Report Number: ICRR0022203

## 1. Project Data

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|---|---|
| **Project ID**<br>P131049 | **Project Name**<br>MZ-Hydro-Met PPCR |
| **Country**<br>Mozambique | **Practice Area(Lead)**<br>Water |

| L/C/TF Number(s) | Closing Date (Original) | Total Project Cost (USD) |
|---|---|---|
| TF-14031 | 31-Dec-2018 | 14,704,595.49 |
| **Bank Approval Date** | **Closing Date (Actual)** | |
| 25-Apr-2013 | 31-Dec-2019 | |

| | IBRD/IDA (USD) | Grants (USD) |
|---|---|---|
| Original Commitment | 15,000,000.00 | 15,000,000.00 |
| Revised Commitment | 15,000,000.00 | 14,704,595.49 |
| Actual | 14,704,595.49 | 14,704,595.49 |

| Prepared by | Reviewed by | ICR Review Coordinator | Group |
|---|---|---|---|
| Ranga Rajan Krishnamani | Dileep M. Wagle | Ramachandra Jammi | IEGSD (Unit 4) |

## 2. Project Objectives and Components

### a. Objectives

The Project Development Objective (PDO) as stated in the Strategic Climate Fund Pilot Program for Climate Resilience Grant Agreement (Schedule 1, page 5) and in the Project Appraisal Document (page 6) was:

**"To strengthen hydrological and meteorological information services to deliver reliable and timely climate information to local communities, and to support economic development".**

This assessment is based on the two sub-objectives: (i) To strengthen hydrological and meteorological information services to deliver reliable and timely climate information to local communities: and (ii) To support economic development.

### 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

There were three components (PAD, pages 8 - 9).

**1. Strengthening Hydrological Information Management**. The estimated cost at appraisal was US$10.3 million (of which, US$8.8 was financed by the Pilot Program for Climate Resilience (PPCR) Fund). The actual cost was US$9.4 million.

This component planned to finance investments for managing hydrological information. Activities in this component included: (i) institutional strengthening and training the staff of the respective agencies: (ii) enforcing quality control and standards through protocols, operating guidelines, and information management frameworks for collecting, processing, and monitoring data: (iii) optimizing the physical hydrological monitoring networks through civil works activities (rehabilitating/upgrading and standardizing stations): (iv) implementing an integrated hydrological and meteorological information management platform for transmitting and managing data: (v) improving the hydrological modelling, forecasting, and early warning systems of the National Directorate of Water Resources Management (DNGRH) and the Regional Water Authorities (ARAs) and (vi) developing hydrological information products.

**2. Strengthening Weather and Climate Information Management**. The estimated cost at appraisal was US$11.1 million (of which, US$4.2 million was from the PPCR Fund).

This component planned to finance activities for supporting meteorological information services. Activities in this component included: (i) Institutional strengthening of the National Institute for Meteorology (INAM) and training their staff: (iii) upgrading their Quality Management System (QMS): (iv) optimizing the physical meteorological monitoring network, through rehabilitation of existing stations and installation of new ones: (v) upgrading INAM's existing data management systems for transmitting and managing data: (vi) strengthening meteorological modelling for forecasting, predicting weather and early warning systems: and (vii) developing access to meteorological information.

**3. Piloting resilience through delivery of improved weather and water.** The estimated cost at appraisal was US$2.0 million (fully financed by the PPCR Fund).

This component planned to finance piloting activities aimed at delivery of hydro-meteorological information to key users. Activities in this component included: (i) delivery of early warnings along the Zambezi,

Limpopo and Incomati River Basins through dissemination of weather forecasts: (ii) dissemination of weather and water forecasts to farmers in Gaza and Inhambane provinces: (iii) enhancing access to weather information for ports, commercial, maritime and artisanal fishery communities in the coastal areas of Inhambane: and (iv) evaluation of innovative ideas for enhancing delivery of hydrological and meteorological services.

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

**Project cost.** The estimated cost at appraisal was US$22.5 million. The actual cost was US$14.7 million.

**Project financing**. The project was financed by a grant of US$15.0 million from the Pilot Program for Climate Resilience (PPCR) Fund. The amount disbursed was US$14.7 million.

