



## 1. Project Data

<b>Project ID</b> P093132	<b>Project Name</b> LK:Dam Safety & Water Resources Planning		
<b>Country</b> Sri Lanka	<b>Practice Area(Lead)</b> Water	<b>Additional Financing</b> P148595,P148595	
<b>L/C/TF Number(s)</b> IDA-44060,IDA-54450,TF-56901	<b>Closing Date (Original)</b> 30-Jun-2013	<b>Total Project Cost (USD)</b> 136,443,123.34	
<b>Bank Approval Date</b> 27-Mar-2008	<b>Closing Date (Actual)</b> 15-May-2018		
	<b>IBRD/IDA (USD)</b>	<b>Grants (USD)</b>	
Original Commitment	65,327,700.00	0.00	
Revised Commitment	148,327,700.00	0.00	
Actual	136,443,123.34	0.00	
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## 2. Project Objectives and Components

### a. Objectives

The Project Development Objectives (PDOs) as stated in the Financing Agreement (Schedule 1, page 4) and the Project Appraisal Document (PAD, page 4);

- (i) establish long-term sustainable arrangements for the operation and maintenance of large dams: and (ii) improve water resources planning.**



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

No

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

No

**d. Components**

There were four components (PAD, pages 34-40). The actual cost of components is from the Implementation Completion and Results Report (ICRR page 41) so as to incorporate the costs added to the project through Additional Financing (AF) in September 2014.

**One. Dam Safety and Operational Efficiency Improvement.** Appraisal estimate US\$53.14 million. Revised estimate with AF to US\$125.00 million. Actual cost US\$92.70 million. This component aimed at enhancing public safety of 32 high risk large dams, improving operational efficiency of 80 dams (including the 32 high risk dams) and establishing institutional arrangements for dam safety improvement and Operation and Maintenance (O&M) of dams. Sub-component activities included: (i) remedial works on the 32 high risk dams: (ii) basic safety facilities for 80 dams: (iii) support for implementing sub-components (i) and (ii). (iv) training for the dam-owning organizations: and, (v) financing studies and providing specialized equipment. This component also included provisions for implementing the Livelihood Assistance Plan (LAP) for providing assistance to the communities that were likely to be affected by water supply interruptions in about nine or ten of the 32 high risk large dams.

**Two. Hydro Meteorological Information Systems (HMIS) Improvement.** Appraisal estimate Appraisal estimate US\$8.48 million. Revised estimate with AF to US\$11.40 million. Actual cost US\$14.40 million. According to the PAD (page 22), HMIS refers to an integrated water information system for providing accurate and timely hydrological data. It includes a scientific hydrological and meteorological observation network, data processing and storage facilities, decision support tools and facilities, data communication arrangement and a trained manpower to operate the systems. This component aimed at enhancing institutional capacity and physical infrastructure investments for monitoring Hydro Meteorological data, detecting and forecasting water hazards and water resources planning and management. Sub-component activities included: (i) upgrading 50 hydrometric stations: (ii) establishing a data base at the Irrigation Department and improving the department's analytical capacity: (iii) flood protection procedures, tools and training for analysis of flood inflows to major reservoirs: (v) establishing a groundwater monitoring system: and, (vi) implementation support.

**Three. Multi-Sectoral Water Resources Planning.** Appraisal estimate US\$6.49 million. Revised estimate after restructuring to US\$10.50 million. Actual cost at closure US\$7.50 million. This component aimed at improving the institutional capacity for integrated multi-sectoral water resources planning and providing assistance for selecting and prioritizing water resources development investments. Sub-component activities included: (i) preparing a National Water Use Plan: (ii) updating the Mahaweli Water Resources



Development Plan: (iii) preparing a water resources development plan for the Mundeni Aru River Basin: and, (iv) preparing feasibility studies of priority developments identified by sub-components (ii) and (iii).

**Four. Project Management, Monitoring and Evaluation.** Appraisal estimate US\$3.05 million. Revised estimate after AF US\$7.80 million. Actual cost at closure US\$4.90 million. This component aimed at providing project management, coordination and monitoring support.

