's ToC did not make any assumptions regarding the achievement or sustainability of the outcomes such as adequate budget to operate and maintain the new infrastructure, which was a shortcoming. The interview with the task team confirmed that additional budget allocation was provided to the Ministry of Public Space and Urban Hygiene for operation and maintenance of the new infrastructure.

Rating
High

OVERALL EFFICACY

Rationale

The ICR documented the achievement of the output, intermediate, and outcome indicators. Despite the minor shortcomings in measuring the indicator related to perceptions, the project's overall efficacy rating is a strong Substantial.

Overall Efficacy Rating

Substantial

5. Efficiency



Ex Ante Economic Efficiency: At appraisal, the internal rate of return (IRR) for Component 2: Flood Mitigation Infrastructure was estimated at 21 percent with a Net Present Value (NPV) of US\$ 334 million for the investment based on three benefit streams: (i) reduction of asset losses, (ii) less traffic disruptions, and (iii) reduction of illnesses caused by lake pollution. The methodological approach and benefit streams employed were appropriate and standard practice for the sector. Component 1: Institutional Development for Flood Risk Management was analyzed separately using a benchmarking technique. At appraisal, the IRR for Component 1 was estimated at 36 percent with a Net Present Value of US\$129.2 million based on comparisons to other countries that have undertaken similar capacity building efforts. (ICR, p.21) For reference, the NPV calculation used a discount rate of 10 percent. (PAD, p.79)

Ex Post Economic Efficiency: The economic analysis at project completion for Component 2 in the ICR included the same benefits streams and modeling approach identified at appraisal, which follows standard practice for the sector and these types of projects. The Economic Internal Rate of Return (EIRR) at closing was estimated at 17 percent with a NPV of US\$ 224 million. The analysis for Component 1 estimated an EIRR at 44 percent with a NPV of US\$129.3 million. The ex-post analysis also used a discount rate of 10 percent.

Operational and Administrative Efficiency: The project was designed to be implemented over 5.5 years, and its implementation started at a rapid pace with disbursements reaching 69 percent by the time of the MTR in April 2020. However, the project did experience delays because of factors that were outside the control of the project implementation unit. These factors included: (i) changes required to procurement packages because the central government decided to build railway line that conflicted with CABA's stormwater drainage plans, and (ii) currency fluctuations resulting in an 18-month extension. (ICR, p.25) While the COVID-19 pandemic did play some role in the delays, the procurement and currency fluctuations drove the extension. (ICRR interview) Despite these challenges, the project was implemented within the original allocated budget. The impact of the currency fluctuation and devaluation of the peso are reflected in the lower net present values of the project's costs and benefits as compared to appraisal figures. (ICR, p.21)

Conclusion. The project's estimated EIRR at 17 percent is higher than the range of 6-10 percent discount rates suggested for Latin America's upper middle-income countries in the World Bank economic analysis guidelines. This result, as well as the administrative measures taken to mitigate further delays, keep the project under budget, and still achieve its results, indicate that the efficiency of this project is 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	✓	21.00	100.00 <input type="checkbox"/> Not Applicable
ICR Estimate	✓	17.00	100.00 <input type="checkbox"/> Not Applicable



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

6. Outcome

The PDO was highly relevant to the government and Bank strategy for Argentina. Efficacy of the two PDOs to strengthen the Autonomous City of Buenos Aires to efficiently manage flood risk and strengthen flood defense mechanisms in the Cildáñez Basin, Maldonado Basin and Vega Basin - was rated as a strong substantial accounting for the shortcomings in measuring PDO 1 outcomes.