The Nordic Development Bank (NDB) was to provide US$6.0 million for financing complementary Technical Assistance (TA) activities to the National Institute of Meteorology (INAM). Procurement delays on the TA activities contributed to project implementation delays. Following the project restructuring on May 12, 2017, INAM assumed responsibility for implementing the NDB related activities, and NDB funds were delinked from this project.

**Borrower contribution**. Borrower contribution was estimated at US$1.5 million at appraisal. There was no borrower contribution during implementation.

**Dates.** The project approved on April 25, 2013, became effective on September 2, 2013, and was scheduled to close on December 31, 2018. The project closed an year behind schedule on December 31, 2019.

**Other changes.** There were two Level 2 restructurings during the project's lifetime.

The following changes were made through the first restructuring on May 12, 2017, after the Mid-Term Review (MTR) of the project on September 2016.

- The project scope was reduced, with some activities dropped. Activities aimed at developing and piloting technological solutions and other innovations to improve delivery of hydrological and meteorological services to beneficiaries in the targeted vulnerable districts (parts of Zambeze, Limpopo and Incomati floodplains) were dropped, as no progress had been made until then by the implementing agencies in identifying possible pilots.
- The results framework was modified. Two PDO indicators, that were not aligned with the project activities were cancelled. These indicators were: (1) monitoring satisfaction of hydro met services through user surveys. This indicator was cancelled as there was no baseline, and realization that effectiveness and satisfaction related to project activities could only be measured after substantive use, which was beyond the project timeframe: and (2) changes in budget allocations at the national level for issues relating to climate variability and climate change.
- One new indicator - approval of standards for hydrological data by the National Directorate of Water Resources Management (DNGRH) and Regional Water Authorities (RWAs) - was added.
- Targets for some indicators were revised (discussed in section 4).
- Funds from the Nordic Development Bank (NDB) were delinked from this project.

The closing date was extended by a year from December 31, 2018, to December 31, 2019, through the second restructuring on December 14, 2018, for completing component two and three activities, that had been subject to procurement delays.

## 3. Relevance of Objectives

### Rationale

**Country context**. Mozambique is one of the countries most at risk from water and weather-related hazards in Sub-Saharan Africa (SSA). The risks from floods, storms, and cyclones are further aggravated by the fact that, more than 60% of its population and 37% of its Gross Domestic Product (GDP) are concentrated in flat areas along flood-prone rivers and coastal zones. Average annual losses from floods were estimated at US$17.5 million in housing and shelters, US$0.7 million in road damages, and US$4.25 million in maize production. Further, climate scenarios indicated significant changes in temperature and hydrological regimes, further exacerbating water and weather risks in the coming years.

**Sector context.** The hydrological and meteorological (hereafter referred to as hydro-met) sectors were facing several challenges in the years before appraisal. The challenges, included poor quality and calibration of monitoring standards due to fragmentation of institutional mandates and weak inter-agency coordination, poor data for forecasting and early warnings, and insufficient technical and staff capacities to operate and maintain the hydro-met activities. Few monitoring stations were operational to meet user needs, and the sectors were financially unviable. Given the potential of hydro-met services to enhance productivity in sectors such as, agriculture, fisheries and maritime activities, hydropower, transportation, infrastructure planning and health, strengthening the hydro-met sectors capacities to provide reliable and timely climate information to local communities and thereby support economic development, was important to the government strategy.

**Government strategy**. The PDOs were well-aligned with the Government's strategy articulated in the *Mozambique National Development Strategy* for 2015 - 2035. The pillar on innovation and technological development in the strategy, highlighted the need for supporting management of natural resources (water, agriculture and fisheries). At appraisal, the PDOs were relevant to the Government's strategy for growth and development as articulated in the *Poverty Reduction Action Plan* (PARP). The plan underscored the need for preventing and adapting to climate change. The PDOs were also relevant to: (i) the Government's 2013 -2025 *National Strategy for Adaptation and Mitigation to climate change,* which identified priority actions to reduce climate risk, strengthen early warning systems and increasing capacity to respond to climate risks: (ii) the draft *strategic plan for Meteorological Services* (2020 - 2025): and the *National Water Resources Management Plan.*

**Bank strategy.** The PDOs are well-aligned with the Bank strategy. The second pillar of the Country Partnership Strategy (CPS) for 2012 - 2015 highlighted the need for building resilience, adapting to the negative effects of climate change, and reducing risks of natural disasters. The Bank's current Country Partnership Framework (CPF) for 2017 -2021, reiterated the need for addressing key ongoing challenges associated with reducing vulnerability to weather-related shocks and climate change, by strengthening hydro-met services. A focus area of the CPF explicitly underscored the need for "enhancing sustainability and resilience" through improving disaster risk management and reinforcing social and economic resilience.

