



## 1. Project Data

**Project ID**

P146314

**Project Name**

Improving Climate Resilience

**Country**

Sri Lanka

**Practice Area(Lead)**

Urban, Resilience and Land

**L/C/TF Number(s)**

IDA-54170,IDA-57680

**Closing Date (Original)**

30-May-2019

**Total Project Cost (USD)**

139,019,103.97

**Bank Approval Date**

22-Apr-2014

**Closing Date (Actual)**

30-Apr-2021

**IBRD/IDA (USD)**
**Grants (USD)**

Original Commitment

110,000,000.00

0.00

Revised Commitment

147,522,955.68

0.00

Actual

139,019,103.97

0.00

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## 2. Project Objectives and Components

### a. Objectives

The project development objective (PDO) as stated in the Financing Agreement and in the Project Appraisal Document (PAD) is "to reduce the vulnerability of exposed people and assets to climate risk and to improve the Recipient's capacity to respond effectively to disasters."

In this review, the PDO is assessed in two parts, namely "to reduce the vulnerability of exposed people and assets to climate risk" and "to improve the Recipient's capacity to respond effectively to disasters". These two



separate parts of the PDO are referred to as Objectives 1 and 2 in Section 4 below. This is in line with the approach used in the ICR.

**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**

The project had the following four components:

Component 1: **Development of basin investment plans** (cost at appraisal: US\$13.0 million, including contingencies; at restructuring: US\$21.5 million, including contingencies; actual cost: US\$14.4 million), to carry out basin investment planning to identify flood and drought mitigation investments in priority river basins, informed by future climate risks. It included support to government engineers and experts to carry out comprehensive flood and drought modeling, assessment of the underlying causes of floods, and drought and technical capacity strengthening of the Ministry of Irrigation and Water Resources Management, including in particular technology transfer and technical assistance to its Special Projects Unit.

The 2018 restructuring expanded the scope of this component to carry out detailed studies and analytical work necessary to prepare the Climate Resilience Multi-Phased Programmatic Approach, a new Bank project that is ongoing. These activities included: (i) preliminary design and strategic environmental and social assessments, resettlement planning, and environmental assessments for the lower Kelani flood mitigation interventions, (ii) Mundeni Aru river flood mitigation feasibility studies and detailed designs, and (iii) capacity building for the Department of Meteorology in extreme event forecasting (2018 Project Paper - PP, para 6).

Component 2: **Increasing climate resilience of infrastructure** (cost at appraisal: US\$90.0 million, including contingencies; at restructuring: US\$120.3 million, including contingencies; actual cost: US\$119.9 million), to implement urgent climate risk mitigation investments identified and prioritized by the government, including (i) flood mitigation, (ii) transport continuity, and (iii) school protection, under the following subcomponents:

Subcomponent 2.1: Flood risk mitigation, including investments to rehabilitate infrastructure damaged by floods or particularly at risk to future floods.

Subcomponent 2.2: Transport Continuity, including investments to mitigate the slope failures/landslides in high/moderate landslide risk areas with frequent roadside slope failures/landslides on highways and rural roads. The transport continuity investments also included reducing the flood risk of low-lying bridges in vulnerable river crossings by raising and lengthening bridges in place of the narrow bridges/causeways.



Subcomponent 2.3: School protection, including investments focused on improving slope stability and drainage capacity of schools that serve about 29,000 students in areas highly vulnerable to landslides.

The 2016 additional financing (AF) covered a cost overrun and scaled up this component to include the repair and disaster proofing of irrigation, flood control, and road infrastructure (see section 2.e below).

Component 3: **Project implementation** (cost at appraisal: US\$5.0 million, including contingencies; at restructuring: US\$7.0 million, including contingencies; actual cost: US\$3.1 million), to support the project management unit (PMU) and the five implementing agencies (IAs).

Component 4: **Contingent emergency response** (cost at appraisal: US\$2.0 million, including contingencies; at restructuring: US\$3.2 million, including contingencies; actual cost: US\$3.2), to make emergency funds available to help the government respond to disasters. The 2018 restructuring triggered this response and reallocated US\$1.2 million to this component (2018 Project Paper - PP, para 6).

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

**Project Cost:** The actual total project cost was US\$140.6 million, which is 128 percent of the original cost estimate of US\$110 million and 92 percent of the AF cost estimate of US\$152.0 million (ICR, Annex 3). The Bank task team mentioned during the discussions with IEG on February 23 and 25, and March 3, 2022 (all references to discussions between the Bank task team and IEG in this ICRR refer to these dates) that the lower project end cost compared to the AF cost estimate was due to the appreciation of the US dollar against the Sri Lankan rupee (LKR).

**Financing:** The Bank was expected to fully cover the project costs through an IDA credit. The Bank disbursed US\$139.0 million according to the ICR datasheet and US\$140.6 million according to ICR, annex 3, which is about 92 percent of the credit amount. The Bank task team pointed out to IEG that the slight differences between the ICR datasheet and annex 3 are due to exchange rate fluctuations.

**Recipient Contribution:** The project did not envisage a recipient contribution, but the PAD, para 35, points out that the government was to make a US\$1.8 million for payment of seconded government staff. The Bank task team mentioned to IEG that the recipient provided the planned counterpart funding through the payment of government staff salaries.

**Dates and Project Restructuring:** The project was approved on April 22, 2014, became effective on August 5, 2014, and was expected to close on May 30, 2019. The closing date was extended three times for a total of 23 months: in October 2018, for 13 months to June 30, 2020, in March 2020 for six months to December 31, 2020, and in November 2020, for four months to April 30, 2021. The latter is the actual closing date.

- The October 2018 extension was necessary due to delays (i) caused by changes in the implementing ministry's leadership, (ii) in obtaining datasets for Component 1 from relevant technical agencies, (iii) caused by adverse weather events affecting construction works, (iv) in constructing irrigation schemes, and (v) scarcity of construction materials (2018 PP).
- The March 2020 extension was necessary because of (i) significant political changes in the country, (ii) difficulty in sourcing construction materials, (iii) adverse weather, and (iv) the Easter Sunday terrorist attacks (March 2020 PP, page 3).



- The November 2020 extension took place because of the disruptions caused by the COVID-19 outbreak and insufficient budget provision between January and August 2020, which delayed the completion of ongoing contracts (November 2020 PP, page 3).