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

**Project cost.** Appraisal estimate US\$71.66 million (including a US\$0.50 million Project Preparation Facility recovery and US\$10.50 million for costs associated with price and physical contingencies). The revised estimate after AF was US\$154.65 million. Actual cost at closure was US\$142.77 million. The actual cost of component two activities were 26 percent higher than estimated, while the cost of component one, three and four activities were about 7 percent, 28 percent and 28 percent respectively lower than estimated. The increase in the actual cost of component two activities was covered through reallocation of funding between project categories.

**Project financing.** The project was financed by an IDA credit of US\$65.33 million. AF of US\$83.00 million was approved. With this the cumulative IDA credit for the project was US\$148.33 million. Amount disbursed at closure US\$142.77 million. There was parallel financing at appraisal of US\$1.050 million for complementary technical assistance on disaster management and Improvement of meteorological and disaster management information network from the Japan International Cooperation Agency.

**Borrower contribution.** Appraisal estimate US\$6.33 million. Actual contribution was as planned at appraisal.

**Dates.** The project approved on March 27, 2008, became effective on June 26, 2008 and was scheduled to close on June 30, 2013. The closing date was extended by two years (from June 30, 2013 to June 30, 2015) through a Level 2 restructuring, to make up for the delays that were encountered for recruiting three teams of international consultants (one for each project component).

**Restructuring.** The AF was agreed in September 2014 for: (i) covering the cost overruns of US\$25.00 million for completing the rehabilitation of dams from the original project. The overruns were due to a combination of factors including, that not all dams were inspected in detail at appraisal and the scope of rehabilitation at most dams was more extensive than estimated at appraisal and the construction costs had increased more than the amount allocated for price contingencies: (ii) scaling up project activities including rehabilitation of 31 additional dams in the northern and eastern parts of the country, including 10 dams in an area that was inaccessible at project appraisal, because of the civil war (ICR, para 48) plus 20 Hydro Meteorological information systems: and, (iii) the target values for the indicators were revised and the closing date was extended to May 15, 2018.



The project was restructured through a second Level 2 restructuring on December 2014, for reallocating credit proceeds between disbursement categories and for formalizing the number of upgraded hydro meteorological stations to 122. The project closed on May 15, 2018.

### 3. Relevance of Objectives

#### Rationale

Sri Lanka's hydraulic assets (such as dams, reservoirs and trans-basin canals) provided the critical irrigation and hydropower, that met the domestic and industrial water supply needs of the country, provided flood control in the river basins and sustained human settlements particularly in rural areas. Given that 85 percent of water resources were used for agriculture in the dry zone (defined as areas with annual rainfall less than 1,200 millimeters), which covered two-thirds of the country and was home for about 80 percent of the population, rehabilitation and proper maintenance of the hydraulic assets, formulation of standards to minimize the risk of dam failures and introducing legislation on dam safety standards and regulation was important in the country context. The importance of protecting citizens from the impact of natural disasters on hydraulic assets was underscored by the tsunami disaster that affected Sri Lanka in the years before appraisal in December 2004.

The PDOs were fully in line with the government's strategic priorities articulated in the National Development Strategy (called Mahinda Chinthanya) for 2006-2016. The strategy included a framework for examining the development potential of selected river basins and a strategy for integrated water resources management. The strategy built on post tsunami efforts to enhance disaster risk management including through creation of new institutions, legislation, assessment and action plans to address such risks. The PDO's were also in line with the government's priorities of balancing growth with environmental conservation and climate resilience and to manage the country's natural resources for improved livelihoods and sustained growth. These priorities were crystalized in the government's recent strategies such as, the Public Investment Plan for 2016-2020, the National Plan of Action for the Social Development of the Plantation Community of 2016-2020 and the Nationally Determined Contributions to address climate change (ICR, page 10).

