



## 1. Project Data

<b>Project ID</b> P113145	<b>Project Name</b> Benin Emergency Urban Env. Pr.	
<b>Country</b> Benin	<b>Practice Area(Lead)</b> Environment & Natural Resources	<b>Additional Financing</b> P148628,P154601
<b>L/C/TF Number(s)</b> IDA-49370,IDA-54430,IDA-56420	<b>Closing Date (Original)</b> 31-Dec-2015	<b>Total Project Cost (USD)</b> 50,000,000.00
<b>Bank Approval Date</b> 26-Apr-2011	<b>Closing Date (Actual)</b> 31-Oct-2017	
	<b>IBRD/IDA (USD)</b>	<b>Grants (USD)</b>
Original Commitment	50,000,000.00	0.00
Revised Commitment	96,400,000.00	0.00
Actual	92,721,289.13	0.00

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## 2. Project Objectives and Components

### a. Objectives

The Project Development Objectives (PDO) were: to (i) improve infrastructure and mitigate the negative environmental impact of floods in the Cotonou Agglomeration, and (ii) increase the Recipient's level of preparedness for future flooding (LA, Schedule 1, page 5).

### 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**

Two PDO indicators were revised, but not to such a degree that it would warrant a split rating.

The project had five components:

**Component 1: Drainage improvement and rehabilitation** (Appraisal: US\$23.56 million; AF1: US\$2.4 million; AF2: US\$32 million; Actual: 57.96 million)

This component was to increase the retention areas for storm water and calibrate the water flow to the outlets (in a lake, a lagoon and the ocean). This was to be achieved by rehabilitating and improving three main drainage networks in key areas of the Cotonou Agglomeration affected by the 2010 flood by calibrating, grading, cleaning and expanding drains and channels. It was also to elevate and rehabilitate the Fifadji bridge with a reinforced concrete deck resting on concrete piles in the Fifadji river, which was prone to flooding.

**Component 2: Municipal solid waste management** (Appraisal: US\$13.82 million; AF1: US\$1.2 million; AF2: US\$3 million; Actual: US\$18.02 million)

This component was to enable Cotonou and affected neighboring municipalities to mitigate environmental and health impacts resulting from the obstruction of drainage systems caused mainly by the indiscriminate dumping of solid waste in the open that was exacerbated by the floods of October 2010. It was to substantially improve: (i) collection, transport and disposal of solid wastes through construction of collection points, transfer stations, controlled dumpsites, and one additional cell at an existing landfill site; and (ii) capacity development support to Government, municipalities, communities and NGOs.

**Component 3: Improved wastewater management and sanitation** (Appraisal: US\$4.7 million; AF1: US\$0.7 million; AF2: US\$0; Actual: 5.4 million)

This component was to reduce the negative environmental and health impacts associated with the mix of floods and untreated wastewater due to the poor nature of the sanitation system in the Cotonou Agglomeration. It was to develop an appropriate institutional framework for the effective and sustainable management of urban wastewater in Benin, preparation of a wastewater masterplan for the Cotonou Agglomeration and Porto Novo, and the implementation of a small-scale decentralized sanitary drainage and wastewater treatment pilot project.

**Component 4: Flooding and disaster risk preparedness and management** (Appraisal: US\$5.03 million; AF1: US\$2.1 million; AF2: US\$4.25 million; Actual: US\$11.38 million).

This component was to increase the level of preparedness and develop a system for flood risk management including an early warning system, information and awareness program, and to strengthen the capacity of the institutions involved in flood and disaster risk management.

**Component 5: Project management** (Appraisal: US\$2.89 million; AF1: US\$0; AF2: US\$0.75 million; Actual: US\$3.64 million)

This component was to provide management support for the implementation of the project, including monitoring and evaluation.



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

### **Project Cost**

The original appraised cost was US\$50 million. The first additional financing allocated an extra US\$6.4 million, and the second additional financing allocated an extra US\$40 million. The total disbursed amount was US\$96.4 million.