The project received an additional financing (AF) of US\$42.0 million, approved on March 21, 2016, to scale up the project scope to finance the repair and disaster proofing of infrastructure damaged by extreme rainfall in December 2014. In addition, financing was required to close a financing gap caused by cost escalation of civil works under the parent project (AF PP, para 3). The Bank staff team clarified to IEG that the cost overrun was US\$5 million, and the main purpose of the AF was to scale up the project. The AF included a restructuring to (i) change the results framework to better capture the benefits of the project, including the ones of the AF, (ii) change the component and subcomponent costs, (iii) add an IA to implement the landslide rectification and slope stabilization interventions of Uva province roads, and (iv) trigger OP/BP 4.37 on Safety of Dams because several flood risk mitigation interventions had to rely on the performance of upstream dams and reservoirs (AF PP, paras 4 and 5).

The results framework changes impacted three PDO indicators as follows: (i) the indicator "decrease in expected annual flood loss from 5 years return period to 25 years" was changed to "area benefitted with reduced annual crop losses due to weather related events in the selected schemes" because of limitation of hydro-meteorological data and the changing rainfall patterns (the Bank task team mentioned to IEG that this data limitation existed at appraisal and that the project activities were to help overcome it. The project, however, did not have the data to report regularly on the original indicator during project implementation, hence they changed the indicator) and its target was increased from 123,000 hectares (ha) to 149,000 ha (AF PP, annex 2); (ii) the indicator of "reduction in people at risk to climate related transport interruptions" was changed to "people benefitted from reduced weather related transport interruptions" to enhance clarity and its target was increased from 721,000 people to 1,220,000 people; and (iii) the indicator of "number of schools protected against landslides" was changed to "number of school children protected from reduced landslide risks in selected schools", to capture the beneficiaries instead of the schools, and its target was changed from 18 schools to 29,000 school children. The changes to the results framework also included the revision of three intermediate outcome indicators to better reflect project activities and results.

The project was again restructured on October 5, 2018. In addition to the above-mentioned closing date extension, this restructuring resulted in (i) reallocating funds among components, especially to component 4: Contingent emergency response, and disbursement categories, (ii) the inclusion of district secretariats of selected districts as implementation agencies for component 4, and (iii) changes in procurement arrangements and the implementation schedule. It also included the increase of the end targets of two PDO indicators ("reduction in people at risk to weather related transport interruptions" from 1,220,000 to 1,800,000 and "development of basin investment plans that are based on integrated understanding of climate risk" from 9 to 10) and the decrease of the end target of one PDO indicators ("area benefitted with reduced annual crop losses due to weather related events in the selected schemes" from 149,000 ha to 113,000 ha (2018 PP, annex 3)). These changes were necessary to reflect the reallocation of funds to component 4 and because of a clearer understanding of the cost of irrigation and flood mitigation works (2018 PP, page 7).

### **Split rating:**

Despite revisions of PDO indicators and targets, no split rating will be applied, and the project's achievements will be assessed against the revised targets for the following reasons. First, the main reason



of the 2016 AF was to scale up the repair and disaster proofing of irrigation, flood control, and road infrastructure activities and therefore increased the respective targets. Second, the replacement with the 2016 AF of the indicator "decrease in expected annual flood loss from 5 years return period to 25 years" with the indicator "area benefitted with reduced annual crop losses due to weather related events in the selected schemes" took place to enable results measuring, the target was increased, and so did not substantially change the indicator's level of ambition. The Bank task team explained to IEG that the original indicator needed data and a modeling capacity that became only available by project end. Therefore, to be able to regularly report on progress, the indicators was changed. The new indicator captures similar results, but relies less on modelling. The target was increased because of the additional works added with the 2016 AF. Third, the change of the target for protection against landslides from "18 schools" to "29,000 school children" slightly reduced the level of ambition because the PAD, para 32 highlighted that the beneficiaries of the 18 schools were 30,000 students. However, the original target of 18 schools was achieved and nearly 30,000 schools benefitted, so applying a split rating would make no practical difference. Fourth, although the 2018 restructuring reduced the target of the indicator "area benefitted with reduced annual crop losses due to weather related events in the selected schemes" from 149,000 ha to 113,000 ha, the original and revised targets were exceeded, so again to apply a split rating would make no practical difference.

### 3. Relevance of Objectives

#### Rationale

**Context at Appraisal.** At appraisal in 2014, climate-related hazards were a significant threat to economic and social development in Sri Lanka, with extreme variability of rainfall defining its climate. Climate projections at that time showed that risks associated with water-related climate variability were likely to intensify and worsen. Inter-annual and intra-seasonal variability of monsoons and the number of dry days and droughts were expected to increase, reducing agriculture production and adversely affecting many aspects of human lives. However, the country lacked a comprehensive and nationally-owned disaster risk assessment. Flood management infrastructure was insufficient, and the country had no comprehensive basin management approach. Upland areas were particularly vulnerable to landslides often triggered by extreme rainfall events. In addition, recent disasters had caused major economic and social damage, which drove the government's interest to build resilience to climate-related risks. Sri Lanka had invested significantly in emergency preparedness and response capacity since the Tsunami in 2004. Despite this progress, large-scale, systematic investment in risk understanding and mitigation across sectors was not yet in place at appraisal.

**Relevance to Government Strategies.** At appraisal, building resilience and improving the government's capacity to respond to disasters was high on Sri Lanka's agenda. Similarly, ensuring that key transport connections were not compromised by landslide events was a government priority. Overall, the project was aligned with the 2014–2018 Comprehensive Disaster Management Program of Sri Lanka and its international commitments on climate change and disaster risk management, including Sri Lanka's 2016 National Determined Contribution and the 2015-2030 Sendai Framework for Disaster Risk Reduction. At completion, the PDO remained aligned with the 2021 National Policy Framework to proactively manage disasters, minimize the loss of lives and property and economic damage, and establish a well synchronized internal system to ease the suffering of people affected by disasters. Similarly, it remained aligned with the



adaptation priorities in the revised 2021 National Determined Contribution and the 2015-2030 Sendai Framework for Disaster Risk Reduction national targets, which was still in force.

