



## 1. Project Data

### Project ID

P122235

### Project Name

AF: Irrigation Restoration &amp; Development

### Country

Afghanistan

### Practice Area(Lead)

Water

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

IDA-H6810, TF-12029

### Closing Date (Original)

31-Dec-2017

### Total Project Cost (USD)

194,094,375.47

### Bank Approval Date

28-Apr-2011

### Closing Date (Actual)

31-Dec-2020

### IBRD/IDA (USD)

### Grants (USD)

Original Commitment

97,800,000.00

118,400,000.00

Revised Commitment

204,199,927.45

108,400,000.00

Actual

194,094,375.47

108,103,471.24

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## 2. Project Objectives and Components

### a. Objectives

The Project Development Objective (PDO) of the Irrigation Restoration and Development Project (IRDP) as articulated in the Emergency Project Paper (EPP, paragraph 16) was identical to the one in the Financing Agreement (FA, page 4) and aimed to:

***"Increase agriculture productivity and production in the project areas."***



**Revised PDO.** According to the Restructuring Paper (May, 2016) the revised PDO was to:

***"Improve access to irrigation in targeted areas and strengthen capacity for water resources management."***

**Parsing the PDO: A split evaluation will be carried out as there were significant changes in the PDO and Results Framework.**

**1. Pre-Restructuring:** The original PDO will be parsed through assessing the increase in agricultural productivity and production in the project areas.

**2. Post Restructuring:** The revised PDO will be parsed through assessing:

(a) Improved access to irrigation.

(b) Strengthening the capacity for water resources management.

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

Yes

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

Yes

**Date of Board Approval**

08-Apr-2011

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

Yes

**d. Components**

The PDO was supported by the following four components:

**1. Rehabilitation of Irrigation Systems and River Bank Protection (appraisal cost: US\$70.00 million, revised cost: US\$120.70 million, actual cost: US\$118.12).** This component would support the rehabilitation of irrigation schemes covering total irrigated area of about 300,000 ha that would benefit approximately 230,000 households and increase irrigated area by about 15%. This component would be designed and implemented using the successful model that is being followed under the Emergency Irrigation Rehabilitation Project (EIRP). Typical rehabilitation works would include improving canal intake structures, conveyance channels, wash structures (water bridges to allow safe passage of hill torrents over canals), siphons, aqua ducts and other river crossing structures, culverts, and control structures. Mini/micro-hydro-electric generation, drinking water supply and small roads needed for construction and operation and maintenance would be considered where feasible. Irrigation scheme designs would be closely coordinated with on-farm development works that would be implemented by the Ministry of Agriculture Irrigation and Livestock (MAIL) under the Afghanistan Reconstruction Trust Fund (ARTF) supported On-farm Water Management Project (OFWM).



**2. Support for Dam Development, Operation and Maintenance (appraisal cost: US\$31.30 million, revised cost: US\$12.20 million, actual cost: US\$5.87 million).** This component would support the design and construction of about three multi-purpose small dams and appurtenances, and associated irrigation conveyance and distribution systems. The selected dams would be located in closed river basins that are free of trans-boundary riparian issues. Actual construction would commence in 2013/14 utilizing three full construction seasons before the project closing date. The project would also support under component 4 the development of the capacity in the Ministry of Energy and Water (MEW) and local institutions [\*Mirabs, CDCs and clusters of CDCs] to carry out operation and maintenance.

Mirab: A community appointed person who serves as the water manager responsible for operation and maintenance and distribution of water in accordance with traditional water shares.

**3. Water Resources Management and Development (WRM&D) (appraisal cost: US\$8.20 million, revised cost: US\$22.10 million actual cost: US\$13.30 million).** This component would build upon the work done under the EIRP and support the establishment of an efficient and effective hydro-meteorological service, including the provision of: (i) hardware and software, field equipment and transport facilities; (ii) operation and maintenance cost of the hydro-met network on a declining basis; and (iii) capacity building of MEW's General Directorate of Water Affairs Management (GDWAFM)/ hydro-meteorological department in data collection, analysis and dissemination. Twinning arrangements are being pursued with countries with well developed hydro-meteorological services to help develop capacity of MEW's hydro-meteorological department.

**4. Project Management (appraisal cost: US\$39.20 million, revised cost: US\$52.70 million, actual cost: US\$55.10 million).** This component would include the following four sub-components:

**4.1. Project management and construction supervision.** This would include support for: (i) overall project management, including procurement, financial management and capacity building; (ii) preparation of irrigation rehabilitation sub-projects, including survey and design work; (iii) supervision of contracts for irrigation rehabilitation and hydro-met facilities, including contract management and quality control; (iv) consultancy services for preparation of sub-project specific ESMPs in accordance with the provisions of the ESMF; and (v) independent monitoring of compliance with the project's ESMF.

**4.2. Support for capacity building.** This would include: (i) training of MEW and the Project Coordination Unit (PCU) staff in various fields as well as training of Mirabs, CDCs and farmers in operation and maintenance (O&M) of completed subprojects; (ii) provision of the services of an international financial management specialist for building capacity of MEW's Finance and Administration Directorate; (iii) performance based incentives/training allowances for Project staff; (iv) rehabilitation of office buildings; (v) establishing a web-based MIS for the Project; and (vi) acquisition of office and field equipment and vehicles required for project implementation.

**4.3. Incremental contract staff.** This sub-component would finance the cost of existing and additional contract staff. Additional staff would include: surveyors, works supervisors, quality controllers, community water assistants (social mobilization), hydro-meteorologists, social and environmental officers, contract management officers, procurement officers, financial management officers, IT staff, M&E, enumerators, etc.