### **Financing**

The project was financed by three IDA credits (4937-BJ, 5443-BJ, 5642-BJ). There were no co-financiers to this project.

### **Borrower Contribution**

There was no borrower contribution to this project.

### **Dates**

The project was appraised on April 26, 2011 and effective 8 months later, on December 13, 2011. The original closing date was December 31, 2015 and the actual closing date was October 31, 2017, with a total of 22 months' extension. The project received Additional Financing twice, through two level II restructurings; the first one in 2014 (the ICR refers to two different dates for this; June 5 (page 9) and December 13 (page 10)) with the following key revisions: i) increasing the span of work on clogged drainage by 2.1 km, thereby benefitting 10,000 additional residents; ii) increasing the number of low-cost wastewater and sanitation pilots; and iii) providing technical support to the newly created National Flood Disaster Agency (ANPC) and the Department of Climate Change Adaption. The closing date was extended to allow for the completion of planned activities.

The second restructuring, on August 6th, 2016, was to address the newly revealed gaps on the drainage and waste management networks, and to scale up the development effectiveness of the project. With this upscaling of activities and geographic expansion, the project reached 94,000 additional beneficiaries. Targets were adjusted in the results framework to capture this increase.

## 3. Relevance of Objectives

### **Rationale**

At the time of appraisal, floods had been increasing in frequency and intensity in Benin, and their adverse impact (on the environment, health and national economy) was aggravated by severe poverty and weak administrative capacity in the government. Furthermore, existing drainage networks and channels were clogged due to inadequate solid waste management, which lead to a contamination of surface and groundwater during flooding. During the appraisal of the World Bank's initial Urban Environment Project in 2010, Benin experienced a catastrophic flooding of historic proportions that affected more than 680,000 people in 55 (of a total of 77) municipalities in Benin. The Government of Benin requested emergency funding from the World Bank, which led to a change in the objectives, preparation schedule and content of the Urban Emergency Project. The project was realigned with the findings of the Post Disaster Needs Assessment report, which emphasized the need to go beyond immediate emergency measures to implement preventive measures to help mitigating the effects of future floods. Focus was placed on interventions to improve urban drainage structure, solid waste management, wastewater management and flood risk management. The



project was approved as an emergency operation under OP/BP 8.00 to allow for expedited project preparation.

At the time of appraisal, the Project Development Objective (PDO) was aligned with all five pillars of the national Poverty Reduction Strategy Paper (PRSP) for 2007-09; to accelerate growth, develop infrastructure, develop human capital, promote good governance; and promote balanced and sustainable development. The PDO was also well aligned with the three objectives of the World Bank's Country Assistance Strategy (CAS) for FY2009-12; i) strengthening competitiveness and accelerating private sector led growth; ii) improving access to basic services; and iii) promoting better governance and strengthening institutional capacities. The PDO remained relevant to both national and Bank priorities and strategies throughout implementation and at closure. It was well aligned with the objectives of Benin's Action Plan for 2016-20 ("Revealing Benin"), which prioritized the following; i) Consolidating democracy, rule of law and good governance; ii) improving governance; and iii) improving people's living environment, which included improved access to basic social services. The PDO also remained relevant for the World Bank's Country Partnership Strategy (CPS) for FY2013-16, which focused on i) governance and public-sector capacity; ii) sustainable growth, competitiveness and employment; and iii) access to basic social services and social inclusion.

## Rating

High

## 4. Achievement of Objectives (Efficacy)

### Objective 1

#### Objective

The first objective was to "improve infrastructure and mitigate the negative environmental impact of floods in the Cotonou Agglomeration". This review analyzes to what degree the project achieved mitigating the negative environmental impact of floods in the Cotonou Agglomeration (outcome) through improved infrastructure (output).