**Relevance to Bank Assistance Strategies.** At appraisal, the PDO was in line with the disaster risk management pillar of the Bank's FY13-FY16 Sri Lanka Country Partnership Strategy, which proposed a comprehensive program to reduce the adverse impacts of climate change and adapt the stock of infrastructure to extreme climate shocks. The PDO remained fully aligned with the Bank's FY17-21 Country Partnership Framework. Its pillar 3 "Seizing Green Growth Opportunities, Improving Environmental Management, and Enhancing Adaptation and Mitigation Potential" aims at supporting activities for more efficient, resilient, and sustainable green urban development, enhanced resilience to climate-related events, and disaster risk management.

**Previous Sector Experience.** Between 2005 and 2012, the Bank was the lead development partner supporting Sri Lanka to address climate-induced disaster risks. It provided US\$467 million to address the reconstruction needs from the 2004 Tsunami, maintain dams for water provision, and reduce flooding in Colombo. Examples of this engagement are the (a) Sri Lanka Tsunami Emergency Recovery Loan (P094205) to support the government to (i) reduce the immediate suffering resulting from the effects of the tsunami and restore livelihoods destroyed by the tsunami, (ii) restore basic services to the affected population, and (iii) start the recovery and reconstruction process; (b) Sri Lanka Tsunami Damage & Needs Assessment (P094204), an economic and sector work, to carry out the preliminary damage and needs assessment from Tsunami Disaster in Sri Lanka; and (c) Sri Lanka post-disaster needs assessment (P122347), a non-lending technical assistance, to support strategic dialogue and capacity development of the counterparts in the government of Sri Lanka in post-disaster needs assessment.

The PDO to "reduce vulnerability to climate risks and improve capacity to effectively respond to disaster risks" addresses Sri Lanka's climate vulnerability. This PDO was and is in full alignment with country and Bank strategies. The PDO is outcome-oriented and appropriately pitched for a country like Sri Lanka. Compared to previous Bank activities in the sector, the project evolved over time in breadth and the objectives became more challenging. Therefore, **the relevance of objectives is rated high.**

## Rating

High

## 4. Achievement of Objectives (Efficacy)

### OBJECTIVE 1

#### Objective

To reduce the vulnerability of exposed people and assets to climate risks.

The PAD, footnote 11 points out that climate risks under this project are hydro-meteorological risks of flood, drought, and landslides.





## Rationale

The theory of change for Objective 1 was that the progressive capacity improvements under objective 2 and the activities to rehabilitate and strengthen irrigation infrastructure, control floods, and implement drainage infrastructure would lead as output to more resilient irrigation infrastructure and flood control measures. In terms of outcomes, this was to lead to reduced vulnerability of irrigation infrastructure to damages by floods and the decrease of crops loss to floods and droughts. The activities to rehabilitate flood damaged and vulnerable highways, provide roads with adequate slope protection, and improve bridges and culverts would lead as output to more resilient roads, bridges, and culverts. In terms of outcomes, this was to lead to reduced transport infrastructure vulnerability to climate risks and less transport interruptions. Finally, the activities to reduce landslide risks around schools, would lead as output to landslide protection infrastructure and as outcome to schools and students protected against landslides and hence educational continuity. Overall, these outcomes were expected to reduce the vulnerability of exposed people and assets to climate risks, with reduced flood, drought, and landslide vulnerable populations and reduced economic losses in districts vulnerable to climate and weather related hazards. The main assumptions were that (i) accurate and up-to-date data to design the vulnerability reduction interventions, (ii) adequate financing for the investments, (iii) sufficient irrigation and rainfall for expected crop yields to materialize, and (iv) a plan and budget to ensure the sustainability of the interventions were available.

## Outputs:

The project produced the following outputs, captured through indicators in the results framework:

### School Protection:

- 100 percent of detailed school landslide stabilization designs completed, exactly achieving the unrevised target;
- 18 schools protected against landslides, exactly achieving the unrevised target (the original indicator measured the school area protected, so the target is not comparable);

### Transport Infrastructure

- 100 percent of detailed road side slope stabilization and bridge designs completed, exactly achieving the unrevised target;
- 38 bridges raised and causeways replaced, largely exceeding the revised target of 16 and the original target of 12;
- 640 culverts and small bridges constructed, exceeding the revised target of 460 and the original target of 89;
- 381 improved farm links, exceeding the unrevised target of 109;
- 2,448 kilometers of roads ensuring transport connectivity improved, largely exceeding the revised target of 560 kilometers (the original indicator measured the length of roadside slopes stabilized, so the target is not comparable);

### Flood Protection

- 100 percent of detailed flood mitigation designs completed, exactly achieving the unrevised target;
- 1,129 km of distribution canals improved, exceeding the revised target of 600 and the original target of 643;



- 10,720 structures in distribution canals improved, exceeding the revised target of 6,200 and the original target of 4,634;
- 104 km of flood drainage canals improved, achieving the revised target of 103, but significantly short of the original target of 778;
- 47 km of flood bunds rehabilitated, exceeding the revised target of 45, but significantly short of the original target of 399; and
- 70 km of spill tail canals improved/rehabilitated, exactly achieving the revised target, but short of the original target of 173.

The Bank task team pointed out to IEG that the substantial overachievement of some of the irrigation infrastructure related targets and the underachievement on others was due to the fact that the exact needs on the ground were not clear at appraisal and hence were not adequately reflected in the indicator targets.

The project also achieved the following output, not captured through an indicator in the results framework:

- 154.95 km of provincial roads improved, including the protection of landslide and rockfall locations and the improvement of bridges;

Note: Exceeding many revised output targets was possible because of savings incurred due to the appreciation of dollar against the Sri Lankan rupee (LKR).

### **Outcomes:**

The project's **irrigation, flood control, and drainage infrastructure repairs and improvements** enhanced the irrigation infrastructure's robustness to withstand floods and the water conveyance and distribution efficiency, thus avoiding flood damage to infrastructure and crops and ensuring water supply. The irrigation rehabilitation benefited 216,933 farming families in 11 districts. By project end, 172,491 ha of land experienced reduced annual crop losses due to weather-related events in the selected schemes, exceeding the revised target of 113,000 (the original target was 123,000 ha but, as mentioned in section 2.e, the indicator measured the decrease in expected annual flood loss from 5 years return period to 25 years, so was not fully comparable). The Bank task team mentioned to IEG that the reduction in annual crop losses was measured by comparing the without and with project areas with stable water supply and affected by floods based on historical flood data, so not expected to experience crop losses because of drought and floods. The ICR does not mention to which year or years the annual crop losses results refer to.