**4.4. Recurring/incremental operating costs.** This sub-component would finance the recurring costs of the PCU and its six regional offices, including office rentals, utilities, communication and IT costs, office



maintenance cost, salaries of support staff (e.g. vehicle drivers), staff travel and per diem, vehicle O&M costs as well as the cost of monitoring and evaluation activities.

### **Revised Components**

The components' description and costs were revised, and changes were made as noted below.

- 1) Component 1 was renamed 'Rehabilitation of Irrigation Systems and River Bank Protection', costs adjusted to meet overruns for the irrigation rehabilitation, and new activities on riverbank protection were added.
- 2) Component 2 was renamed 'Support for Dam Development, Operation and Maintenance', the construction of small dams as an activity was dropped, and activities pertaining to dam safety and O&M were added.
- 3) Component 3 was renamed 'Water Resources Management and Development' and scaled-up by including broader water resources management issues.
- 4) Component 4 was renamed 'Project Management' and capacity building and technical assistance activities were transferred across Components 1-3.

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

**Project Cost.** The total cost of the six-year project was estimated at appraisal as US\$148.7 and revised as US\$218.70 million with the additional financing including physical and price contingencies. This amount was revised downwards to US\$204.20 million. The actual cost reported by the ICR Data Sheet (page 2) was US\$194.09 million.

**Financing.** The project was financed through an IDA Grant worth US\$97.80 million and an Afghanistan Reconstruction Trust Fund (ARTF) Grant worth US\$48.40 million. As part of the May 2016 restructuring, an Additional Financing (AF) of US\$70.00 million from the ARTF was approved to address cost escalations and overruns in irrigation scheme rehabilitation. The total financing to the project was US\$216.20 million. This amount was revised downwards to US\$204.20 million as US\$12.00 million was cancelled (US\$ 5.2 million from component 2 and US\$6.8 Million from component 3) in June 2020 as part of a portfolio-wide restructuring to assist the Government of Afghanistan in its COVID-19 response. The amounts disbursed according to the ICR Data Sheet (page2) were US\$85.99 million from the IDA Grant and US\$108.10 million from the ARTF bringing the total disbursed amount to US\$194.09 million.

**Borrower Contribution.** The borrower was expected to contribute US\$2.5 million of counterpart funds. According to the ICR Data Sheet (page 2) the borrower did not contribute any funds.

**Dates.** The project was approved on April 28, 2011, and became effective a month and a half later on June 15, 2011. The Mid-Term Review (MTR) was conducted on December 3, 2014, which was about three years and eight months into effectiveness. While the Emergency Project Paper did not specify an exact date for the MTR, it was conducted in a reasonable time for a six year project. The project was expected to close on December 31, 2017. The actual closing date was three years later on December 31, 2020. The ICR did not provide an explicit reason for the extension of the closing date, but noted that the project received US\$70 million in AF.

The project was restructured twice as follows:



1. On May 23, 2016, when the amount disbursed was US\$88.07 million. This was a Level 1 restructuring that involved the approval of US\$70 million of Additional Financing, changing the Project Development Objective (PDO), changes in Results Framework (RF), changes in components and costs, extension of the Loan closing date by three years to December 31, 2020, change in the safeguard policies triggered, change in Legal Covenants, and changes in implementation schedule.

2. On June 30, 2020, when the amount disbursed was US\$167.16 million. This was a Level 2 restructuring that involved a change in components and cost, and cancellation of US\$12.00 million financing.

**Rationale for Changes and their implication on the original Theory of Change (ToC).** As noted above, the PDO was fully revised with a different focus compared to the original PDO. The original cost of rehabilitation works under component 1 was estimated at US\$200 per hectare. Due several factors noted in the ICR (paragraph 21) including: type of civil works, degree of deterioration, topography, size of the command area, and access, as well as the underlying security situation the cost was revised upwards to US\$600 per hectare. Activities under component 2 were scaled back to ensure their completion within the implementation timeframe. Activities under component 3 were scaled up and emphasized a stronger focus on enhancing functional hydromet skills in close collaboration with donor agencies. The PDO indicators, outputs as well as outcomes linked to the revised activities were redefined.

These changes were relevant and reflected realities on the ground. The revision of the PDO was necessary to align the PDO with the supported activities.

### 3. Relevance of Objectives

#### Rationale

**Context at Appraisal.** In Afghanistan, only 12% of the total land is arable and irrigation is essential for reliable agricultural production in most parts of the country. Irrigated agriculture, which accounts for bulk of the total production of cereals and other crops was the worst affected by the continuing insurgency, as maintenance was neglected leaving the irrigation systems in a state of disrepair. Irrigated area decreased by almost 70% and crop productivity fell below 50% of the pre-war levels. In 2008, the wheat crop failed because of delayed and low precipitation resulting in a wheat deficit of over two million tons, further highlighting the critical importance of irrigation for food security in the country (Emergency Project Paper, paragraph 7). This project aimed to build on the success of the IDA-funded Emergency Irrigation Rehabilitation Project (EIRP) to scale up interventions and address unmet demand for irrigation rehabilitation.

**Previous Bank Experience.** The Bank and the Government of Afghanistan (GoA) launched the IDA-funded Emergency Irrigation Rehabilitation Project (EIRP-approved in 2003 and closed on 2011) which was instrumental to the GoA's launch of a national irrigation rehabilitation program in 2004. In addition, the Bank has extensive experience in irrigation rehabilitation projects in the region including in Pakistan and India, as well as in other countries around the world.