**Bank prior experience**. The Bank has executed several projects that are complementary to this project. For instance, the Mozambique Climate Change Development Policy Operation approved on January 2013, aimed at supporting implementation of institutional and policy reforms, and contained two hydro-met policy actions. This project was also closely aligned with the objectives of the ongoing National Water Resources Project (NWRP), which aimed at enhancing the planning, management and development of national water resources. This project's activities aimed at strengthening hydro-met information was expected to aid the NWRP project.

Although the PDOs were well-aligned with the Government and the Bank strategies, the project scope was overly ambitious, given the existing implementation capacity and relatively tight time frame for implementation. As indicated in section 2, following the Mid Term Review, some project activities were cancelled, and targets of some indicators were revised during implementation in the face of realities on the ground (discussed in section four). The relevance is hence rated Substantial.

### Rating
Substantial

## 4. Achievement of Objectives (Efficacy)

### OBJECTIVE 1
#### Objective

To strengthen hydrological and meteorological information services to deliver reliable and timely climate information to local communities.

#### Rationale
**Theory of change**. The links between project activities (which included actions to improve the monitoring of weather, climate, water resources, and improving delivery of hydro-met services), their outputs, and outcomes were logical. Physical improvements aimed at rehabilitating/upgrading stations combined with technological improvements aimed at improving hydro-met modelling and prediction capacities, expanding access to hydro-met information and developing hydro met products, were intended to strengthen the evidence-base for climate resilience in policymaking. Activities aimed at institutional strengthening of respective agencies in water, climate and hydro-met sectors, were aimed at improving the agencies' capacities to deliver reliable and timely information to local communities on impending climate-related natural disasters and issuing early warnings to local communities. These activities were likely to provide a critical mass sufficient to achieve the desired results of strengthening delivery of hydrological and meteorological information services. The intended outcomes which were attributable to project activities, were monitorable.

**Outputs.** (ICR, pages 27 - 37).

These activities were completed as targeted.

- The National Directorate of Water Resources Management (DNGRH) and the Regional Water Authorities (ARAs) adopted standards for hydrological data.
- 250 DNGRH staff were trained, exceeding both the original and revised targets of 50 and 150 respectively.
- 80 hydrological monitoring stations were reporting real time information at closure (as compared to eight at the baseline). This exceeded the target of 40.
- 70% of the river gauge stations were reporting hourly information at closure (as compared to 37% at the baseline). This exceeded the revised target of 60%, but was short of the original target of 80%.
- 60 synoptic weather stations were reporting information at closure, as per the revised target, but short of the original target of 90.
- 65 real time meteorological monitoring stations were reporting continuously at closure. This exceeded the revised target of 25, but was short of the original target of 80.
- 28 daily weather forecasts were provided at downscaled areas at closure. This exceeded the revised target of six, but short of the original target of 50.
- 70% of the climatology data was entered in the World Meteorological Organization's (WNO) Global Observation System (GOS), exceeding the target of 50%. (WMO's GSO refers to a coordinated system of methods and facilities, operated by the WMO country members, to make meteorological observations at a global scale in support of WMO programs).
- 131 staff pf the National Institute of Meteorology (INAM) were trained, exceeding both the revised and original targets of 50 and 130 respectively.
- The INAM's Decree on Data Standards, Modelling and Forecasting were approved and implemented.
- At project closing, the National Integrated Water Resources Management Information System (NIWRIMS) database hosted information from 717 water stations, 17 reservoirs, 1389 rainfall stations, 7,686 borewells, 3,598 National Directorate for Water Supply and Sanitation (DNAAS) sites and 428 water use licenses.
- Hydrological models and frameworks were developed for generating flood forecasts for the Zambezi and Limpopo Basins. The Hydraulic Engineering Center's River Analysis System (HEC-RAS) for Limpopo and Zambezi was installed and operational, when the project closed.
- 26 Automated Weather Stations (AWS) and one maritime AWS were upgraded as targeted. Three automated weather observing systems were installed at the airports of Beira, Nampula and Lichinga. Fiberoptic connections and internet broadband connections were installed in the National Meteorological Institute and decentralized centers throughout the country as targeted.
- The Inter-Ministerial Protocol on data sharing was approved and implemented.
- The project facilitated the staff of the implementing agencies to learn from other novel and best practices through enabling them to participate in international events and regional platforms (such as, the African Ministerial Conference on Meteorology (AMCOMET) in 2018, the Southern African Development Community (SADC) Conference on Disaster Risk Protection in 2018, and the International Conference on Climate Services in 2013 and 2020).