The ICR, para 37, explains that the irrigation investments increased the cultivable land by 5,593 ha and 12,705 ha for paddy and other field crops and the yield by 1,535 million tons per ha and 2,222 million tons per ha for paddy and other field crops. For the Hakwatuna Oya irrigation scheme in Kurunegala, it also points out that the avoided flood and drought crop loss per ha was LKR 62,123 (about US\$360). Again, the ICR does not mention to which year or years the cost of the avoided annual crop losses refer to. The improvements in this scheme covered 2,575 ha and, hence, the avoided losses for the interventions was about US\$800,000 ( $2,575 \times 62,123 = \text{LKR}159,966,725$ ). To put this in perspective, the area intervened in the Hakwatuna Oya scheme represents 0.015 percent of the total intervened project area of 172,491 ha.

The project's **road-related investments**, reduced the risk of climate related transport interruptions for 1,799,000 people, compared to a revised target of 1,800,000 and an original target of 721,000. These investments restored and enhanced the accessibility and connectivity on highways and roads damaged or





obstructed by floods and landslides and improved their resilience to future flood and landslides. They ensured connectivity to markets, health care, education, employment opportunities, and other critical basic services, especially for farmers selling produce and buying agricultural inputs and for the general public and tourists (ICR, para 38). As an example, the ICR, para 39, mentions that the Udappuwa Bridge, the largest of the bridges intervened under the project, improved connectivity and travel time for 250 houses/families and 500 school children (no data on travel time reduction is given in the ICR), reduced interruptions to livelihood activities for around 1,500 families and 20 prawn farms during floods, and ensured access to critical services, such as hospital, police stations, and schools. The Bank task team explained to IEG that prior to the construction of this bridge, people were cut off from these services for on average 10 days a year because of heavy rains.

The ICR, para 38, points out that the project investments improved the corridor's resilience to landslides caused by heavy monsoon rains, and that during the November 2021 landslides, the project intervention areas fared better than other areas. The Bank task team clarified to IEG that in 2021 Sri Lanka experienced about 700 landslides and that the project's landslide protection measures along roads withstood the strong rains despite being in highly landslide prone areas whereas in many other areas roads were blocked and large damages occurred.

In terms of **slope stability near schools**, before the project, school children and staff of the selected 18 schools in Kandy were at high risk of landslides and schools closed during heavy rainfall periods. This negatively affected education activities for 2 to 4 weeks annually (ICR, para 40). Because of the slope stabilization and drainage activities, by project end, 28,801 students and about 500 staff in 18 schools in the Central Province were less vulnerable to landslides, against a revised target of 29,000 students (the original indicator measured the number of schools and the target of 18 was achieved). The Bank task team clarified to IEG that the schools with the landslide protection interventions constructed under the project did not close during heavy rains, hence avoided interruptions in education.

The Bank task team pointed out that the designs of road, bridge, irrigation, and landslide infrastructure all reflected future climate risks.

Overall, about 11.5 million people in 22 out of 25 districts in Sri Lanka benefited from project investments. Seventy percent of project beneficiaries surveyed felt that the project investments reflected their needs, short of the target introduced with the 2016 AF of 75 percent.

The project reduced crop losses, and it is likely that it made farmers and irrigation infrastructure less vulnerable to droughts and flooding. The project also restored transport connectivity and likely made transport infrastructure more resilient to climate risks, hence reducing the people's vulnerability to future weather-related connectivity interruptions. The project also made selected schools less vulnerable to landslides risks and permitted to keep these schools open during heavy rains. Therefore, **the efficacy of Objective 1 is rated substantial.**

**Rating**  
Substantial

## OBJECTIVE 2



## Objective

To improve the recipient's capacity to respond effectively to disasters.

## Rationale

The theory of change for Objective 2 was that the **activities** to (i) develop basin investment plans, (ii) train government staff, (iii) prepare preparatory studies to implement the basin investment plans, and (iv) provide contingent emergency financing during project implementation would lead to the following **outputs** of (a) databases, a model to forecast flood and drought risks, and other tools, (b) a portfolio of flood and drought risk mitigation investments, (c) feasibility and other preparatory studies for these investments, (d) rapidly available financial resources to respond to disasters, and (e) capacitated government staff with greater awareness. This was to lead as **intermediate outcomes** to (i) staff with greater capacity and tools to understand and respond to disaster risks and (ii) a faster response to disasters because of available financing. In the longer run, it was to lead to new investments to mitigate flood and droughts risks. All this meant that the recipient's capacity to respond effectively to disasters improved, and hence that flood, drought and landslide vulnerable populations and economic losses in districts vulnerable to climate and weather-related hazards would be reduced. The main assumptions were that (i) accurate and up-to-date data for river basin modelling and climate risk analysis were available, (ii) government staff was competent in river basin modelling, and (iii) the identified investments to mitigate flood and droughts risk were implemented.

## Outputs:

The project produced the following outputs captured through indicators in the results framework:

- 10 river basin-level flood and drought risk mitigation investment plans, exceeding the original target of nine and exactly achieving the revised target. This included, among others:
  - 10 computational framework reports, which provided data sets and tools, e.g. web-based global information system information presentation tool, to understand the climate risk in the targeted basins;
  - 10 floods and drought risk assessment reports; and
  - 10 integrated flood and drought risk assessment reports, identifying a portfolio of investments to mitigate flood and drought risks.
- Seven risk mitigation feasibility studies for investment envisaged in the basin investment plans, not achieving the original target of 15 and the revised target of 10; and
- Four strategic environmental assessments and four strategic social assessments for the proposed investments of four river basins (the project had an original indicator "strategic environmental assessment developed", with a target of one, which was replaced with the indicator "risk mitigation feasibility studies developed").

Note: The Bank task team pointed out to IEG, that the investments envisaged in one of the river basin investment plans will be implemented under the ongoing Climate Resilience Multi-Phase Programmatic Approach (P160005).