The PDOs were well-aligned with the Bank's strategy for Sri Lanka. The Country Assistance Strategy (CAS) for 2006-2009 specifically addressed the need for helping the irrigation sector. The CAS for 2009-2013 highlighted the need for infrastructure development and addressing the critical needs of the water sector, many of which were deemed to be in the nature of "public goods" with high strategic priority. The Bank's water resources strategy of 2003 recognized: (i) the role water resources management play for sustaining growth and poverty reduction: and, (ii) the need for assisting countries in developing and maintaining appropriate investments of well-performing hydraulic infrastructure. The PDOs were in line with the Country Partnership Strategy (CPS) for 2013-2016 goals of: (i) facilitating sustained private and public investment: and, (ii) improving living standards and inclusion. The PDO's were also relevant to the current Country Partnership Framework (CPF) for the 2017-2020 period. This CPF emphasized infrastructure strengthening



under objectives 1.3 (scaling up infrastructure), 2.3 (improving living standards in lagging areas, and 3.2 (strengthening climate resilience and disaster risk management (ICR, para 18).

**Rating**  
High

#### 4. Achievement of Objectives (Efficacy)

##### **Objective 1** **Objective**

To establish long-term sustainable arrangements for the operation and maintenance of large dams

##### **Rationale**

**Theory of Change.** Activities associated with rehabilitation of 63 high risk dams with necessary remedial features, providing basic safety facilities in 80 large dams, establishing hydrometric stations and agro meteorological stations, developing hydraulic and meteorological databases to be used by the different users in conjunction with capacity building aimed at strengthening the dam-owning organizations, were all relevant for realizing the PDO of establishing long term sustainable arrangements for O&M of large dams.

**Outputs** (ICR, page 10 and pages 28-29).

- 63 large dams were rehabilitated with remedial measures at project closure, as per the revised target and as compared to the original target of 32. The ICR notes that the remedial works varied by dams. In the earthen dams, the typical safety remedial measures included addressing issues such as, seepage boils and leakages in the downstream of dams, slope sloughing/slips, erosion of abutments, settlement and cracks among dam crests and cracks in concrete spillway and outlet gate sections. In the case of gravity dams, the remedial measures included addressing issues such as, malfunctioning of dam monitoring instruments, repair and replacement of spillway and outlet gates and gate hoisting mechanisms.
- 80 large dams were provided with basic safety facilities as targeted. The ICR notes that the basic facilities provided included monitoring and deformation measuring instruments, micro-seismographs and pore water pressure gauges, functioning communication and observation systems (wireless or telephone at site, upstream and downstream flush lighting system with standby generators), all weather-access roads and equipment for minor O&M and emergency situations.
- Hydro Meteorological Information Systems that allowed for automated, accurate and real-time collection of rainfall, water volume and flow data that was transmitted through a network to data centers at the Mahawelli Authority of Sri Lanka and the Irrigation Departments for flood forecasting, dam operations and water allocations, were installed in 63 dams. This exceeded the target of 32 dams.
- A flood Control Center was established connecting six major dams on the Mahawelli river basin through a common control center for collecting real time data on upper catchment conditions, reservoir inflows and



gate operations, as targeted. The center was fully staffed and was the first integrated dam management system in Sri Lanka.

- Emergency action plans for the 13 dams deemed to be critical were prepared as targeted.
- Central electronic database was created for storing core engineering data related to dam design and operation as targeted.
- 487 training hours were provided on dam safety and O&M of dams as targeted.
- The National Center for Dam Safety Inspectorate, an institution envisioned to establish code of practice and guidelines and procedures for O&M of dams (including through regular dam inspections) and to be managed by a high-level steering committee and a dam safety secretariat, was not yet set up as targeted. The ICR (page 12) notes that while the staffing arrangements for the center had been approved by the Management Services Department, transfer of staff to the secretariat and recruitment were pending when the project closed. The ICR states that the formal approval of the institution was expected by the end of 2018.