As discussed in section 2, the activities associated with developing and piloting technological solutions and other innovations to improve delivery of hydrological and meteorological services to beneficiaries in the targeted vulnerable districts were dropped at restructuring, as no progress had been made by the implementing agencies in identifying possible pilots.

**Outcomes.**

The project activities were expected to provide timely and reliable hydrological and meteorological information to local communities.

- There was an 80% increase in the accuracy of flood forecasts in Zambezi and Limpopo basins as per the revised target, when the project closed, exceeding the original target of 50%. The forecast lead time for appropriate decision-making and taking action increased from 24 hours (one day) to 72 hours (three days). The accuracy of rainfall information forecasts improved from one day to two days.
- The accuracy of meteorological forecasts for temperature increased by 85% relative to the baseline, when the project closed. This exceeded both the original and revised targets of 50% and 70% respectively.

Efficacy is rated as substantial, given that the revised targets were either realized or exceeded.

### Rating
Substantial

## OBJECTIVE 2
### Objective

To support economic development.

### Rationale
**Theory of change**. Activities under the project aimed at strengthening the capacity for climate resilient planning at the national, sectoral and local levels, and were likely to contribute to providing reliable and timely hydrological and meteorological information, increase the lead time for appropriate decision-making and action, and issuing early warnings of flood forecasts and other weather-related natural disasters to farmers and fishermen. Given the importance of these sectors to the economy, the activities were likely to provide a critical mass to achieve the intended result of supporting economic development, by helping in minimizing the negative impacts of extreme weather-related events in these sectors. The links between the project activities, outputs and outcomes were logical and the intended outcomes were monitorable.

**Outputs.**

In addition to the outputs discussed above, the following outputs were relevant to this objective.

- 312,941 people (farmers and fisherman targeted by the pilots receiving hydro-met information in Mabalone, Inharime and Massinga headquarters), benefitted from project activities at project closure. This exceeded both the original and the revised targets of 6,000 and 167,488 respectively.
- The ICR (page 35) notes that the Bank team also sought to gather information through anecdotal and qualitative evidence through interviewing local government representatives of different sectors, site visits, exchanges with local officials, air control staff, and representatives of commercial airlines in Lichinga, Nampula and Beira Airports. Interviews with representatives of commercial airlines

confirmed that real-time meteorological information was used for all flight plans. Interviews with government authorities highlighted the safety of maritime navigation, due to the installation of Automatic Weather Stations (AWS). Government officials also confirmed that the real-time hydro-met information was also being used by the academic and the public sector.

**Outcomes.**

- 65% of the farmers were receiving flood forecasts in the targeted areas of Gaza province. This exceeded the revised target of 60%, but fell short of the original target of 80%.
- 93% of fishermen were receiving daily weather forecasts and early warnings in the target areas of Inhambane, as compared to none at the baseline. This exceeded both the revised and original targets of 70% and 80%.

Efficacy is rated as Substantial, given that the revised targets were realized and project t activities provided substantive support to farmers to help mitigate the adverse impacts of weather-related disasters, thereby providing support to economic development.

### Rating
Substantial

## OVERALL EFFICACY
### Rationale
The overall efficacy of the two objectives - to strengthen hydrological and meteorological information services to deliver reliable and timely climate information to local communities and to support economic development, is rated as Substantial.