**Consistency with the Bank Strategies.** At appraisal, the original PDO was aligned with the Bank's Interim Strategy for Afghanistan (2009). Support to rehabilitation of irrigation systems is highlighted under the second pillar of the Interim Strategy. Further, the IDA-supported EIRP was the only nation-wide project



supporting the government's program for irrigation rehabilitation. Therefore, continued Bank support under IRDP was crucial for maintaining the momentum to further develop water resources in an environmentally and socially sustainable manner (Emergency Project Paper, paragraph 14).

At completion, the revised PDO was aligned with the Interim Strategy Note (ISN 2012-2014) and the Systematic Country Diagnostic (SCD, 2016). The revised PDO supported all three themes of the ISN: (i) Building the legitimacy and capacity of institutions, (ii) Equitable service delivery, and (iii) Inclusive growth and jobs. The revised PDO was also aligned with the Banks' Country Partnership Framework (CPF, FY 2017 – FY2020), and with the 2018-2020 Partnership Framework and Financing Plan. The revised PDO supported the CPF's second pillar "Supporting Inclusive Growth" where objective 2.4 aimed to increase agricultural productivity and value added. The PDO would also support the cross-cutting theme on climate change under objective 5 that aimed to improved climate resilient landscapes and infrastructure. This was expected to be achieved through strategic investments in infrastructure, technology, training, transfer of skills to national staff and by building capacity at the local levels, particularly through women and enhanced citizen engagement.

**Consistency with Government Strategies.** According to the Emergency Project Paper (paragraph 13) at the time of appraisal, there was a consensus among GoA and ARTF donors that continued IDA support through a follow-on lending operation is crucial to scale up the program's impact. The Government also expressed interest in developing small dams focused in closed river basins that are free of trans-boundary riparian issues, which would be supported by the project. The original and revised objectives remain in line with central objectives of the Government of Afghanistan that aimed to ensure food security and reduce livelihood vulnerability (ICR, paragraph 4).

The original and revised PDO were both aligned with the Bank strategies and Government priorities. Both statements would contribute to achieving the Bank's twin goals and were pitched at an adequate level of ambition that reflected the Bank's experience. Further, it is expected that agriculture will continue to play an important role in the economy and in providing rural employment. Also, water availability and delivery systems will remain key determinants of the sustainability of irrigation and food production.

On this basis, Relevance of Objectives is rated High.

## Rating

High

## 4. Achievement of Objectives (Efficacy)

### OBJECTIVE 1

#### Objective

To increase agriculture productivity and production in the project areas.

#### Rationale



**Theory of Change (ToC).** To achieve the stated objective, the project would rehabilitate the irrigation system, fund small dam development, and establish hydromet facilities and services. The project would also provide capacity building for the staff of relevant institutions. As a result of these activities farmers would have better access to water from the rehabilitation of irrigation schemes and small dam construction. This would enable farmers to increase production and productivity in project areas. Also, hydromet data and service would be used in designing cost-effective sub-projects. Government and local institutions would become more effective due to capacity building. According to the EPP (paragraph 18) "irrigation scheme designs would be closely coordinated with on-farm development works that would be implemented by the Ministry of Agriculture Irrigation and Livestock (MAIL) under the ARTF supported On-farm Water Management (OFWM) Project." All this would ultimately result in increasing agricultural production and productivity in project areas. Anticipated long-term outcomes included an enhanced rural food security and improved institutional capacity and planning.

The achievement of the PDO was underpinned by the following assumptions: 1. Provision of adequate amounts of irrigation water would lead to a reduction in water related disputes; 2. improved availability of irrigation water would result in increased productivity; and 3. Hydromet infrastructure would yield analytical products useful for the project design.

The activities reflected in the ToC were directly linked to the PDO in a plausible causal chain and the stated assumptions were logical and realistic. However, utilizing the hydromet data requires concurrent investments in analytical products.

## **Outputs**

The following outputs were reported in the ICR (Annex 1, unless referenced otherwise):

### **Improving access to irrigation**

1. 2,667 km of irrigation canals were rehabilitated (Target: 900 km, significantly exceeded)
2. 90% of beneficiaries expressed satisfaction with involvement in rehabilitation design and implementation (Target 90%, achieved)

### **Strengthening capacity for water resources management**

1. Two dams undergone minor dam safety works (Target: 2, achieved).
2. One dam safety guideline and manual was prepared (Target:1, achieved).
3. 216 hydromet/weather /snow measurement stations were installed (Target: 230, substantially achieved).
4. Transboundary water unit established at MEW/NWARA (achieved).
5. Mandate for irrigation between MAIL and MEW/NWARA was clarified (achieved).
6. 100 government staff were trained on topics related to river bank protection, dam planning and management, water resources management and development (Target:30, exceeded).

## **Outcome**

- The PDO was to be assessed through two outcome indicators: 1. An increase in irrigated area, and 2. An increase in agricultural production and productivity. The RF included an indicator for measuring yields per hectare, i.e. it measured agricultural productivity. There was also indirect evidence on



production/productivity via satellite images showing increased vegetation in project areas compared to non-project areas.

### 1. Increase in the irrigated area.

- This was expected to be achieved through the rehabilitation of irrigation infrastructure combined with improved planning and capacity building. The increase in irrigated area (PDO Indicator #1) reached 53,459 ha or 18% (of the baseline of 300,000 ha) compared to target of 45,000 ha or 15% (target exceeded, baseline:300,00 ha). This area was served by 152 irrigation schemes supported by the project.
- According to the ICR (paragraph 36) improved irrigation water management as a result of infrastructure rehabilitation and enhanced farmer capacity contributed to the reduction in water-related disputes, from 1152 to 283 per year per sub-project.
- In the M&E reports and impact assessment surveys, of the 823 PCU and Water Management Directorate trainee respondents 83% stated trainings helped improve their respective work performance, 80% stated trainings enhanced their knowledge and skills; and 83% stated that trainings helped them improve their motivation (ICR, paragraph 42).
- Despite the above-mentioned positive results, the project fell short on achieving its target on small dams as none were constructed compared to a target of 3. The ICR attributed this shortcoming to "MEW's limited technical capacity to process relevant procurements, as well the technical viability of the envisioned investments (ICR, paragraph 38). Also, the hydromet facilities data was not explicitly used in designing sub-projects to increase irrigated area or crop production. The ICR noted that the project helped with hydromet infrastructure, however, support "did not move beyond infrastructure provision (ICR, paragraph 40).