#### Rationale

#### Outputs:

- Drainage master plan for Abomay, Bohicon, Ouidah, Abomey-Calavi and Porto-Novo prepared, as targeted.
- The Fifadji and Sodo bridges were rehabilitated, as targeted.
- 43.40 kilometer of drainage network rehabilitated, exceeding both the original target (8.6 km) and the revised target (22.2 km).
- A wastewater master plan was developed for Cotonou Agglomeration and Porto Novo, as targeted.
- Only one pilot small-scale sanitation project was completed by project closing, not achieving the original target of two pilot projects, or the revised target (for which no figure was specified, but it is stated that "additional" pilot projects beyond the original two were to be implemented). Target not achieved.
- 4 technical studies on selected coastal erosion sites were completed. The target was originally 6



separate studies, but as some of the studies were merged, all planned topics were covered in the studies undertaken, and the target was therefore achieved with the 4 studies (meeting with project team on May 9th, 2018).

- 53 solid waste collection points and/or transfer stations were constructed and operational, exceeding both the original target (40) and the revised target (50).
- The number of direct project beneficiaries were 1.52 million, exceeding the original target of 1.4 million, and meeting the revised target of 1.52 million. The percentage of female beneficiaries was estimated to be 52 percent, achieving the target.

**Outcomes:**

Findings from an impact evaluation conducted in October 2017 showed that:

- More than 582,000 people were now protected from the impacts of cyclical floods, and there was considerable reduction of flood damage in many neighborhoods.
- The duration of work to remove stagnation of rainwater in the drainage system was reduced from an average of 28 days to 2 hours.
- There was a daily flow of people and goods over the Fifadji bridge (40,000 people and 20,000 vehicles), and over the Sodo bridge (50,000 people and 25,000 vehicles).

No measurements of decreased water contamination were undertaken (meeting with project team May 9th, 2018).

The achieved outputs and outcomes show that relevant infrastructure was improved and that the negative impacts of flood in the Cotonou Agglomeration have been mitigated.

**Rating**

Substantial

**Objective 2**

**Objective**

The second objective was to “increase the Recipient’s level of preparedness for future flooding”.

**Rationale**

**Outputs:**

Most outputs under the first objective are also relevant here, as the rehabilitation of the infrastructure contributes to increased preparedness for future flooding.

- 22 awareness campaigns and sensitization meetings on coastal erosion and coastal contingency preparedness were held, exceeding the (original and revised) target of 12.



- 22 awareness campaigns and sensitization meetings on municipal solid waste management were undertaken, exceeding the target (both original and revised) of 12.

In addition to the output indicators in the results framework, the ICR is reporting on additional outputs (that were not reflected in the indicators and thus do not have related targets, pp 39-40):

- A guide on building standards in flood zones for the municipalities of Cotonou, Abomey-Calavi and Sèmè-Podji;
- Development of 28 municipal contingency plans for the 21 communes at high risk of flooding and 07 other vulnerable communes;
- Mapping unbuildable zones (elaboration of flood risk maps) (1 paper map per district)
- Availability of the ORSEC plan
- An updated Post Disaster Needs Assessment Report (PDNA);
- 25 gauges and 25 tipping bucket pluviographs in the Ouémé basin for flood warning;
- 11 gauges and 16 tipping bucket pluviographs on the Mono Basin for flood warning;
- 9 agro-meteorological stations equipped with tele-transmission and remote management for early warning of hydro-climatic risks;
- An updated action plan for strengthening the early warning system for floods in the Ouémé basin;
- A decentralized flood management program;
- A National Policy for Prevention and Integrated Disaster Management.

### **Outcomes**

The outcome indicator in the results framework for this objective was "at end of project, mechanisms and institutional arrangements or the putting in place a flood early warning system is in place and operational. This target was not fully achieved. As explained in the ICR (page 28), the original target was to install a Flood Early Warning System (FEWS) with 20 annual alerts issued. However, due to unforeseen costs and the complex implementation of a full-scale FEWS, the indicator and target was downscaled to a feasibility study and technical support to the responsible authorities. The foundation for installing a FEWS has been achieved.