### Overall Efficacy Rating

Substantial

## 5. Efficiency

**Economic analysis**. A Benefit- Cost Benefit Analysis (BCA) was conducted both at appraisal and at closure for activities associated with strengthening delivery of hydrological and meteorological services. These activities accounted for 92% of the project cost. The potential economic benefits were estimated to come from positing economic values to: (i) households based on Willingness to Pay (WTP) method for improved forecasts and warning systems: (ii) the economic value of lives saved due to the reduction of hazards and natural disasters: and (iii) the enhanced productivity on major sectors. The BCA estimates indicated a total Net Present Value

(NPV) of 46.4 million over a 50 year period, at a 3% percent Social Discount Rate at project closure. As such, the NPV estimated at closure was way below the NPV of US$391. 2 million estimated at appraisal, as reported in the PAD (paragraph 50). The ICR does not provide any reasons why a discount rate as low as 3% was used.

**Administrative and operational shortcomings.** Events on the ground (which included emergency response to the flooding in the Limpopo Basin) caused significant delays, with project execution mostly dormant during the first two years of implementation. This was exacerbated by procurement delays. Activities under component two (meteorological services) and component three (pilot projects for hydro met services) were significantly behind schedule, and some of these had not yet commenced, when the Mid-Term Review held in September 2016. These delays were due to a combination of factors including limited fiduciary capacity and changes in key management positions in the relevant implementing agencies, and Bank leadership changing four times over a six year implementation period. These factors necessitated reduction in project scope, with some activities cancelled and targets for some indicators being revised downwards after the Mid-Term Review. However, the reduced scope of project activities was met when the project closed, with a year's extension of the project closing date.

In sum, efficiency is rated as modest, given the weak economic justification for the project and administrative and operational shortcomings during implementation.

### Efficiency Rating

Modest

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

| | Rate Available? | Point value (%) | *Coverage/Scope (%) |
|---|---|---|---|
| Appraisal | | 0 | 0<br>☐ Not Applicable |
| ICR Estimate | | 0 | 0<br>☐ Not Applicable |

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

## 6. Outcome

Relevance of the PDO to the Government and Bank strategy is Substantial. Efficacy of the two objectives was rated as Substantial, as the revised targets were either realized or exceeded. Efficiency is modes, in view of the weak economic justification of the project and administrative and operational shortcomings during implementation. Taking these ratings into account, overall outcome is rated as moderately satisfactory, reflecting moderate shortcomings in the project's efficiency and relevance.

### a. Outcome Rating

Moderately Satisfactory

## 7. Risk to Development Outcome

**Government commitment and political risk.** The ICR (paragraph 72) notes that the policy environment in Mozambique 68) remains conducive for strengthening hydro-met services and climate information for supporting resilience to hydro-met risks. The government commitment is also demonstrated by consistent funding to the respective agencies at the central level. The protocols and decrees developed under the aegis of this project for inter-agency data sharing were further expected to improve policy coordination, and thereby reduce the risk associated with the unclear and fragmented mandates of the relevant government agencies.

**Technical risk.** The technical risk is rated as low. The ICR (paragraph 70) notes that the it is unlikely that functioning of the hydro met stations constructed under this project, could be undermined by vandalism and external environmental risks, given the way the physical structures were designed.

**Institutional risk.** The ICR (paragraph 71) notes that although there is consistent source of funding from the government to the central hydro-met agencies, it is unclear if there is adequate and earmarked source of funding for maintaining the hydrological and meteorological infrastructure investments made at the subnational levels. Given this, maintenance of infrastructure at the subnational level could be compromised, without adequate subsidies or funding from the central government.

## 8. Assessment of Bank Performance

### a. Quality-at-Entry

This project was prepared based on the lessons from similar projects under the Pilot Program for Climate Resilience (PPCR), and from prior Bank-financed projects in Mozambique. Lessons incorporated at design included, adopting an approach that combined investments in institutions and infrastructure investments for sustainability of outcomes, focusing on adapting to both climate variability and longer-term issues pertaining to climate change at the national level and seeking senior level government endorsement to ensure collaboration between the hydro-met agencies. (PAD, pages 10 -11). The implementation arrangements were appropriate, with the Project Administration and Monitoring Team (PAMT) established in the National Institute of Meteorology (INAM) - the agency responsible for coordinating the national meteorological services in Mozambique's ten provinces and 128 districts (PAD, paragraph 38). Several risks were identified at appraisal including high risk associated with sustainability of outcomes. Mitigation measures at design included, seeking greater political endorsement during implementation. With mitigation measures, overall project cost was rated as moderate at appraisal (PAD, page 14). The arrangements made at appraisal for safeguards and fiduciary compliance were appropriate (discussed in section 10).