- 100 percent of flood and drought risk models developed, exactly in line with the unrevised target;
- 100 percent of digital elevation model and hydro-meteorological data for the nine basins collected and compiled for analysis, exactly in line with the unrevised target;
- 100 percent of local flood risk analyses and modeling to support immediate mitigation carried out, exactly in line with the unrevised target; and



- 72 Ministry of Irrigation and Water Resources Management staff trained in modeling climate risks, exceeding the original target of 20 and the revised target of 40. The training included monitoring, forecasting, and early warning of hydro-meteorological hazards, risk and vulnerability assessments, disaster risk reduction, and basin-level flood and drought risk mitigation planning.

The project also produced the following outputs not captured in the results framework:

- 15 river basin risk mitigation investment prefeasibility studies (this output had no indicator in the results framework but it is mentioned in Annex 1, page 37);
- Various software, including the European Center for Medium Range Weather Forecasting license, and equipment;
- Sri Lanka Weather Information Network design, which, as mentioned by the Bank task team to IEG, will be implemented under the ongoing Climate Resilience Multi-Phase Programmatic Approach;
- Bidding documents and the engineer's cost estimate for weather forecasting center, which, as mentioned by the Bank task team to IEG, will be implemented under the ongoing Climate Resilience Multi-Phase Programmatic Approach;
- Salinity barrier detailed design (the Bank task team explained to IEG that this structure will be implemented under the ongoing Climate Resilience Multi-Phase Programmatic Approach and will help reduce floods and supply fresh water);
- Road map and details of the planned activities to enhance forecasting and early warning (the Bank task team explained to IEG that activities will be implemented under the ongoing Climate Resilience Multi-Phase Programmatic);
- 2,400 staff of IAs and other relevant agencies exposed to overseas training and exposure visits; and
- Availability of IDA credit enabling the relocation of resources to quickly respond to a disaster.

### **Outcomes:**

According to the ICR, para 42, the development of the 10 basin investment plans, in line with the revised PDO indicator target and exceeding the original target of 9, improved the government's capacity to respond effectively to disasters through (i) a more strategic approach to medium and long-term climate resilience challenges, (ii) the identification of the investments to address the longer term challenges to build resilience, and (iii) information on costs of flood and drought risks generated through the flood and drought risk assessments and important for the government's investment planning. The government strengthened its capacity through (i) learning by doing, by assigning young local engineers to work with the international consulting firm to prepare the river basin plans, (ii) the data sets and tools developed and now available to the government, and (iii) the capacity strengthening events. The Bank task team pointed out to IEG that the consulting firm carried out the first basin investment plans and trained the local engineers. Successive plans were directly carried out by the local counterpart. According to the Bank task team, the government is now able to update the existing plans or prepare new ones.

The National Building Research Organization, by being in charge for the design and construction supervision of the slope stabilization works for roads and schools under the project and through additional equipment, built its capacity to carry out its national mandate for landslide risk modelling, managing, and monitoring. By project end, this organization delivered continuous support to landslide rectification and slope stabilization of major highways (ICR, para 49). The Bank task team mentioned to IEG that before the project, the National



Building Research Organization was not able to design the type of landslide mitigation works implemented under the project because this was the first time such large scale works were carried out in Sri Lanka.

The slope protection works also provided local contractors with hand-on experience, which they previously lacked (ICR, para 50). Similarly, local engineers in road agencies improved their skills through the design and implementation of flood-damaged and vulnerable transport infrastructure rehabilitation and roadside slopes control (ICR, para 38). The Bank task team clarified to IEG that also for the road agencies involved in the project, the type of slope protection works carried out were new.

The European Center for Medium Range Weather Forecasting's license acquired under the project and the training provided by the Norwegian Meteorology Department enhanced the capacity of the Meteorology Department to monitor and forecast extreme weather events and provide warnings. As an example, the ICR, para 46, mentions that this department issued timely and accurate warnings to prepare for two extreme weather events, the cyclonic storm 'Burevi' in December 2020 and Amphan super cyclonic storm in May 2020, resulting in the timely evacuation of 75,000 people and minimizing death to only eight people despite the severity of the storm. The Bank task team explained to IEG that the 2016 floods caused by a similarly severe storm combined with monsoon rains caused 201 deaths. According to them, the forecasting software and capacity building that the project provided to the Department of Meteorology helped them to adequately and timely forecast the storms and assisted in warning people to evacuate, hence at least partially contributed to the reduced number of deaths in more recent storms.

The ICR, para 45 mentions that district secretaries worked with road agencies at different levels and divisional secretaries to restore and rehabilitate the damaged infrastructure after the 2017 floods. According to the ICR, para 45, this collaboration enhanced the capacity of the district secretariats to prepare designs, cost estimates, tendering, and contract supervision and prepared them for future rehabilitation/restoration of similar infrastructure in a post-disaster situation.

During project implementation, the capacity to respond effectively to disasters was enhanced through the contingent emergency financing, which the government triggered after the May 2017 floods. However, the activation of the contingent emergency financing was slow because of delays in finalizing the priority investment list and designing the implementation arrangements, with the civil works tendered by September 15, 2018 (2018 PP, page 5). The Bank task team mentioned that this project taught them and the government how to trigger the contingent emergency financing in projects, and they managed to use them very quickly for Covid19 in 2020. The team also pointed out to IEG that even if the availability of the financing under this project stopped with its completion, the ongoing Climate Resilience Multi-Phase Programmatic Approach and all other Bank projects in Sri Lanka include contingent emergency financing.

Finally, the Bank task team pointed out to IEG that the preparation of the basin investment plans and the other capacity strengthening activities helped the government to switch from a disaster risk management approach focused on response to one based on prevention, which constitutes a new way of operating in Sri Lanka.

In summary, it is likely that the project strengthened the government's capacity to effectively respond to disasters through learning by doing, training activities and exposure to good practices, software and tools, and the contingent emergency financing. Therefore, **the efficacy with which Objective 2 was achieved is rated substantial.**



**Rating**  
Substantial

## OVERALL EFFICACY

### Rationale

The planned project investments were successfully implemented, and it is likely that the project reduced the vulnerability of exposed people and assets to climate risks and strengthened the recipient's capacity to respond effectively to disasters. Therefore, **the project's overall efficacy is rated substantial.**

### Overall Efficacy Rating

Substantial

## 5. Efficiency

### Economic Analysis:

**At appraisal**, the project carried out cost benefit analyses for the three main subcomponents of component 2, amounting to 82 percent of the total project costs. The analyses use a discount rate of 12 percent and a time period of operation of 20 years. The project carried out a Monte Carlo simulation analysis to account for the uncertainty in determining the return period of floods, droughts, landslide events, and the vulnerability of physical structures and crops damage.