### **Outcomes.**

- The remedial works on the dams was expected to reduce risks of failure in 63 dams. The ICR notes that risk assessments were carried out before works began and after completion. The methodologies adopted for assessing risks included both a quantitative analysis (based on a methodology developed by the United States Bureau of Reclamation) for the original 32 dams and a semi-quantitative assessment for the 31 dams funded by the AF. The quantitative risk analysis yielded a numerical estimate of the risk of adverse consequence, considering the probabilities dam failure and magnitude of adverse consequence given dam failure. Based on the semi-quantitative assessments, risks were reduced by 65 percent on average for all the 63 dams rehabilitated under the project. The ICR also reports that there was a higher risk reduction percentage for the 32 dams under the original project (81 percent) as compared to the 31 percent dams under the AF (48 percent) reflecting the higher risk profile among the former set of dams.
- The PDO was to be assessed based on the preparation of O&M plans for the 63 rehabilitated dams (including 32 dams for the initial phase of the project and 31 dams following the AF for the project). The ICR notes that an international consultancy firm prepared the O&M plans for 32 dams. The plans included, in addition to risk assessment studies, verifying designs and inspecting works at completion. The responsibilities pertaining to preparation of O&M plans for the 31 dams following AF, devolved to the implementing agencies due to a cabinet-imposed limit on international consultancies (and to give preference to local consultants and implementing agencies). There were some delays in preparation of O&M plans by the implementing agencies. The ICR notes, however, that all 31 plans had been completed and reviewed by the independent Dam Safety Review Panel at project closure.

**Rating**  
Substantial



## **Objective 2**

### **Objective**

To improve water resources planning.

### **Rationale**

**Theory of change.** Activities associated with establishing groundwater monitoring system, developing a national water use master plan and water resources development plan for the Mundeni Aru river basin and updating the Mahawelli Basin Development plan, in conjunction with training the core team on integrated multi-sectoral water resources planning, were aimed at improving water resources planning. These activities in conjunction with activities described above were aimed at protecting the citizens from potential water and dam induced hazards and protecting the related hydraulic infrastructure of the country were relevant to the long-term development objective of improving agricultural productivity and reducing poverty.

**Outputs** (ICR, pages 13-16 and pages 30-34).

In addition to the outputs described above in the theory of change, the following outputs contributed to this objective.

- 167 hydrometric stations and agro-meteorological stations for forecasting floods, operating dams, allocating bulk water and managing irrigated agriculture, were established at project closure. This exceeded the revised target of 142 stations.
- Eight groundwater monitoring systems in pilot areas were established for monitoring, assessing and safeguarding groundwater resources. There was no baseline or original target for this indicator, as this activity was added in the AF.
- The national water use master plan and the water resources development plan for Mundeni Aru river basin were developed; the Mahawelli basin development plan was upgraded as planned.
- 10 members of the core team were trained for multi-sectoral water resources planning as compared to the original and revised targets of 12 and 15 respectively. According to the ICR (page 32), the reason for the shortfall was that the government realized that only 10 core staff were required for multi-sectoral water resources planning.
- Eight feasibility studies were prepared for key interventions identified in the various plans. This exceeded the revised target of six.

### **Outcomes.**

- 32 improved water databases were utilized by the implementing agencies for flood forecasting, dam operations and water allocations as targeted.
- The National Water Use Master Plan and two river basin development plans had been adopted by the Cabinet of Ministers at project closure. This exceeded the target of one river basin development plan.



- 1.34 million people (including 754,000 female beneficiaries) benefitted from the project activities at closure as compared to the target of 1.03 million people (including 534,000 female beneficiaries). The beneficiaries included about 500,000 people who lived near the dams whose lives would therefore have been directly affected by a dam breach and 1.3 million people whose livelihoods were dependent on the dams, reservoirs and the associated irrigation schemes (such as farmers, fisherman and aqua-culturalists).

### Rating

Substantial

### Rationale

Most of the expected outcomes from this project were either achieved or exceeded. The overall efficacy of this project is therefore rated substantial.