### 2. Increase in agricultural productivity and production.

- Wheat yield (kg/ha) was used as a proxy measurement for the increase in agricultural productivity (since wheat was the dominant crop). According to the 2020 M&E Annual Impact Assessment Survey (ICR, Annex 11) the average wheat yield exceeded the production target at appraisal by 75%. Also, wheat yield for sampled IRDP restoration sub-projects (2,832 kg/ha) was found to be 54% (target: 20%, exceeded) higher than for surveyed control group irrigation schemes. However, the accuracy of wheat yield data is questionable.
- Remote sensing analysis showed that restored schemes on average, experienced a 50% increase in vegetation activity associated with crop production as a result of improved water delivery. In contrast, existing schemes (did not benefit from rehabilitation) recorded only a 20% increase in crop vigor on average. This clearly demonstrated the positive impact of the provision of irrigation infrastructure on the vegetation activity associated with crop productivity. Based on these results, it is plausible to assume that production in the project areas would increase.

The following table summarizes the indicators targets and achievements:

	Indicator	Unit	Target	Actual	Achievement
PDO 1	Increase in irrigated area	%	15	18	120%



PDO 2	Increase in agricultural production - Wheat kg/ha	%	20	35	175%
IRI 1	Reduction in water related disputes	%	50	75	150%
IRI 2	Small dams completed	Number	3	None	0%
IRI 3	Sub-projects using data from Hydromet facilities	%	100	unknown	-
IRI 4	Staff trained who agree that training helped them do their job better	%	70	83	119%

Based on the above mentioned discussion and evidence, the efficacy with which Objective 1 was achieved is rated Substantial, despite some minor shortcomings. The project exceeded its two outcome indicators. However, it failed to deliver on any of the small dams and hydromet data was not used as envisioned. The Impact of not delivering any of the three small dams on the availability of the irrigation water was not discussed in the ICR. Finally, despite concerns on the wheat yields data, it is plausible to assume that better access and availability of irrigation water would result in better yields in project areas, also there was indirect evidence on production/productivity via satellite imaging showing increased vegetation in project areas compared to non-project areas.

### Rating

Substantial

## OBJECTIVE 1 REVISION 1

### Revised Objective

To improve access to irrigation in targeted areas.

### Revised Rationale

**Theory of Change (ToC).** To achieve the stated objective, the project would support the rehabilitation of the irrigation system through irrigation canal rehabilitation, river bank erosion works (new activity) and building community capacity. These activities would result in increasing the areas and number of beneficiaries benefiting from irrigation and drainage services, and improving local capacity for water resource management. This was expected to improve access to irrigation in targeted areas and strengthening the capacity for water resource management. Anticipated long-term outcomes included: increasing agricultural production, national and international basin-wide development planned and implemented, water security enhanced, climate risks reduced, improved efficiency and availability of water delivery, rural food security enhanced, and improved institutional capacity and planning.

The revised ToC dropped the activity aiming to support the construction of small dams. The activities reflected in the ToC were directly linked to the PDO in a plausible causal chain. However, the ToC lacked the critical assumptions that underpinned the achievement of the stated objective.

### Outputs



The same outputs mentioned under the original objective pertain to this objective. The outputs below reflect the new activity added under the revised ToC.

1. Direct project beneficiaries reached 611,483 compared to a revised target of: 400,000; exceeded by 53 %) of which 317,971 or 52% were female 52% (target: 48%; exceeded).
2. 45.81 km of riverbank were protected from erosion (Target: 26.3 km, exceeded).
3. Two dams undergone minor dam safety works (Target: 2, achieved).
4. One dam safety guideline and manual was prepared (Target:1, achieved).

## Outcome

- Increasing the irrigated area and providing beneficiaries with more reliable access to irrigation was achieved through the rehabilitation and improvements to existing irrigation systems. This was also expected to lead to diversification in agricultural production and enhancing rural food security in the long-term. The resilience of systems to climate events such as flooding was expected to benefit from the project support in strengthening riverbanks.
- By project completion, 284,391 hectares (ha) were provided with improved irrigation and drainage services compared to a revised target of: 215,000 ha; target exceeded by 32%). Also, 580,908 water users were provided with new/improved irrigation and drainage services compared to a revised target of 385,000; target exceeded by 51%).
- Increased water-discharge at the intake and conveyance efficiency for all completed sub-projects were measured twice a year, at peak and base time for a period of three years following rehabilitation. The rehabilitation of structures resulted in a 10% improvement for both indicators (ICR, paragraph 48).
- The ICR (paragraph 49) noted that there were regional differences in the magnitude of change in irrigated area as a result of the IRDP interventions. For example, in Herat region this magnitude exceeded 300% in restored schemes, while in Kabul region saw the smallest change at less than 40%.
- Other notable achievements under this outcome included:
  1. Completion of 45.8 km of bank protection works (target: 26.30 km, exceeded) which provided protection to over 35,903 ha of farmland and over 67,746 households.
  2. Strengthening local capacity at the Mirab level. 215 Mirabs (target: 210, exceeded) benefited from strengthening capacities in various aspects of irrigation management functions (canal operation and maintenance, conflict resolution, resource mobilization, among others). According to the ICR (paragraph 51) "this strengthened their ability to monitor quality of works and undertake O&M of completed schemes."