The economic analysis showed that the project had an EIRR greater than regional discount rates for upper middle-income countries. The project adjusted the design to address factors outside the control of the project implementation unit. These adjustments included increasing the PDO targets along with an extension of the closing date yet maintaining the same budget resulting in a substantial efficiency rating. Overall, the outcome was rated Satisfactory.

a. Outcome Rating

Satisfactory

7. Risk to Development Outcome

Based on the information in the ICR, the following issues pose modest risks to the development outcome:

- **Technical and Government Ownership Risks.** The ICR indicates that there are no immediate risks that could undermine the development outcomes achieved by the project. Arrangements for operation and maintenance of the infrastructure and the drainage works have successfully been transferred to the Ministry of Public Space and Urban Hygiene – the ministry responsible for managing the networks. The ICRR interview confirmed that this ministry has a budget line for operation and maintenance of the new infrastructure. The capacity building efforts for flood risk mitigation had substantial ownership from all groups implementing them, thus increasing the likelihood that these initiatives continue being relevant for the city. (ICR, p. 28)
- **O&M Financing Risk.** The main risk was related to the operation and maintenance of the SIHVIGILA due to its operating cost. Despite CABA having budget allocations for its implementation, the current economic situation, and any future downturns, could put pressure on city administrators to reduce public expenditure and that could pose a threat to the SIHVIGILA. (ICR, p.28)

8. Assessment of Bank Performance

a. Quality-at-Entry

The project was well aligned with the government and CABA's priorities of flood risk mitigation and had high strategic relevance. The Bank team facilitated a preparation process that resulted in technically and financially sound design. This was demonstrated by the amount of counterpart financing to achieve the



PDOs. The environmental and social risks were well identified, and the project was accurately classified as a category A project. The design of the project was aligned with the capacity of the client, and the project was explicit on serving poor and vulnerable populations as reflected in the PDO indicator. The implementation arrangements were adequate and reflected the reality of the local context at the time, and the project had well advanced procurement packages during the preparation phase. The Bank team consisted of an array of experts to help guide the client in the design, and it built upon the lessons learned from previous flood mitigation projects such as the Urban Flood Prevention and Drainage Project (P088220). Given the robustness of the preparation, the quality of entry is rated Satisfactory, with the minor shortcoming related to activities that were included in the design, but ultimately dropped because the client did not see value in executing them. These activities did not impact the efficacy or efficiency ratings.

Quality-at-Entry Rating Satisfactory

b. Quality of supervision

The Bank team benefited from having a task team leader that continued throughout the design and execution of the project. This continuity allowed for a trustworthy relationship to be developed between the implementing agency and the Bank, and facilitated good communication to make course corrections as needed. (ICR, p. 28) In addition, the main task team was present in-country enabling them to closely monitor the progress of the project implementation through frequent field trips and meetings with the client. The Bank team and implementing agency had to contend with exogenous factors such as the COVID-19 pandemic, which they adjusted to through virtual missions. Moreover, the macro-fiscal crisis and the devaluation of the Argentinian peso against the dollar was outside the control of task team and implementing agency, but despite these shocks the project was able to deliver on performance indicators.

The task team also supported the adjustment of the project timeline when the implementing agency was forced to make changes to the engineering designs, because of the central government's decision to build a railroad line that would impact the original designs. This was unanticipated and was the main reason for the extension of the project closing date, but the task team supported the necessary changes. Through close engagement with the client and monitoring, the team used the two restructurings to proactively address issues that arose during implementation. In addition, the team provided technical assistance and trust fund support to the implementing agency on innovative green infrastructure that influenced the implementation of the project. (ICR, p.32) The factors that effected implementation delays were outside the control of the Bank and the implementing entity, and Bank team took proactive measures to restructure which allowed the project to fully achieve the targets with its available budget. Moreover, the Bank was proactive in supporting the implementing entity with technical assistance to support the project outcomes and build the capacity of the client. These efforts result in a satisfactory rating. (ICR author)

Given there were only minor short-comings at the design phase, the overall Bank performance rating is Satisfactory.