The ICR is reporting on additional outcomes that were not reflected in the indicators and thus do not have related targets (p 39);

- Increased resilience to the effects of flooding of people living in areas at high risk of flooding;
- Regular organization of disaster risk reduction platform sessions, including communal platforms;
- Active status of Peer Educators and Rescuers trained for emergency shelter assistance in all 21 high-risk municipalities;

The project's achievements at both output and outcome levels show that the objective of increased level of preparedness for future flooding was substantially achieved.

**Rating**  
Substantial



## Rationale

The project met and/or exceeded most output targets. Although the results framework lacked relevant indicators on outcome level, studies and impact assessments were undertaken to measure the project's outcomes. The project had significant outcomes and the evidence shows that outputs and outcomes under this project contributed to the achievement of the two objectives.

## Overall Efficacy Rating

Substantial

## 5. Efficiency

At appraisal, a cost-benefit analysis was performed to determine the economic viability of the combined preventive and adaptive components (drainage, bridge and solid waste) as well as the financial viability of the solid waste component. The ICR does not mention the benefit-cost analysis conducted at appraisal over a period of 24 years, which produced the following estimates (Project Emergency Paper, p 11):

- For the flood prevention and adaptation investments (12 percent discount rate): NPV of US\$77.4 million; IRR of 31 percent; and benefit-cost ratio of 11.
- For the solid waste investments (5 percent discount rate): NPV of US\$3 million; IRR of 10 percent; and benefit-cost ratio of 1.6

Unfortunately, the economic and financial analysis undertaken at appraisal and at the time of the ICR cannot be directly compared, as the objects of the analysis were different. The economic and financial analysis conducted at the ICR (pp 16-17) only considered two benefits: i) land value increase as a result of improved drainage; and ii) reduced time loss at the Fifadji and Sodo bridges. The analysis showed a positive NPV with an IRR above 12 percent and a positive benefit-cost ratio. The benefit-cost ratio reached 4 while the IRR was 35 percent. The analysis showed that the drainage works, and the rehabilitation of the bridges were economically viable.

The project had 22-months' extension with Additional Financing twice. The extension was to allow for the increased amount of activities due to increased financing. The project disbursed close to 100 percent (99.6 percent) of all project funds before closing.

The ICR figure was inserted in the table below because it is the latest calculation, but the appraisal figure has been left empty because the two calculations are not comparable.

## Efficiency Rating



Substantial

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

	Rate Available?	Point value (%)	*Coverage/Scope (%)
Appraisal		0	0 <input type="checkbox"/> Not Applicable
ICR Estimate	✓	35.00	0 <input checked="" type="checkbox"/> Not Applicable

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

**6. Outcome**

Relevance of Objectives is rated High as the PDO was highly relevant to both national and Bank priorities and strategies at both appraisal and at closure. Under Efficacy, both objectives were substantially achieved, and Efficiency was also substantial. Based on these ratings, the project’s overall Outcome rating is Satisfactory.

a. **Outcome Rating**  
Satisfactory

**7. Risk to Development Outcome**

**Sustainability risk:** As pointed out in the ICR (p 24), the impact of infrastructure investments is sensitive to their sustained operations and maintenance. There is a risk that the infrastructure may not be sufficiently maintained; the ICR uses the Fifadji bridge as an example. It has been in operation since 2015 and is already experiencing maintenance deficit as the gutters are not being cleaned regularly. Another related risk is that none of the newly completed solid waste infrastructure still had been put into operation at project closure. If solid waste collection is not picking up, there is a significant risk to the sustainability of the water and drainage works. It is pointed out in the ICR (p 24) that challenges to ongoing operations and maintenance are likely to continue to affect the infrastructure improvements that have been achieved, given Benin’s poverty status and the weak government.