### Overall Efficacy Rating

Substantial

## 5. Efficiency

**Economic Analysis.** An economic analysis was conducted at appraisal and at closure for the project's activities in the first three project components (discussed in section 2d). These activities accounted for about 95 percent of the cost at appraisal and at closure. The methodology entailed a comparison of the benefits and costs "with" and "without" the project. The project costs included the cost of capital investment for the respective dams and the O&M costs (assumed to be 0.3 percent of the total capital investment costs of the respective dams). The primary quantitative benefits were assumed to come from: (i) the reduced risk of dam failure: and (ii) reduced risk of floods caused by deficient dam operations (PAD, page 91). The other potential benefits that were identified but not factored in the economic analysis were, benefits due to reduction in human life mortality and injuries caused by dam failures and improvement in agricultural productivity. The ex- post Economic Internal Rate of Return (EIRR) was about 26.6 percent as compared to the ex-ante EIRR of 19 percent. The ICR (page 46) notes that the increase in ex post EIRR was mainly due to the decrease in the capital investment value in real (constant) prices as of 2008. The ICR also notes that while the nominal (current) total capital investment amount was almost equivalent to those envisaged at appraisal, it was reduced by more than 20 percent when converted to the real prices of 2008 by applying the inflation rates of respective years, which were as high as five percent on average.

**Administrative and Operational Issues.** The project suffered significant implementation delays, with very little implementation of the project during the first three years. This was mainly due to the delays associated with hiring the international consultancies for providing technical inputs to plan, design and initiate the



implementation of the three project components (ICR, page 19). As noted already there was underestimation of dam rehabilitation costs by 28 percent as many detailed inspections of all dams could not be undertaken at appraisal. This necessitated the AF credit to cover the cost overruns. During implementation, there were further delays associated with the completion of the 31 dams rehabilitated under the AF. This was, however, primarily due to the cabinet-imposed limit on international consultancy contracts. Despite these delays all activities including the scaled-up project activities following the AF were completed at the project’s amended closing date.

**Efficiency Rating**

Substantial

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

	Rate Available?	Point value (%)	*Coverage/Scope (%)
Appraisal	✓	19.00	95.00 <input type="checkbox"/> Not Applicable
ICR Estimate	✓	26.60	95.00 <input type="checkbox"/> Not Applicable

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

**6. Outcome**

The relevance of the objective to the government and the Bank strategy is rated as High. The relevance of the objective following AF is also high, given that 10 dams that were selected under the AF were in the northern and eastern parts of the country, which had been inaccessible due to the civil war when the original project was prepared. Efficacy of the two objectives - to establishing long-term sustainable arrangements for O&M of large dams and to improve planning of water resources - is rated as substantial, given that outcomes were for the most part, either realized or exceeded. Efficiency is rated as substantial, given the high estimated economic rate of return. Taking these ratings into account, the project’s overall outcome is rated as satisfactory.

**a. Outcome Rating**

Satisfactory

**7. Risk to Development Outcome**



**Technical risk.** The ICR (page 24) notes that with the remedial works (which included modern state-of-the-art Hydro Meteorological instruments) to allow timely and effective detection of problems and risks in dam operations, the expected life of the dams was extended by 50 years. The technical risk of dam failure in the short and medium term is therefore rated as Low.

**Institutional risk.** Given the capacity building activities of the implementing agencies that were undertaken under the auspices of this project in several specialized skills (such as dam engineering principles, risk assessment and dam portfolio management, flood forecasting, groundwater monitoring as well as analysis and multi-sectoral water resources planning), the institutional risk is rated as Low.

**Financial risk.** There is moderate risk to ongoing benefits, given that there is no clear evidence of adequate budget for the O&M for the remedial works of dam safety. Indeed, the ICR (page 13) notes that the Bank task team was unable to obtain evidence of budgetary allocation for need-based O&M. The ICR also notes that while the recent completion of remedial works precluded the need for immediate budget allocations, there are risks associated with financial sustainability because, according to one estimate, only 25 percent of the budget requests are approved in any given year (ICR, para 27).