The analyses showed economic internal rates of return (EIRRs) of 30.4 percent, 16.0 percent, 18.9 percent and net present values (NPVs) of US\$44.6 million, US\$10.1 million, and US\$2.7 million for the flood and drought risk mitigation, transport connectivity, and school protection subcomponents. For the project as a whole, the EIRR was estimated to be 22.7 percent and NPV of about US\$57 million.

**At the approval of the AF**, the project did not repeat the economic analysis for the transport connectivity subcomponent. Instead, the AF PP, page 13, mentions that "given that the new investments proposed under this AF are very similar to those in the parent project, it is unlikely that the EIRR with the new investments will be significantly different from the original project." The project carried out an economic analysis of the flood mitigation subcomponent, including the cost overrun of US\$5 million. This resulted in an EIRR of 27 percent.

**At completion**, the project performed cost benefit analyses for the three main subcomponents under component 2, amounting to 85 percent of the total project costs. They followed the method and assumptions of the economic analyses done at appraisal but used actual data, for instance on costs and the duration of the construction, and discount rates of 12 and 6 percent. Because Covid19-related travel restrictions, the team was



not able to collect other types of data and relied on data from government departments and extrapolations. This does not seem to jeopardize the reliability of the analyses.

The analyses showed EIRRs of 16.9 percent, 22.6 percent, 14.8 percent and NPVs of US\$22.9 million, US\$33.3 million, and US\$0.8 million for the flood and drought risk mitigation, transport connectivity, and school protection subcomponents. For the project as a whole, the EIRR was estimated to be 18.8 percent, the NPV in the range of US\$64–206 million, and the benefits costs ratio in the range of 1.7–2.8. The NPV and BCR ranges are based on the discount rates of 12 percent and 6 percent. According to the ICR, annex 4, the lower EIRR at completion is due to the use of actual expenditure and benefits data resulting in less uncertainty in the modeling.

### Cost Effectiveness, Administrative and Operational Efficiency:

This project had a 23-month implementation delay for the reasons pointed out in Section 2. The project received an AF partially to cover a cost overrun related to the flood risk mitigation investments. The AF PP, pages 10 and 14, explains that the initial cost figures for the flood risk mitigation investments were based on the conceptual designs during project preparation and, after the completion of detailed designs and cost estimates for nearly 80 percent of the planned investments, the government found that the actual costs exceeded the initial estimates by 8 to 10 percent. However, the project mostly achieved or exceeded its revised output targets, and the final project cost was 8 percent lower than the AF cost estimate for the reason given in Section 2.

Because of the implementation delays, even if partially beyond the project's control, the cost overrun in the flood risk mitigation component, and a 17 percent lower estimated project completion EIRR than the EIRR estimated at appraisal, **the efficiency of project implementation is rated modest.**

## 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	✓	22.70	82.00 <input type="checkbox"/> Not Applicable
ICR Estimate	✓	18.80	85.00 <input type="checkbox"/> Not Applicable

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

## 6. Outcome





The project's relevance of objectives is rated high, its efficacy is rated substantial, and its efficiency is rated modest. Consequently, **the project's overall outcome is rated moderately satisfactory**

**a. Outcome Rating**

Moderately Satisfactory

## **7. Risk to Development Outcome**

The following pose risks to development outcomes:

- **Financial and capacity risk:** The most significant and likely risk to the development outcomes is related to insufficient resources and capacity to maintain the flood, drought, and landslide mitigation investments. The ICR, para 118, points out that despite O&M-related measures, such as the maintenance manual for slope protection, field visits before project closure showed maintenance shortcomings due to insufficient budget and lack of local capacity to translate manual's procedures into action. This risk is most acute for the slope stabilization measures at schools, handed over to the provincial entities after their completion. For the road sector, this risk is somewhat mitigated by setting up a dedicated unit in the road agency for slope stabilization of its major highways, which can use the agency's annual budget. To ensure the sustainability of the Department of Meteorology's monitoring and extreme weather forecasting and warning, the renewal fee for the European Center for Medium Range Weather Forecasting license was included in its recurrent annual budget (ICR, para 46).
- **Government ownership/commitment:** This risk is low and not very likely to occur because the government recognized the importance of disaster risk management and the project managed to initiate a shift from disaster response to preparedness. The preparatory works to implement some of the basin investments prepared under the project are being implemented in the ongoing Climate Resilience Multi-Phase Programmatic Approach project. In addition, as explained by the Bank task team to IEG, the government has been approaching other donors to implement these investments (e.g. ADB). All preparatory work is also available on the ministries websites for investors to make proposals. A water supply Bank project is also under preparation, which is likely to finance some of the investments. In addition, because the basin investment plans are long term plans and the government has the capacity to update them, there is a low risk that they become outdated and irrelevant even if in the light of Covid19 and the difficult economic situation, immediate government resources to implement the investments might be limited.
- **Political risk:** The Bank task team explained to IEG that there is a high likelihood that political changes will take place in Sri Lanka. However, this is unlikely to influence the project development outcomes because the staff trained under the project is unlikely to be affected by political changes. However, political changes might have an impact on salary increases and some of the trained staff might leave for better jobs.
- **Exposure to natural disasters:** The Bank task team mentioned to IEG that Sri Lanka is highly exposed to natural disasters, but the infrastructure constructed under the project was designed to take future rainfall and flood risks into account. Therefore, it is unlikely that these structures would be destroyed because of ordinary weather events. However, there is still a risk to development outcomes due to severe and rare weather events.



## 8. Assessment of Bank Performance

### a. Quality-at-Entry

The Bank task team intervened in areas highly relevant for Sri Lanka. The task team benefited from the previous Bank engagement to address climate-induced disaster risks in Sri Lanka, on which they built and expanded. According to the ICR, para 10, this led to a holistic long-term investment project that combined the knowledge to understand the risks and vulnerability of selected river basins with 'no regret' immediate risk mitigation interventions. It also laid the foundation for developing a longer-term investment plan to mitigate risks and build resilience against climate change and extreme weather-induced disasters.