The following table summarizes the indicators targets and achievements:

PDO indicator	Unit	Target	Actual	Achievement
Area provided with irrigation and drainage services - Improved	Ha	215,000	284,391	132%
Water users provided with new/improved irrigation & drainage services	Number	385,000	580,908	151%
Water users provided with irrigation and drainage services – female	Number	200,000	302,072	151%
Mirabs strengthened	Number	212	215	101%



Direct project beneficiaries	Number	400,000	611,483	153%
Female beneficiaries	%	48%	52%	108%

Based on the above-mentioned assessment, the efficacy with which this objective was achieved is rated High. All PDO targets and intermediate outcome indicator targets were achieved or exceeded.

### Revised Rating

High

## OBJECTIVE 1 REVISION 2

### Revised Objective

To strengthen capacity for water resources management

### Revised Rationale

**Theory of Change (ToC).** To achieve the stated objective, the project would support water resources management and development through the installation and operationalization of hydrological and snow stations, training MEW staff in hydrology, meteorology, and water resource management, developing and publishing a hydrological yearbook, developing and enacting water law, policy, guidelines (new), and establishing a transboundary unit at MEW (new). These activities would result in strengthened capacity in water resource management including the development of a water disaster risk management plan and two river basin management plans. Anticipated long-term outcomes included: increasing agricultural production, national and international basin-wide development planned and implemented, water security enhanced, climate risks reduced, improved efficiency and availability of water delivery, rural food security enhanced, and improved institutional capacity and planning.

The activities reflected in the ToC were directly linked to the PDO in a plausible causal chain. However, the ToC lacked the critical assumptions that underpinned the achievement of the stated objective.

### Outputs

The same outputs mentioned under the original objective pertain to this objective.

The following outputs were reported in the ICR (Annex 1, unless referenced otherwise):

1. Transboundary water unit established at MEW.
2. Hydromet weather snow measurement stations installed.
3. Mandate for irrigation between MAIL and MEW clarified.
4. 100 government staff were trained on topics related to river bank protection, dam planning and management, water resources management and development (target:30, exceeded.)

### Outcome



- Strengthening the capacity for water resources management was expected to be achieved through investments in dam safety, development of hydromet infrastructure, and data collection and collation with parallel investments in technical capacity for management.
- By project completion, two detailed preparation studies for dams were completed (revised target: 2, achieved). Also, 10 dams had undergone a safety review compared to a revised target of 3 (target exceeded by 233%). According to the ICR (paragraph 58) "detailed studies were completed and recommended maintenance and minor repair works were carried out on Qargha and Darunta dams, as planned."
- However, the project failed to prepare any water disaster risk management plans (target: 3). This was to be achieved through three key activities: building robust hydromet infrastructure, strengthening capacity of staff to operate and maintain this infrastructure, and using this data for river basin planning including flood/drought forecasting and early warning systems. The project was successful in supporting the first two activities. However, developing the river basin plans for Kabul and the Balkha river basins were not completed (ICR, paragraph 60).

The following table summarizes the indicators targets and achievements:

PDO Indicator	Unit	Target	Actual	Achievement
Dams for which detailed preparation studies have been completed	Number	2	2	100%
Dams which have undergone safety review	Number	3	10	500%
Water Disaster Risk Management Plan	Number	3	none	0%

The project achieved mixed results. On one hand, the project was successful in meeting its outcome targets on dam safety and detailed dam studies. However, it failed on delivering any water disaster risk management plans.

On balance, the efficacy with which this objective was achieved is rated Substantial despite shortcomings. While the project failed to deliver on water disaster risk management plans, it contributed to strengthening capacity and built a robust hydromet infrastructure. This would provide a good foundation for designing future risk management plans.

**Revised Rating**  
Substantial

## OVERALL EFFICACY

### Rationale

Overall Efficacy is rated Substantial despite shortcomings. The project exceeded its two outcome indicators. However, it failed to deliver on any of the small dams, and hydromet data was not utilized as envisioned.



## Overall Efficacy Rating

Substantial

## OVERALL EFFICACY REVISION 1

### Overall Efficacy Revision 1 Rationale

Overall, Efficacy is rated Substantial despite shortcomings. The project was successful in increasing the irrigated area and providing beneficiaries with more reliable access to irrigation. All PDO targets and intermediate outcome indicator targets for the first objective were achieved or exceeded. For the second objective, the project achieved mixed results. On one hand, the project was successful in meeting its outcome targets on dam safety and detailed dam studies. However, it failed on delivering any water disaster risk management plans.

### Overall Efficacy Revision 1 Rating

Substantial

## 5. Efficiency

### Economic and Financial Analysis (EFA)

#### *ex-ante*

- The economic rate of return (ERR) of the project was estimated at 28%. The project's financial rate of return (FRR) was estimated at 20.3%. The ERR was estimated for 20 years including the investment period of six-years using a standard conversion factor (SCF) of 0.9 for converting cost of non-tradable goods to economic/shadow prices. Irrigation scheme restoration was estimated to cost US\$200/ha.
- Expected benefits: (i) increase in cropping intensity from 122% to 152%; (ii) an average increase of 15% increase in irrigated area (45,000 ha equal to 15% of 300,000 ha); and (iii) an average 20% increase in crop yields (wheat being the dominant crop has been used as a proxy for all crops).
- Sensitivity Analysis. The ERR was robust and not sensitive to reasonable cost overruns, reduced benefits and a combination of both. A 20% reduction in benefits reduces the ERR to 25.8%. A 20% increase in cost reduces the ERR to 26.5%. A combination of 20% increase in cost and 20% reduction in benefits reduces the ERR to 23.1%.
- Irrigation scheme restoration was estimated to cost US\$200/ha, which was not a realistic estimate as it did not account for "material cost increases due to inflation, change in size of infrastructure being rehabilitated, and uncertain security situations (ICR, paragraph 88)."