## 8. Assessment of Bank Performance

### a. Quality-at-Entry

This project was prepared based on the lessons from a prior Bank-financed project (Sri Lanka: Mahaweli Restructuring and Rehabilitation Project) and from other Bank financed projects in Indonesia, Armenia and India (PAD, page 6). Lessons incorporated in this project's design included, having a regulatory agency with adequate capacity for overseeing the dam safety program, tailoring activities to the country's specific circumstances, undertaking water resource planning and management using a river basin approach and strengthening the utilization of the Hydro Meteorological system for water users by introducing decision support tools for water-related operations. The project was prepared in coordination with the Japan International Cooperation Agency who were undertaking complementary activities associated with disaster risk management (PAD, page 7).

Several risks were identified at appraisal including the high risk associated with adequacy of budget allocation for Operation and Maintenance (O&M) for dam safety measures and the Hydro Meteorological systems and substantial risks associated with ownership and commitment to dam safety regulation, procurement risk and corruption and rent seeking. Several mitigation measures were incorporated at design including, assessing the O&M needs of project dams and helping the government to create either a non-fungible budget line for O&M expenditure or exploring other options for ensuring adequate O&M spending, establishing a procurement unit in the Project Management Unit and close monitoring of procurement issues by the supervision team and developing a corruption risk mapping and mitigation action plan. With the mitigation measures, the overall project risk was rated as Substantial (PAD, pages 10-12). The overall responsibility for project implementation was with the Ministry of Agricultural Development and Agrarian Services. The other agencies associated with the implementation were the



Mahawelli Authority of Sri Lanka, the Irrigation Department, the Ceylon Electricity Board, the National Water Supply and Drainage Board, and the Water Resources Board. The day to day management of the project was the responsibility of a Project Management Unit, established within the Ministry of Agricultural Development and Agrarian Services (PAD, page 7). Appropriate arrangements were made at appraisal for Monitoring and Evaluation (discussed in section 9) and safeguards and fiduciary compliance (discussed in section 10).

There was an underestimation of costs of 28 percent. However, this was primarily due to the difficulties associated with arriving at a precise estimate without technical inspection of all dams.

The ICR (para 50) notes that rather than using the conventional investment project design, activities aimed at institutional reforms such as "operationalization of a national dam safety entity, could have been better supported by other approaches, such as output / results-based financing, development policy financing or technical assistance". This review accepts that an investment project is not likely to be an adequate design for the establishment of a major new institution such as a national dam safety entity

### **Quality-at-Entry Rating**

Satisfactory

#### **b. Quality of supervision**

There were 20 formal supervision missions. These missions were supplemented with technical and other visits (ICR, page 23). The continuity of leadership was maintained with three task team leaders over a ten-year implementation period (ICR, page 20). The team proactively identified opportunities to scale up project activities. Given that AF was prepared as part of a broader effort to consolidate peace and equitable growth through investments in the conflict-affected parts of the country, ten of the selected dams under AF were in the northern and eastern parts of the country. Although project implementation began against the backdrop of an ongoing conflict and this contributed to delays, support by the Bank supervision team contributed to the accelerated implementation after AF and this contributed to completion of project activities. Support provided by the supervision team aided in safeguards and fiduciary compliance (discussed in section 10).

The ICR (page 21) does not provide reasons but reports that the planned Mid-Term Review was not undertaken during implementation.

### **Quality of Supervision Rating**

Satisfactory

### **Overall Bank Performance Rating**

Satisfactory



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

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

The results framework was logical, and the four key outcome indicators were appropriate for monitoring project performance. Two key outcome indicators (reduction in the number of dams with unacceptable risk index and increase in the number of dams with operational risk-based O&M plans) were appropriate for assessing the achievement of the PDO of establishing long-term sustainable M&E as well as providing the technological basis for the O&M of large dams. The other two key outcome indicators (utilization of the improved water database by the implementing agencies for flood forecasting and dam operations and developing water use plans, and adoption of at least one river basin development plan by the government) were appropriate for assessing the second part of the PDO, namely improving the planning of water resources.