**Institutional risk:** While the strategies to increase Benin’s level of preparedness for future flooding are in place, the actual level of institutional preparedness will depend upon the completion of the FEWS and on repetitions of national, departmental and local rehearsals.

**Political and financial risk:** There is a risk that the Government of Benin will not have the finance to complete and maintain the new infrastructure. Ownership and commitment to the project might also change with the change of governments.



## 8. Assessment of Bank Performance

### a. Quality-at-Entry

Project design was based on a solid diagnostic foundation of Benin's development priorities and needs. The Bank held close consultations with the Government of Benin during the preparation of this project even before the emergency flooding happened, which facilitated a swift revision of the project design to address the new situation while sustaining the quality of technical solutions and the planned institutional implementation arrangements. Provisions for procurement, financial management, safeguards and risk mitigation measures were all adequate and in place.

The cost and level of effort needed for the installation of a full scale FEWS was substantially underestimated, which was a shortcoming in the design. At the time of project appraisal, the World Bank had significant global experience in disaster risk management including in building flooding preparedness, however, the project team did not draw on the Bank's global expertise in this sector when preparing the project.

#### Quality-at-Entry Rating

Moderately Satisfactory

### b. Quality of supervision

The project benefitted from steady management from the World Bank team as there was only one Task Team Manager from the planning stage throughout implementation and project closing. 12 supervision missions were conducted during the six years of project implementation. From the third year of implementation, the Bank also undertook one technical mission per year, providing timely and dedicated attention to technical, safeguards, and fiduciary issues in collaboration with the Project Implementation Unit (PIU). It is pointed out in the ICR (p 23) that the timely presence and deep understanding on the part of the Bank team to the issues affecting project implementation was critical to the success of the project. While the Bank team was proactive in revising the results framework (RF) when needed, the redesign of an impact-oriented RF to a more output-oriented RF was unfortunate in that it made it more difficult for the project to measure and report on project results.

#### Quality of Supervision Rating

Satisfactory

#### Overall Bank Performance Rating

Satisfactory

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



### **a. M&E Design**

The overall results framework was clear with intermediate indicators linked to the components. Most of the indicators were at output level, however, and the results framework lacked indicators to track relevant outcomes. At outcome level, both PDO indicators in the results framework were restructured from being impact-focused to output-focused. The indicator linked to the first objective "to mitigate the negative environmental impact of future floods in Cotonou Agglomeration" was originally designed to measure the reduction in households vulnerable to floods due to poor infrastructure but was revised to "At the end of the project, the drainage infrastructure in the zones of intervention in the targeted municipalities has been improved (yes/no)". How and to what degree the drainage infrastructure was improved was not included in the indicator, and no measurable targets were set. Furthermore, this indicator focused only on one component (Component A, drainage infrastructure), and the other components (solid waste and wastewater management) were no longer measured at outcome level.

The original PDO indicator for the second objective would measure the creation of a full-scale Flood Early Warning System (FEWS), which the team was proactive in restructuring as feasibility studies revealed that the cost of FEWS implementation would be beyond the possibilities of the project. The revised indicator "At the end of the project mechanisms and institutional arrangement for a flood early warning system will be in place and operational (yes/no)" was poorly defined as it was not clear about what was actually to be measured. It did not specify the mechanisms and institutional arrangements that should be in place and operational by the end of the project.

There were also some significant outputs that were not tracked in the results framework, like the Drainage Master Plan and the rehabilitation of the Sodo bridge.

### **b. M&E Implementation**

The PCU was responsible for monitoring and evaluation and for tracking project progress. The PCU included an M&E specialist. The PCU had experience with two previous World Bank projects and had the necessary capacity to develop reliable M&E data. According to the ICR (p 21), the baseline data was adequate to track project progress and all indicators in the RF were tracked and reported on by the PCU.