Quality of Supervision Rating

Satisfactory

Overall Bank Performance Rating

Satisfactory

9. M&E Design, Implementation, & Utilization

a. M&E Design

The results framework adequately captured the outputs and intermediate outcomes, but could have been stronger at the outcome level. PDO 1 had two binary outcome indicators to measure whether the institutional capacity to efficiently manage flood risk was strengthened, which was a short-coming. Measuring changes in institutional capacity implies measuring changes in policies, procedures, and behaviors to efficiently carry out functions, and this can be difficult to quantify in a project context. However, a proxy measure for improvements in institutional capacity is the satisfaction of the end user with the service or information that is being provided by the service delivery institution. An alternative to having the PDO 1 indicator - “weather forecasting warnings based on data from hydrometeorological network – yes/no” - , may have been “beneficiary satisfaction with CABA’s ability to communicate flood risk information in a timely manner”. The weaknesses of the PDO 1 outcome indicators was underscored in the ICR.

The project adequately measured the outputs regarding education, communication, and training that reached an array of stakeholders in school and non-school settings. However, the linkage between the training and education efforts across the array of actors and the perceptions on managing flood risk was less clear, because the target audience for measuring perceptions was not well defined. Moreover, the ICR’s ToC was not explicit about any assumptions of what the education and communication efforts in the school and non-school setting would lead to.

For PDO 2, the inherent challenge in measuring outcomes in a flood reduction project such as a reduction in damaged assets or interruptions with traffic or employment is the timing of when the infrastructure is completed and operational, the occurrence of hydrometeoroglocal events that would demonstrate the benefits of the enhanced design capability of the infrastructure, and the timing of the project closure. Unlike other projects such as water supply, sanitation, or parallel sectors such electricity, those projects have a predictable production elements that produce inputs to transmission and distributions systems such as volumes of water per day or kilowatts hours per day of electricity that influence outcomes at the household level. Whereas flood reduction projects may be designed for a 50 or 100 year flood, those events or smaller ones may not happen in the window of completing the infrastructure and project closure thereby making it difficult to rely on project monitoring data to measure outcomes. Measurement of outcomes may need to happen after project closure. In such projects, modeling the outcomes based on the installed design capacity for purpose of evaluation is an acceptable practice.

The project carried out a baseline, mid-term, and end line surveys to augment other administrative data sources used to measure outputs, and intermediate outcomes. The data sources to capture beneficiaries residing in the targeted basins and those transiting in and out of the basins were robust and adequate.



b. M&E Implementation

The M&E implementation was done in a satisfactory manner and was conducted by the project implementing unit. The Bank team provided close support during implementation and strengthened the capacity of M&E staff in the project implementation unit. Bi-annual reports were submitted and at least 2 supervision missions were conducted per year along with a series of technical meetings. (ICR, p. 26) The close supervision by the Bank team helped ensure the quality of the information being reported was high.

The Bank team was proactive in adjusting or adding indicators during implementation to better capture the projects impacts, and dropping indicators that were no longer relevant because of dropped activities during the restructurings. For example, at the second restructuring a series of indicators were added that captured beneficiary perceptions around satisfaction with the flood mitigation water works, and of flood resilience. This was a positive development aside from the shortcoming on better defining the population whose perceptions were being measured given the expansive education and communication efforts. These results were captured in a series of independent surveys financed by the project. Likewise, the project made a change in the education activities, and decided to give more emphasis on flood risk management in the public education system, which entailed a specific indicator being added at restructuring to capture the number of beneficiaries of educational programs on flood risk management in schools.

c. M&E Utilization

The M&E system was proactively used by the project implementing unit and the Bank team during implementation at the output level. The project implementation unit also had to rely on independent mobility surveys from the Transportation and Public Works Secretariat to track the number people that commuted through the project intervention areas to capture and estimate the total number of beneficiaries that benefited from the project but did not reside in the intervention areas. The interview with the Task Team confirmed that the beneficiary numbers extracted from those surveys reflected only the population transiting in and out of the targeted basins. These surveys were conducted in 2019, 2020, and 2021. As previously mentioned, the project measured beneficiary perceptions of flood risk at baseline, mid-term, and endline, which is good practice. The Bank team closely monitored procurement and tracked physical progress of infrastructure installation, which informed the decision to undertake restructuring and adjust indicators in the results framework to reflect changes in the project.