Baseline surveys for the project at preparation included, a risk assessment of 38 large dams (out of which the 32 project dams were selected), a study of the physical and analytical infrastructure for the Hydro Meteorological system and a review of the institutional capacity related to the three project components (PAD, page 7). The Project Management Unit was to be responsible for monitoring project outcomes with assistance from monitoring and evaluation consultants (PAD, page 9).

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

Following the AF for the project, one intermediate indicator associated with preparation of feasibility studies for future investments was added and the target values of some indicators were revised upwards. The ICR (para 21) notes that the data for monitoring were collected and analyzed by the Project Management Unit in a methodologically sound manner. The methodologies for risk assessments of dams included both quantitative and semi-quantitative assessments for the original 32 dams and a semi-quantitative assessment for the 31 dams under the AF (discussed in detail in section 4).

The ICR (para 22) notes that the modern Hydro Meteorological system allowed for automated, accurate and real time collection of rainfall, water volume and flow data for flood forecasting, dam operations and water allocation. This represented an improvement over manual reading which was prone to errors in data collection, transmission and analysis. The ICR (para 23) reports that the Flood Control Center established under the project, connected six major dams on the Mahawelli river basin through a common control center where real time data on upper catchment conditions, reservoir flows, and gate operations were collected, analyzed and decisions taken to optimize reservoir operations. The ICR (para 23) notes that in times of heavy rain, the control center could, for example, release flood waters in advance and in a controlled manner to avoid sudden downstream inundations.

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



The M&E framework was used for informing decision making during implementation and for monitoring project performance. The ICR (para 59) notes that the project management unit continued to use the M&E framework, as part of preparation of the proposed Water Resources Management Project which was expected to continue the dam modernization program and efforts to improve water resources management.

## **M&E Quality Rating**

Substantial

## **10. Other Issues**

### **a. Safeguards**

The project was classified as Category B for purposes of environmental assessment. In addition to Environmental Assessment ((OP/BP 4.01), three safeguard policies were triggered: Cultural Property (OP 4.11): Involuntary Resettlement (OP/BP 4.12): and, Safety of Dams (OP/BP 4.37).

**Environmental Assessment.** The PAD (page 15) notes that the project financed only essential dam safety repair and safety of existing dams and not construction of new dams. However, there was the possibility that dam rehabilitation works could lead to removal of large quantities of topsoil, rock boulders and generate concrete debris and other construction wastes. In addition, wastes would be generated from worker camps. Given that the environmental impacts could not be completely assessed until the works were designed after technical investigations, an Environmental Assessment and Management Framework (EAMF) was prepared at appraisal to serve as a template for guiding environmental analysis and developing mitigation measures at appraisal and for public disclosure (PAD, para 50). The ICR (para 60) does not provide details but states that "the project remained fully in compliance with environmental safeguards policies" during implementation.

**Cultural Property.** The PAD (para 54) notes that some of the dams included in the project were "ancient dams" that were built centuries ago and last renovated after 1900. Certain structures in the ancient dams could be of high archeological significance and if such structures were replaced, the old structures needed to be preserved as cultural property. The PAD notes that the project would undertake an archeological impact assessment study with technical assistance from the Department of Archaeology during implementation. Based on the assessment, the Department was to draw an implementation plan, as deemed appropriate. The ICR (page 22) notes that as required, the Department of Archaeology conducted an archeological impact assessment and, based on its recommendations, an ancient sluice structure identified at the Urusitawewa dam site was preserved.