#### *ex-post*

- The internal rate of return (IRR) of the overall project was estimated at 83.5% over 30 years, the net present value (NPV), discounted at 10%, was US\$923 million, and the benefit-cost ratio was 12.9.



- The ex-post economic and financial analysis was based primarily on observed quantifiable benefits at primary beneficiaries' level associated with the production of crops (wheat, barley, alfalfa, orchards (apples, almond, apricot, peach plum), vegetables, rice, cotton, and watermelon), and partially on the economic impact of reduced damage from flooding, reduced vulnerability to drought and climate benefits.
- According to the ICR (paragraph 70) the ex-post IRR was mainly driven by improvements in wheat yields that outpaced the expected yield gains during project design and mid-term review. For example, wheat yield increased on average of 50% between 2012-2020, compared to an estimated increment of 20% in the ex-ante analysis. However, the accuracy of the yield data is questionable. The ICR (Annex 4, Table 7) showed the wheat baseline was 2,092 kg/ha. In 2012, (one year after effectiveness) the recorded wheat yield jumped to 3,411 kg/ha, a 63% increase, when the project investments had just started.
- Sensitivity Analysis. Four scenarios were analyzed: first a delay of project benefits by one and two years would decrease the IRR to 55.5% and 42.8%, respectively. The second considered a set of scenarios that evaluated the impact of each sub-component of component 1 independently. This revealed that sub-component 1.1. had limited impact on the overall IRR. The impact of sub-component 1.2 varied by region with a substantial impact on Kunduz and Mazar, as the two regions comprise 83% of the arable land protected by the river embankments. A third scenario assessed a reduction in benefits by 20% which resulted in an IRR of 68.1%. The fourth scenario analyzed the impact of increasing the discount rate from 10% to 12%, which showed that the NPV for the project dropped by 23% from US\$923 million to US\$708 million.
- Cost over-runs. The cost of rehabilitation reached US\$600 per hectare which was significantly higher than the estimate at appraisal (US\$200 per hectare). The cost of the six-year project was estimated at US\$148.70 million, and eventually the total cost was US\$194.09 million over 9 years. In a further communication the project team explained "the time extension was not a delay in achieving outputs outlined in the original Project, rather the additional time was utilized to achieve more than the target envisaged at appraisal and even in the restructuring, as well as to finance new activities."
- The ex-post EFA could have benefited from including a comparison to similar projects to better assess cost efficiency of the project investments. In a further communication the project team explained that "for rehabilitation projects, similar to the project in Afghanistan, the average global cost per hectare is \$2,882 and for the South Asia region is \$1,008. Even if the cost for Afghanistan is US\$600 per hectare, it is still below the global average cost and the average cost in South Asia."

### **Administrative and Institutional Efficiency**

- The project closing date was extended by three years from December 31, 2017 to December 31, 2020. The ICR did not provide an explicit reason for the extension of the closing date, but noted that the project received US\$70 million in AF. The ICR (paragraph 92) highlighted that the deterioration in the security situation limited the access to project areas. This in turn "impacted contractors' ability to mobilize machinery and equipment on time, timely completion of surveys, field level supervision and beneficiary interactions (ICR, paragraph 92)." The Restructuring Paper (page 5) stated that the extension of the closing date was to "allow for completion of activities under the parent project."
- The ICR (paragraph 77) noted that implementation efficiency benefited from the role of FAO in streamlining procurement, contract management, capacity building and construction.
- The project suffered from frequent turnover of national staff, which added the burden of training new staff. In a further communication, the team explained that "the project had in place institutional mechanism through the TSU and FAO and strong regional teams, and so this did not impact overall project delivery as is evidenced in the achievement of results."



## Assessment of Efficiency

The ex-post EFA showed that project generated attractive returns on investment with an EIRR of 83.5% at completion compared to 28% at appraisal. Although, there were questions in terms of the accuracy of yield increases, the sensitivity analysis suggested these returns could be considered robust under a range of plausible scenarios.

Therefore, and based on the evidence in the ICR combined with team's explanations, Efficiency is rated Substantial.

## Efficiency Rating

Substantial

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

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

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

## 6. Outcome

### Pre-restructuring

Relevance of Objectives was rated High. Overall efficacy was rated Substantial despite shortcomings. The project exceeded its two outcome indicators. However, it failed to deliver on any of the small dams, and hydromet data was not utilized as envisioned. Efficiency was rated Substantial as the ex-post EFA showed that project generated attractive returns on investment with an EIRR of 83.5% at completion compared to 28% at appraisal. Also, the sensitivity analysis suggested these returns could be considered robust under a range of plausible scenarios.

Based on a High rating Relevance of Objectives and Substantial rating for both Overall Efficacy and Efficiency, the overall Outcome rating is Satisfactory.

### Post-restructuring

Relevance of Objectives was rated High. Overall efficacy was rated Substantial despite shortcomings. The project was successful in increasing the irrigated area and providing beneficiaries with more reliable access to irrigation. All PDO targets and intermediate outcome indicator targets for the first objective were achieved or exceeded. For the second objective, the project achieved mixed results. On one hand, the project was



successful in meeting its outcome targets on dam safety and detailed dam studies. However, it failed on delivering any water disaster risk management plans. Efficiency was rated Substantial as the ex-post EFA showed that project generated attractive returns on investment with an EIRR of 83.5% at completion compared to 28% at appraisal. Also, the sensitivity analysis suggested these returns could be considered robust under a range of plausible scenarios.