The overall quality of M&E is rated modest. The M&E system adequately captured the achievement of the development objective of the project; however, the results framework had minor shortcomings such as indicators that could have possibly better measured PDO 1 with respect to CABA's capacity to efficiently manage flood risks. PDO 1 indicator was a yes/no indicator as to whether forecast warnings based on the SIHVIGILA were being issued. An indicator that measured changes in beneficiaries satisfaction with information on flood risk may have better reflected the desired outcome.

While the project captured an array of indicators to support the overall performance record of the project, the weakness in PDO 1 outcome indicators resulted in the rating for M&E being Modest.

M&E Quality Rating

Modest



10. Other Issues

a. Safeguards

The Project was designated as Category A. Environmental and social risks were deemed high because of the large-scale tunneling activity. The safeguard policies triggered were Environmental Assessment (OP 4.01), Physical Cultural Resources OP/BP 4.11, Involuntary Resettlement (OP 4.12), and Projects on International Waterways OP/BP 7.50 because of the common waterway shared with Uruguay. (ICR, p.26-27).

Environmental and Social Impact Assessments (ESIA), including an Environmental and Social Management Plan (ESMP), were developed for each of the interventions related to the Cildáñez, Vega and Maldonado subcomponents. All safeguard-related policies were complied with, and the safeguard ratings were satisfactory throughout most of the implementation period. (ICR, p.27) The ICR reported that CABA's staff who were responsible for the socioenvironmental management were well experienced and gained extensive knowledge during implementation, specifically with respect to community involvement and citizen engagement activities. (ICR, p27)

In the last year of the project, citizens filed complaints regarding the piloting of nature-based solutions in the city over concerns with the interventions' effectiveness in flood mitigation as well as environmental and social impacts. The project implementation unit reinforced their stakeholder engagement and communication processes, and the complaints were addressed and closed satisfactorily. (ICR, p.27)

b. Fiduciary Compliance

Financial Management: The project complied with the Bank's financial management requirements. During implementation, the FM arrangements allowed for the recording of all Project transactions and balances, supported the preparation of regular and reliable financial statements, and were subject to external audits which were found acceptable to the Bank. No accountability issues were flagged during implementation except for one ISR that rated financial management as Moderately Unsatisfactory due an overdue 2019 financial audit report. The project closed with a satisfactory rating for financial management.

Procurement: All procurement processes followed World Bank standards, and no misprocurement was declared throughout the project's implementation. Procurement processes slowed down near the end of the project because of staff turnover, which resulted in inadequate transfer of project knowledge and experience with Bank regulations. In addition, the depreciation of the Argentinian peso contributed to the slowdown during implementation. The project procurement rating was rated as satisfactory throughout project implementation with a slight downgrade to moderately satisfactory in the last year because of the procurement staff turnover. (ICR, p.27)

c. Unintended impacts (Positive or Negative)



The ICR reports various positive unintended impacts that included: (i) improved international coordination on flood risk management, (ii) incorporation of nature-based solutions in city-wide strategies, (iii) methodology for evaluating costs and benefits of nature-based solutions developed for CABA, and (iv) the inclusion of flood risk management in education programs. Given that almost all of these were captured in some form in the PAD, the ICRR does not consider them unintended impacts. Improved international coordination was envisioned at project design through financing international workshops. While not referred to in the PAD as nature-based solutions, the document explicitly mentions retention ponds as part of the project. The inclusion of flood risk management in education programs was brought into the project design during implementation and was reflected in the results framework. The one activity that may not have been envisioned at design, but supported with technical assistance was the methodology for evaluating costs and benefits of nature-based solutions. During implementation, the Bank team made significant efforts to support the client and connect them with international experience. Nurturing this activity, beyond international workshops, contributed to CABA joining the C40 Cities Climate Leadership Group and signing a cooperation agreement with the city of Copenhagen. This partnership in turn influenced CABA's thinking on nature-based solutions in their city-wide flood mitigation and climate strategy. These efforts impacted CABA's thinking beyond just the project intervention sites, and while not explicitly in the project design it had a larger impact than what was expected.