There were moderate shortcomings affecting Quality-at-Entry. For one thing, the design was ambitious, given weaknesses in implementation capacity and the tight time frame. This necessitated reduction in

scope of project activities during implementation. (ii) For another, there were shortcomings in M&E design (discussed in Section 9).

Based on the above, Quality-at-Entry is rated Moderately Satisfactory.

### Quality-at-Entry Rating
Moderately Satisfactory

### b. Quality of supervision

Fourteen Implementation Status Results Reports (ICRRs) were filed during the project implementation period of six years, implying on average twice a year supervision missions. The ICR (paragraph 64) notes that supervision missions included frequented visits to project areas to ensure that effective mechanisms of quality control were in place. The supervision team included multi-disciplinary specialists. Following the recommendations of the Mid-Term Review at the end of 2016 which identified the weaknesses in the capacities of the implementation agencies, the project was restructured with a reduced scope. This aided in completion of the revised scope of project activities. Following the Mid-Term Review, which identified the weakness in M&E design, the indicators were modified and targets were revised. This aided in effective monitoring of the revised scope of project activities. The support provided by the team aided in safeguards and fiduciary compliance (discussed in section 10).

There were minor shortcomings in supervision. The continuity of leadership was not maintained, with four Task Team Leaders (TTLs) over the project time frame of roughly six years. This added to the implementation challenges during implementation. The ICR (paragraph 64) notes that some proactive measures could have been taken earlier in the project, to solve implementation bottlenecks.

Based on the above, supervision is rated as Moderately Satisfactory.

### Quality of Supervision Rating
Moderately Satisfactory

### Overall Bank Performance Rating
Moderately Satisfactory

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

### a. M&E Design

The M&E framework included indicators from the global Pilot Program for Climate Resilience (PAD, paragraph 43). The M&E framework envisioned building on the existing reporting procedures set up by the Project Administration and Monitoring Team (PAMT), as part of the prior Bank-financed National Water

Resources Development Project, to avoid duplication of efforts and to provide for a more consistent system for evaluating project performance (PAD, paragraph 43).

The original results framework was somewhat optimistic, given weaknesses in implementation capacity. An original indicator - Measurement of Satisfaction through user surveys was found to be inappropriate, as effectiveness and satisfaction related to the project activities could only be measured after substantive use, which was beyond the project timeframe.

### b. M&E Implementation

The ICR (paragraph 55) notes that Mid Term Review held on May 12, 2017, identified the shortcomings in M&E design. Indicators which were clearly beyond the project time frame were dropped (such as measuring satisfaction through user surveys) and targets were revised downwards in line with the realities on the ground through the first level 2 restructuring. This enabled better monitoring of the revised scope of project activities. Better mentoring of focal points and training the staff of technical units could have aided in ensuring a consistent framework across implementing agencies.

### c. M&E Utilization

The ICR (paragraph 56) notes that the project-generated data was utilized to support implementation and Bank supervision and reporting, and disseminating progress. The results were evaluated against indicators.

In sum, M&E is rated as Substantial, Although there were shortcomings in the M&E framework, these were identified at the Mid-Term Review and corrective actions taken through the first Level 2 restructuring. This allowed for better monitoring performance of the revised indicators.

### M&E Quality Rating

Substantial

## 10. Other Issues

### a. Safeguards

The project was classified as a Category B (partial assessment) project under World Bank safeguards policies. Three safeguard policies were triggered at appraisal: Environmental Assessment (OP/BP 4.01): Natural Habitats (OP/BP 4.04): and Involuntary Resettlement (OP/BP 4.12).