Based on a High rating Relevance of Objectives and substantial rating for Overall Efficacy and Efficiency, the overall Outcome rating is Satisfactory.

### Split Rating

	Pre-restructuring	Post restructuring
Relevance of Objectives	High	High
Overall Efficacy	Substantial	Substantial
Efficiency	Substantial	Substantial
Outcome Rating	Satisfactory	Satisfactory
Numerical Value of Outcome Ratings	5	5
Disbursement (US\$ millions)	US\$88.07	US\$106.02
Share of Disbursement	45%	55%
Weighted Value of Outcome Rating	2.25	2.75
Final Outcome Rating	Satisfactory (5)	Satisfactory (5)

Based on the split rating above, the weighted outcome rating for the project is Satisfactory.

#### a. **Outcome Rating** Satisfactory

## 7. Risk to Development Outcome

**1. Security risk.** Despite that beneficiaries have clear economic incentives to maintain the good practices and co-management arrangements introduced under the project, worsening security conditions could undermine the project achievements. An increase in internal conflict will adversely impact longevity of infrastructure and its utilization (ICR, paragraph 112).

**2. Political risk.** With the collapse of the elected Government and subsequent control by the Taliban, there is a significant risk to gains made in gender related aspects during the project. While these gains were substantive, they are fragile, and significant barriers to progress persist (ICR, paragraph 112).



## 8. Assessment of Bank Performance

### a. Quality-at-Entry

- This project aimed to build on the success of the IDA-funded Emergency Irrigation Rehabilitation Project (EIRP) to scale up interventions and address unmet demand for irrigation rehabilitation. According to the ICR (paragraph 108) "there was strong ownership from the MEW and client counterparts on developing the IRDP."
- The original project objective, while broad in nature, was aligned with the Bank strategies and Government priorities (see section 3 for further details). However, the original objective was not fully aligned with project activities that focused primarily on improving irrigation.
- Project preparation included three missions and there was a six month overlap between EIRP completion (December 31, 2011) and the IRDP which became effective June 15, 2011). The ICR (paragraph 108) noted that the "transition from EIRP to IRDP and did not take into active consideration evolving techno-economic and security trends."
- A notable design shortcoming was the underestimation of the cost of rehabilitation of irrigation works. This was later addressed through restructuring and additional financing. Also, the capacity of MEW to undertake small dam construction was over estimated.
- The project emergency paper identified several risks including risks related to security, contractor capacity, and fiduciary management in remote areas. However, the risk related to the staff capacity at MEW was under estimated and this negatively impacted the activity related to the construction of small dams, which was eventually cancelled. The ICR did not comment on the adequacy of the mitigation measures mentioned in the project emergency paper.
- M&E design suffered from a number of weaknesses relating to Results Framework (RF) which lacked relevant indicators to assess production despite being an integral part of the original PDO (see section 9 for further details).
- Overall, Quality at Entry is rated Moderately Satisfactory due to weaknesses in background analysis, risk assessment and analytics at entry as well as weaknesses in project design.

### Quality-at-Entry Rating

Moderately Satisfactory

### b. Quality of supervision

- The project was implemented under a challenging security environment. The Bank conducted 18 implementation supervision missions. According to the ICR (paragraph 109) "supervision mission skill mix included specialists in procurement, financial management, social and environmental safeguards, FAO counterparts, Third Party Monitoring Agency (TPMA) staff as required and other subject matter specialists."
- The Bank team also held regular progress review meetings to monitor progress and address key issues in between missions. At the MTR, the Bank team identified that a restructuring and fine-tuning of the PDOs was necessary and mobilized AF to meet cost escalations.
- The ICR (paragraph 110 and Annex 10) highlighted some discrepancies in the project documents and noted the poor archiving of project related documents. The Bank team could have addressed



the RF weaknesses at an earlier stage and more attention should have been given to the consistency of reporting and archiving of project related documents.

- Overall, Supervision is rated Satisfactory. The Bank team steered the project under a challenging implementation environment with a deteriorating security situation. Proactive performance and timely technical support enabled the successful completion of the project.

Overall Bank Performance is rated Moderately Satisfactory due to moderate shortcomings pertaining to Quality at Entry.

### **Quality of Supervision Rating**

Satisfactory

### **Overall Bank Performance Rating**

Moderately Satisfactory

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

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

- The Emergency Project Paper (EPP) did not include a Theory of Change (ToC) or results chain. Nevertheless, the ICR included an ex-post ToC that was constructed based on the PDO, the project activities and the results indicators as reported in the EPP. Overall, the ToC in the ICR was sound and reflected the relation between the project inputs, outputs, outcomes and long-term outcomes. However, the original PDO was not fully aligned with the stated activities, since the activities were mainly focused on irrigation improvements. Meanwhile, capacity building and extension services to farmers on irrigation and productivity enhancement technologies, as well as on-farm irrigation works, which are key to achieve productivity and production enhancements were not included in the TOC.
- The PDO was to be assessed through two PDO outcome indicators: 1. The increase in irrigated area, and 2. The increase in agricultural productivity. The first indicator was not directly measuring the PDO and was more relevant as an intermediate outcome indicator. The second indicator, aimed to measure productivity through measuring wheat yield (kg/ha). The RF lacked any indicators to measure production which was a key part of the PDO. Both indicators had baselines, were measurable and included realistic targets.
- The RF included four intermediate outcome indicators. These indicators were directly connected to the project activities and measurable. However, the RF could have benefited from more indicators to comprehensively cover the different aspects of the project activities. For example, an indicator to measure improvements in irrigation water conveyance, and water delivery to tail-end users. The ICR (paragraph 97) correctly pointed out that "M&E design could have been further strengthened with remote sensing applications."
- Overall, M&E design suffered from weaknesses. Most notable was that the RF was not aligned with the PDO statement as the project activities lacked on-farm irrigation works as well as capacity building and extension services for farmers on irrigated agricultural production.