Additional studies and impact assessments were undertaken to document project outcomes, as the results framework mostly focused on outputs.

### **c. M&E Utilization**

The ICR reports that M&E data was used to track project implementation and performance (p 21). Findings in the Drainage Master Plan were used to estimate the impact of the gaps in project achievements regarding the kilometers of rehabilitated drainage infrastructure. Data was used to seek additional financing to close the gaps.

The additional studies undertaken were used to report on project outcomes, as outcomes were not sufficiently covered under the original results framework.

## **M&E Quality Rating**



Modest

## 10. Other Issues

### a. Safeguards

The project was classified as a safeguards category B and triggered OP 4.01 Environmental Assessment and OP 4.12 Involuntary Resettlement, as civil works under components A and B would require some expropriation of land. An Environmental and Social Management Framework (ESMF) and a Resettlement Policy Framework (RPF) had already been prepared for the original Urban Environment Project and the two safeguards instruments were subsequently revised to be fully aligned with the activities approved for the emergency project, consulted upon and re-disclosed within six months of effectiveness and before commencement of the civil works. The ESMF and RPF were disclosed on May 29, 2012 and June 1st, 2012, respectively. Environmental and Social Impact Assessments (ESIAs), Environmental and Social Management Plans (ESMPs) and Resettlement Action Plans (RAPs) were prepared as and when necessary. The ICR reports (page 22) that the project fulfilled all safeguards requirements and remained in full compliance with the policies.

There were, however, reports of instances of non-compensation to some residents who were affected by the expropriation of land. The ICR team was not able to verify those claims but noted that the project did not establish a grievance redress mechanism but relied instead on existing mechanisms for dispute resolutions.

### b. Fiduciary Compliance

#### Financial Management

The ICR reports (page 22) both timely delivery of the financial reports and audits satisfactory to Bank standards. No major issues with the Financial Management were reported. The Financial Management risk had been rated low at appraisal. There is no mention of any qualified opinions in the ICR.

#### Procurement

Procurement was delegated to the two executing agencies who had previous experience with handling large civil works contracts. The procurement risk had been rated low during appraisal. During implementation, the ICR reports (page 22) that there were no major issues, delays, mis-procurement price variation or cost escalation.

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

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### d. Other

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## 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 lessons are taken from the ICR with some adaptation of language.

**An emergency project can achieve results beyond just basic emergency measures if project management is flexible.** This project was designed as an emergency response that was linked to longer-term reconstruction and prevention efforts. Two additional rounds of financing helped expand the scope and longer-term impact of the project.

**Moving from an impact-focused to an output-focused results framework may jeopardize a project's ability to adequately report on results.** An oversimplification of the indicators makes it challenging to capture the full impact of the project. Yes/no target values for PDO indicators does not capture the extent of outcomes achieved by the project.

**To establish an Early Warning System (EWS) is highly complex and costly, requiring expertise, analysis, preparations, needs assessments and capacity building prior to its design and implementation.** Establishing an EWS in an urban setting is ambitious, and especially in environments that lack administrative and implementation capacity.

**Flood maps are an important analytical foundation for the planning of interventions, to track and visualize progress and to evaluate its impact.** This is one of the main lessons from the project that should be reflected in new project designs.

**Effective communication and outreach may be a key element of successful implementation.** The project benefited from having high visibility in the country partly owing to a generous communications budget used to raise awareness among the general public about the project's objectives and achievements.

## 13. Assessment Recommended?

No

## 14. Comments on Quality of ICR

The ICR is well written, the text is relevant, succinct, to the point and is focusing on the most important issues. The report is results-oriented and the quality of the Theory of Change, the evidence and the analysis are high. The lessons are based on evidence and analysis presented in the report. The ICR is internally consistent and in line with OPCS guidelines.



There was some minor lack of clarity regarding achievement of some of the indicators in Annex 1.

**a. Quality of ICR Rating**  
Substantial