The Bank task team integrated the lessons from similar Bank operations in the region, which included the need for an integrated flood and drought management system, coordination and cooperation among ministries, easily and readily available data on floods and droughts, and learning by doing and capacity building (PAD, paras 39 to 42). The task team included in the project design structural and nonstructural elements. Being this a multi-sectoral project, the design was complex by nature, including many activities, various IAs and beneficiaries, and a large geographical spread. The implementation arrangements were adequate for this type of project.

The Bank task team paid adequate attention to the social, environmental, and fiduciary aspects during preparation.

The Bank task team rated the overall project risk as moderate and mainly flagged risks related to a change from a siloed to a multi-sectoral approach to climate risk management, implementation challenges and delays, the multisector nature of the project, and the short implementation period (PAD, paras 53 to 56). With the exception of a risk related to the technical complexity of the basin investment plans, the risk identification was adequate. The mitigation measures were not fully adequate, and especially project delays occurred. The M&E framework had shortcomings (see Section 9).

The Bank task team largely adequately supported project preparation and appraisal, but the project design had minor shortcoming in risk mitigation and M&E. On balance, **the project's quality at entry is rated satisfactory.**

**Quality-at-Entry Rating**  
Satisfactory

### b. Quality of supervision

The Bank task team brought strong disaster risk management, country, and international experience. The team mentioned to IEG that for transport and irrigation investments, they were supported by a roads engineer specializing in landslides and an irrigation engineer. The team carried out eight formal implementation support missions, which for a project of a duration of six and a half years is on the short side, even considering that because of the Covid19 pandemic, since March 2020, the team had to



carry out project monitoring, supervision support, and the closing activities virtually. The team provided adequate support to fiduciary and safeguards policy implementation.

The Bank task team provided strong implementation support to the Ministry of Irrigation, the PMU, and other IAs to facilitate timely completion of activities, restructured the project, reallocated resources, and ensured communication in the project (ICR, para 111). The Bank task team helped overcome project implementation challenges. The team fostered strong government ownership and facilitated coordination. The team reviewed the deliverables of component 1 and provided recommendations. The team provided technical advice and quality assurance during field visits in the design and construction of the investments in component 2. The government appreciated the dedicated support of Bank staff to this project (ICR, annex 5).

During Covid19, the Bank task team adopted innovative tools for remote monitoring and reporting (ICR, para 104) and final project evaluation, including the use of photos. This worked largely adequately.

Areas for improvement for the Bank task team in supervision include a more adequate correction of M&E shortcomings and greater attention to sustainability.

In summary, the Bank task team adequately supported the implementation of this complex project with minor shortcomings. Consequently, **Bank performance in supervision is rated satisfactory.**

**Quality of Supervision Rating**  
Satisfactory

**Overall Bank Performance Rating**  
Satisfactory

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

### a. M&E Design

According to the PAD, para 45, the PMU was to be responsible for project monitoring with the assistance from independent monitoring and evaluation consultants.

The project's PDO and theory of change were clear. The project activities were to logically lead to the expected outputs, intermediate outcomes, final outcomes, and impacts. The PAD also explained the meaning of climate risk.

The original and revised PDO indicators were outcome-oriented and adequate to measure the objective 1 of reducing vulnerability of exposed people and assets to climate risks. The indicator revision took place to enhance clarity and facilitate results measurement.

However, objective 2 of improving the recipient's capacity to respond effectively to disasters was measured by a single output-based indicator "development of basin investment plans that are based on an integrated



understanding of climate risk". This was inadequate to capture the objective's achievement, and the Bank task team, in the ICR and during the meeting with IEG, provided additional evidence.

The project had shortcoming in target setting. The Bank task team pointed out to IEG that the substantial overachievements on some of the irrigation infrastructure-related targets and the underachievement on others was because at appraisal the exact needs on the ground were not clear and hence not adequately reflected in the targets. Baseline data for some irrigation investments and bridges were also unavailable at appraisal. In addition, some indicators were not clearly defined, and the M&E framework lacked information on measurement methodologies. For instance, it was not clear how the indicator of "decrease in expected annual flood loss from 5 years return period to 25 years" was to be measured.

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

The ICR, para 98, points out that the PMU was adequately staffed with a full-time M&E specialist to support data collections and progress reporting, and track the progress of 800 subprojects spread over a large geographic area. This enabled capturing project performance shortcomings and take corrective actions. However, the absence of a dedicated M&E staff in the IAs to collect and compile monitoring data was an implementation challenge. Some IAs did not finalize their subproject completion reports. The project also had delays in submitting the data and information required for the ICR, which were resolved through virtual meetings with the field staff of IAs. Overall reporting on project progress and results, however, was adequate.

The project had a citizen engagement assessment study conducted by an independent consultant (ICR, annex 1).

The results indicators and targets were restructured several times. The restructurings of the results framework, however, failed to specify all necessary measuring methodologies and adjust some of the output targets.

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

With respect to M&E utilization, the ICR, para 102, mentions that Bank's implementation supervision missions benefited immensely from progress reports to track and address physical and financial progress and implementation issues. The aide memoires used the M&E data and the progress reports to inform implementation progress, identify issues, suggest remedial actions, and take decisions.

### **M&E Quality Rating**

Modest

## **10. Other Issues**

### **a. Safeguards**



The project was classified as category B for environmental assessment purposes. The project triggered the following safeguards policies: Environmental Assessment OP/BP4.01, Natural Habitats OP/BP 4.04, Physical Cultural Resources OP/BP 4.11, and Involuntary Resettlement OP/BP 4.12. The Safety of Dams OP/BP 4.37 policy was retroactively triggered with the AF because of the risk associated with possible failure of upstream dams and potential impacts on infrastructure works.

Overall, the ICR, para 115, points out that no major negative social or environmental impacts were identified during project implementation. More specifically, **in terms of environmental safeguards**, the project provided several training programs for the PMU and the IAs, and environmental staff continuously supported these entities. The project was in compliance with the environmental safeguards policy. It adhered to its environmental assessment management framework, implemented environmental and social management plans, and ensured diligent monitoring. The project reported no major environmental safeguards compliance issues. The PMU and the contractors, with the Bank's guidance, rectified minor environment management shortcomings. The Bank task team pointed out that examples of such shortcomings included inadequately closing off work sites from traffic, not always using personal protective equipment even if it was provided, dust, and noise.