**Environmental Assessment and Natural Habitats**. The ICR (paragraph 66) noted that the adverse environmental impacts of the civil works activities financed by the project (rehabilitation and installation of equipment for monitoring hydrology and meteorology), were expected to be minor and confined to the sites of the monitoring equipment and their vicinity. The safeguards on natural habitats was triggered, as the

planned works could affect natural habitats. An Environment and Social Management Framework (ESMF) was prepared and publicly-disclosed to address issues pertaining to environmental and natural habitats safeguard. The ICR (paragraph 58) noted that Environmental and Social Management Plans (ESMPs) and standard Environmental and Social Rules for contractors to civil works were prepared during implementation.

The project was in compliance with environmental and natural habitats safeguards (ICR, paragraph 58). The ICR also notes that the Government appointed an Environmental and Social focal point to systematically monitor and report safeguards performance during implementation.

**Involuntary Resettlement.** The PAD (paragraph 70) notes that land acquisition may be required for installing new stations and for accessing stations. A Resettlement Policy Framework (RPF) was prepared to address issues pertaining to involuntary resettlement. The ICR (paragraph 58) notes that the project did not entail any land acquisition or physical displacement of people.

### b. Fiduciary Compliance

**Financial management**. A financial management assessment of the Project Administration and Monitoring Team (PAMT) in the National Directorate of Water (DNA) was conducted at appraisal. The assessment concluded that the financial arrangements of the DNA were satisfactory and met the Bank's requirements (PAD, paragraph 61). The ICR (paragraph 60) notes that there was financial management compliance throughout the project. Financial management supervision was carried out by the Bank on a timely basis. The ICR provides no information on whether the audits were unqualified

**Procurement**. An assessment of the PAMT to address procurement issues was conducted at appraisal. The assessment concluded that the procurement arrangements of PAMT were satisfactory. The procurement risk was rated as moderate at appraisal (PAD, paragraph 63). The ICR (paragraph 51) noted that the lack of consistency in the approach to procurement (such as, due to the poor quality of procurement packages and delayed procurement for large packages), due to the lack of fiduciary capacity, contributed to procurement delays during implementation. The ICR also noted that at the onset of the project, procurement challenges ultimately resulted in the cancellation of the weather radar in Xai-Xai. The ICR reports no case of misprocurement.

### 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 | Moderately Satisfactory | Moderately Satisfactory | |
| Bank Performance | Moderately Satisfactory | Moderately Satisfactory | |
| Quality of M&E | Modest | Substantial | Shortcomings in M&E design were identified at the Mid- Term Review and corrective measures were taken through the first Level 2 restructuring. This enabled better monitoring of the revised indicators. |
| Quality of ICR | --- | Substantial | |

## 12. Lessons

The ICR draws the following main lessons from the experience of implementing this project, with some adaptation of language.

**1. A comprehensive and programmatic sector engagement can have a transformational impact on the hydro-met agenda**. This project had strong links to the broader sector agenda (including through a prior Bank-financed Development Policy Operation, a pilot program for climate resilience) and other investments in water resources. This engagement proved effective in providing the setting for sustainability and sector impact.

**2. Hydro-met investments targeting local level beneficiaries must ensure their early and continuous engagement, through tailoring hydro-met information to end user needs.** In this project's pilots, early and proactive engagement resulted in an effective coordination between government entities at various levels and the beneficiary communities. At the same time, the early engagement with local level beneficiaries enabled setting effective systems were adapted to the local reality.

**3. Developing pilots can demonstrate how to effectively advance innovative concepts to real life solutions and provide the basis to locking in strong financial sustainability**. The impact-based approach followed in this project provided an effective example of impact-based forecasts daily to end users. The implemented pilots further demonstrated implementing agencies can adopt new technologies with better information.

## 13. Assessment Recommended?

No

## 14. Comments on Quality of ICR

The ICR is well-written and provides a clear exposition of the activities and their links to the intended outcomes. The theory of change outlined in the ICR is clear and the ICR candidly acknowledges the faults in the results framework. The ICR also candidly acknowledges the shortcomings in the design of the monitoring and evaluation framework and how they were addressed following the Mid-Term Review.

However, there were some shortcomings. The ICR provides no explanations for why a low social discount rate was used for the economic analysis  The ICR does not use the appropriate methodology for the split rating. The ICR provides no information on the quality of audits and on whether the Task Team Leaders were based in the field or at headquarters.

**a. Quality of ICR Rating**
Substantial