**Involuntary Resettlement.** The PAD (paras 51 and 52) reports that the project components would require neither land acquisition or cause permanent displacement of people. However, in some cases, water flows into the reservoir and consequently, irrigation flows might have to be stopped for prolonged periods to conduct detailed technical investigations and conduct repair/rehabilitation works. This could have had an adverse impact on the livelihoods of some downstream users. A Livelihood Support Assistance Plan was



developed to address issues associated with temporary disruption of irrigation supplies. The ICR (para 62) notes that there was no land acquisition or physical displacement of people during implementation. However, in the case of seven dams, water flows to the reservoir and to connected irrigation schemes were interrupted during implementation in order to conduct detailed technical investigations and rehabilitation works. These interruptions had adverse impacts on the livelihoods of about 15,500 people (including farmers and others downstream that were dependent on dam reservoirs). The Livelihood Assistance Plan consisted of different types of activities such as, a wage assistance plan which provided wage employment for affected farmers, fisherman and landless laborers, an alternative crop plan to assist farmers in growing drought resilient crops, a program to replenish inland fish stocks, a gender action plan and a domestic water supply provisioning program. The ICR notes that a grievance redress mechanism was established, and an oversight committee was established to resolve the complaints during implementation.

**Safety of dams.** The PAD (para 58) notes that the dams financed by the project had a high risk of failure due to either a malfunction or a structural breach. The PAD notes that provisions made under the dam safety policy were to be incorporated into the project design and implementation. The ICR (para 60) does not report any issues associated with safety of dams during implementation.

## **b. Fiduciary Compliance**

**Financial management.** An assessment of the financial management arrangements conducted at appraisal, concluded that the financial management arrangements were satisfactory, and the financial management risk was rated as Modest at appraisal (PAD, page 14). The ICR (para 65) reports that financial management during implementation was deemed to be satisfactory and that audit reports were submitted in a timely fashion and were of good quality. The ICR (para 65) also notes that the financial management arrangements proved to be adequate in the execution of the Livelihood Support Assistance Plan described in section 10a.

**Procurement.** An assessment was conducted at appraisal to assess the procurement management capacity of the implementing agencies (PAD, Annex 8). The procurement risk was rated as High at appraisal in view of the different agencies entrusted with procurement. The mitigation measures adopted at design included training the key procurement staff of the Project Management Unit and the implementing agencies and developing a procurement plan at appraisal. The ICR (para 64) notes that there were no procurement issues and the procurement arrangements were satisfactory during implementation.

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

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## **d. Other**



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## 11. Ratings

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

## 12. Lessons

The ICR (pages 24-25) draws six lessons from the experience of implementing this project. Some of the lessons were focused on the details of issues facing Sri Lanka without broad relevance to Bank operations in general. IEG considered that two most important lessons with relevance beyond this project (with some modification of language) were as follows:

**(1) The project design chosen at appraisal needs to be tailored to the project's objectives.** Despite strong government ownership and commitment, this project fell short in not establishing the National Center for Dam Safety. The shortfall of this important objective reflected the difficulty of supporting policy and institutional reforms through a conventional investment project design.

**(2) This project demonstrated the importance of critical importance of capacity building of implementing agencies, if implementing agencies are to be used for facilitating project implementation.** In this project, following a Cabinet decision in September 2007, implementing agencies were to limit international consultancies and give preference to local consultants or implementing agencies. The ability of the local implementing agencies to take the lead in implementing the project during the AF phase reflected the strong capacity developed by local implementing agencies during the initial phase of the project. The IEG draws the following lesson from the experience of implementing this project.

**(1) To achieve critical institutional development such as establishing a National Center for Dam Safety in the context of a project or program the achievement needs to be an agreed prior condition for the project or program.** In this project the establishment of the National Center for Dam Safety was neither an agreed prior action nor a formally agreed objective to be achieved during project implementation. The choice of project or program design will determine the scope for achieving an agreed prior action or an agreed project objective.

## 13. Assessment Recommended?

No



## 14. Comments on Quality of ICR

The ICR is reasonably clear and candidly discusses the delays that arose in the initial years of the project. It is, for example candid in describing the drawbacks of a conventional investment project design for activities such as setting up a National Center for Dam Safety. It also provides a clear description of how the Bank assisted post conflict development by including activities in the northern and eastern parts of the country in the course of approving the AF. The ICR is consistent with the guidelines.

The ICR could have provided more details on the constraints to the establishment of the national level dam safety institution (or the Dam Safety inspectorate).

### a. Quality of ICR Rating Substantial