d. Other

11. Ratings

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

12. Lessons

- The Bank's long-term engagement with the client can enhance prospects for implementation success.** This project built on previous Bank engagement and adjusted the design by incorporating lessons learned from previous in-country experiences. Notably, the project moved beyond building infrastructure to also investing in flood warning systems, education programs, and capacity building at the community level for emergency response. The comprehensive approach and long-term relationship demonstrate that the thinking of the client and Bank evolves over time to address challenges that will improve sustainability and resilience. The Bank's Multiphase Approach (MAP) can serve as an appropriate mechanism when dealing with development problems and reforms that span multiple project cycles.



- **Limited Bank staff turnover during implementation can allow trust to be built with the client and can have a positive impact on implementation success.** The Bank team had one local TTL be part of the design, implementation, and completion, which can allow for trust to develop between the Bank team and client. Difficult implementation challenges and the need to make quick course corrections can be influenced by the level of trust and quality of relationships between the Bank and the client. These relationships go beyond one project cycle. As this project showed, the thinking by the Bank team and the client evolved over time and took a more comprehensive approach to ensure sustainability and resilience. There was limited Bank staff turnover among the extended team as well such as the environmental and social specialists which proved important for the success of a large scale, high risk, and complex project.
- **A strong citizen engagement strategy is needed to increase the client's ability to achieve development outcomes.** This project demonstrated the impact of having a strong citizen engagement and education program as part of the design. This is particularly important in flood mitigation projects that rely on the communities' input not only for planning, but also for participation in risk reduction activities including early flood warning systems.
- **Combining green and grey infrastructure can provide a holistic and resilient approach to flood mitigation infrastructure investments.** Historically flood mitigation has depended on grey infrastructure to improve drainage and increase basin flow capacity to evacuate excess runoff. This strategy is an essential part of flood mitigation, but this project demonstrated that incorporating green infrastructure can be equally as important. Repurposing public lands such green areas or parks to allow for runoff retention can reduce peak flows, improve ground water availability, and provide cheaper and cost-effective solutions for city-wide flood management and climate strategies.

13. Assessment Recommended?

Yes

Please Explain

Yes, given the accelerating severity of flooding events globally, the positive outcomes of the project, and the Bank's strong engagement with the client, a more in-depth assessment could yield important insights regarding the success factors for projects of this type and their applicability in similar contexts.

14. Comments on Quality of ICR

The ICR was well-written, concise, provided a good analysis, and did a good job of documenting the results and data sources. The narrative was clear and supported the ratings. The ToC was adequate as it captured the overall logic of the project. The documentation of data sources that were provided in the main body of the ICR or in the footnotes increased the robustness of the document. The ICR also provided good documentation in the annexes to show project implementation of all its components, in addition to the list of contracts supported by the project. A minor shortcoming of the ICR was the lack of incorporation of more details regarding the



beneficiary survey completed at the end of the project, particularly regarding details of the perception index on flood management. A summary report of the final perception index was shared separately by the Task Team.

The ICR captured the proactive nature of the Bank team in supporting the client with course corrections, appropriately updating the results framework through restructurings – while remaining within the framework of the ToC. The ICR also documented the technical assistance that informed project implementation and city level flood mitigation and climate strategies that went beyond the project intervention sites. The M&E section of the ICRR mentioned the challenges related to measuring PDO 2 outcomes; however, the ICR for this project, and other flood reduction projects, would benefit from documenting a timeline of when infrastructure interventions were put into operation, and a record of significant hydrometeorological events that may have occurred during the life of the project. This would allow the ICR to demonstrate whether it was feasible to capture outcomes during the life of the project. While recognizing some of the minor shortcomings, the overall rating for the quality of the ICR is Substantial.

a. Quality of ICR Rating
Substantial