The project complied with the Physical Cultural Resources OP/BP 4.11 safeguards policy. The ICR does not report on the necessity to invoke the Natural Habitats OP/BP 4.04 and Safety of Dams OP/BP 4.37 safeguards policies and its compliance. The rating for these two policies in the operational portal was satisfactory.

**With respect to social safeguards**, the project complied with the Involuntary Resettlement OP/BP 4.12. The project promptly identified and addressed temporary impacts from civil works and ensured that they were in line with the social impact mitigation plan, including the abbreviated resettlement action plan preparation and compensation of the project-affected people. The ICR does not provide details on the nature of resettlement impacts and the number of affected people. The project followed the Bank's occupational health and safety procedures in civil works. In addition, the project established and maintained operational a project-specific grievance redressal mechanism throughout implementation. The project received and resolved 174 grievances.

## **b. Fiduciary Compliance**

**As for procurement**, the ICR, para 107, points out that, overall, the PMU satisfactorily complied with the procurement rules and procedures. The project had one miss-procurement related to a mesh for landslides, which was successfully revolved. Because of the large number of procurement processes (881), the PMU would have benefitted from additional procurement specialists.

The project's **financial management** performance was satisfactory. The project complied with the financial management related loan covenants and submitted the interim financial reports and audited financial statements timely and adequately in contents. The project adequately accounted for and documented all transactions. The ICR did not specifically mention if the financial audit reports had unqualified opinions.



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	Satisfactory	Satisfactory	
Quality of M&E	Substantial	Modest	Because of the moderate shortcomings in M&E design and implementation.
Quality of ICR	---	Substantial	

## 12. Lessons

The following lessons have been derived and summarized from the ICR, with minor additions by IEG after discussions with the Bank task team:

**The production of communication and learning materials as integral part of the development of complex technical modelling tools for disaster risk management may help in the understanding and uptake of the highly technical modelling outputs.** This

project developed complex and often interlinked models necessary to implement the basin investment plans jointly with comprehensive communication and learning materials. These included, for instance manuals, specialist training, and guidance on how to use and update databases. These materials aimed at simplifying the understanding around these complex tools and ensuring that they are used in decision making by a wider audience who would benefit from the outputs.

**Inadequate attention to capacity building of institutions in charge of post-project management of investments and not involved in project implementation can endanger the sustainability of project outcomes.** In this project, for instance, the school landslide mitigation measures were carried out by National Building Research Organization and then handed over to the provincial education departments, which is responsible for school infrastructure. The education departments were not involved in project implementation and only received a maintenance manual for slope protection, but no training to provide adequate maintenance. According to what the Bank task team mentioned to IEG, initially this was because they were not IAs and later also because Covid19 did not allow to carry out training activities. This resulted in inadequate maintenance of the new infrastructure.

**Insufficient attention to weather events in civil works contract conditions and implementation might cause project delays and cost increases.** The project did not adequately adopt and strictly enforce climate risk-informed work planning because it did not sufficiently factor in rainfall





seasonality and water issuance in civil work implementation. This interrupted the civil works several times a year, causing implementation delays.

**The absence of technical experts to procure and supervise the high-value and technically complex basin investment plans contracts from the beginning may cause project implementation delays.** This project insufficiently factored in the need for adequate technical capacity from the outset to procure and manage the high-value and technically complex basin investment plan contracts. The technical capacity required to prepare terms of reference and bidding documents, evaluate proposals for such contracts required experienced procurement specialists, PMU staff, and technical evaluation committee members, which initially did not exist. In addition, the project initially also did not have sufficient capacity in the PMU to manage this complex work and ensure quality control. All this caused delays in project implementation.

**Having a central PMU with experienced staff to take care of Bank requirements and support multiple IAs in a multisector project may enhance coordination and facilitate smooth project implementation.** The implementation arrangements of this project included a central PMU with a project director and fiduciary, safeguards, and M&E staff and different IAs with deputy project directors. The PMU worked together with the staff in the respective IAs. While coordination among the different IAs, as in all multisector projects, was challenging, this arrangement helped overcome the challenges and ensured efficient coordination, ownership, and smooth project implementation.

### 13. Assessment Recommended?

No

### 14. Comments on Quality of ICR

The ICR is well-written, candid, and consistent. It contains a very detailed description of the project context, implementation, and achievements, especially in terms of project outputs. Although such a complex multisector project might warrant a somewhat longer ICR than recommended, the ICR includes sections that could have been shortened, such as the comprehensive summary of the country background or the detailed presentation of outputs in the efficacy section.

The theory of change was logically presented. Even if the efficacy section contains a lot of information on outputs, overall, the ICR is results oriented. It adequately reports on the achievement of the targets and provides additional information on project impacts. This additional evidence, however, was not always precise. For instance, for the Hakwatuna Oya irrigation scheme in Kurunegala, the ICR, para 37, points out that the avoided flood and drought crop loss per ha was LKR 62,123, but it does not mention which years were compared and how it was calculated. It did also not put this example in perspective, i.e. it did not mention what magnitude this scheme represented with respect to the overall irrigation component. Another example is the comparison of the impact of more recent storms with past ones to evidence the enhanced capacity. This was done without providing information on the impact of the past storms. The Bank task team in the discussions with IEG remedied these shortcomings.



Some additional evidence was not complete and hence not adequate. For instance, to show that the project had reduced the risk of climate related transport interruptions, the ICR mentions that the Uva road agency spent LKR 19.75 million per year on average on road blockage clearance before the project and that this amount was reduced following the project. It does not mention which years the before project cost figure refers to nor the post project expenditures. The Bank task team in the interviews with IEG did also not know the post project expenditures, this evidence was not used in this ICRR.

The lessons are important and based on evidence, but they are more formulated as findings or forward looking recommendations than lessons. The ICR is consistent with the guidelines.

The ICR does not provide details on the nature of resettlement impacts and the number of affected people. The ICR does not discuss the implementation of OP 4.04 - Natural Habitats and OP 4.37 - Safety of Dams safeguards policies.

On balance, **the quality of the ICR is rated substantial.**

**a. Quality of ICR Rating**  
Substantial