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

- M&E implementation benefited from the capacity built at the Project Coordination Unit (PCU) during the implementation of the Emergency Irrigation Rehabilitation Project (EIRP). However, M&E activities were hindered in areas that experienced a deterioration in the security situation (ICR, paragraph 98).
- According to the ICR (paragraph 98) "all physical outputs were regularly monitored by the M&E unit of the PCU and reported to the MEW and World Bank and donors representing the Afghanistan Reconstruction Trust Fund (ARTF)." Crop yield surveys were conducted annually one year after sub-project completion.
- The M&E unit provided monthly, quarterly, and bi-annual updates on project progress. In total, six main reports were generated during the period of implementation. This included reports on agricultural productivity, areas receiving reliable irrigation, number of sub-projects completed and number of the number of people benefitted, water disputes and other project indicators.
- According to the ICR (paragraph 98) data on different indicators were triangulated to assess their validity by using in-house historical data, crop cutting 2019 survey, relevant reports produced by the Ministry of Agriculture Irrigation and Livestock agriculture prospect reports, Afghan institutions, including, Food and Agriculture Organization (FAO) Improved Seeds Unit, Ministry of Rural Rehabilitation and Development's National Risk and Vulnerability Assessment (2008), and Afghanistan Market Bulletin, produced by the World Food Program (WFP) and Afghanistan Statistical Year Book 2009-2010.
- Geographic Information System (GIS) analysis on irrigation and crop productivity supplemented the results of the M&E and impact assessment surveys and provided an independent set of observations beyond the existing data provided by the project M&E system.
- Restructuring and revision of the PDO and the RF. The project was restructured in May 2016 to change the PDO to "Improve access to irrigation in targeted areas and strengthen capacity for water resources management." The two original PDO indicators and four intermediate indicators were dropped in the restructuring, and a new set of indicators corresponding to the revised PDO was added. The original PDO indicator "Increase in Irrigated Area" was replaced with the corporate indicator "Area provided with improved irrigation or drainage services", and a corporate indicator "Project beneficiaries, disaggregated by gender" was also added. In total seven new indicators were added to the RF. The ICR (Annex 10) also included an updated ToC that reflected the changes introduced as part of the restructuring.
- Despite the revision of the RF and dropping the activities on river basin management plans, the RF was not updated to reflect this change (ICR. paragraph 98).

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

- According to the ICR (paragraph 99) the "data collected by the PCU with assistance from FAO were used for preparing project progress reports and provided important inputs for the World Bank's implementation support missions (ISM)."



- M&E data were used for project management through monitoring implementation progress, tracing results indicators, and tracking impact and for the economic and financial analysis update.
- M&E provided insights into delivery constraints, issues and challenges to be addressed and areas for improvement. However, "there is limited evidence to suggest that this guided policymaking or drive key decisions in the project (ICR, paragraph 99)."

Overall the Quality of M&E is rated Modest. This rating reflects significant shortcomings with regards to M&E design. Specifically, the RF had significant weaknesses at entry that failed to be rectified at restructuring. This Review also has concerns on the accuracy of the yield data collected by the project M&E system.

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

Modest

## **10. Other Issues**

### **a. Safeguards**

The project was rated Environmental Category A due to the negative impacts anticipated from civil works, particularly dam development. It triggered four safeguard policies: Environmental Assessment (OP/BP 4.01), Involuntary Resettlement (OP/BP 4.12), Safety of Dams (OP/BP 4.37), and Projects on International Waterways (OP/BP 7.50). The project would build upon and scale up activities supported under the Emergency Irrigation Rehabilitation Project (EIRP), it would also support MEW in developing Afghanistan's water resources for irrigation comprising a small dam development program in closed river basins that are free of trans-boundary riparian issues.

An Environmental and Social Management Framework (ESMF) was prepared to guide environmental and social impact assessment of project schemes and preparation of environmental and social management plans. The ESMF included a Resettlement Policy Framework that would be applied to prepare site/scheme specific land acquisition and resettlement action plan (LARAPs) if land acquisition and/or resettlement are involved. The final ESMF was disclosed through the World Bank's InfoShop on January 26, 2016, and in the country through the project's six regional offices.

The Bank's Pest Management policy (OP/BP 4.09) and Physical Cultural Resources Policy (OP/BP 4.11) were both triggered as part of the 2016 restructuring. According to the Restructuring Paper (page 21) OP/BP 4.09 was triggered because the use of pesticides/agro-chemicals was expected to increase in conjunction with the intensified irrigated agriculture, while OP/BP 4.11 was triggered because there were chances that investments proposed under the proposed AF could be located in areas and locations that may negatively impact local cultural properties and/or historical sites.

**Compliance with Environmental Safeguards.** According to the ICR (paragraph 106) "the project was in full compliance with the World Bank's environmental and social safeguard policies and with the



Government's regulations." The ICR also noted that "shortcomings were shared with project staff and relevant corrective actions taken."

**Compliance with Social Safeguards.** According to the ICR (paragraph 106) "the project was in full compliance with the World Bank's environmental and social safeguard policies and with the Government's regulations." The project did not involve involuntary land acquisition and resettlement except for 20 ha of land that was acquired through land donation in agreement with landowners. The project had an active Grievance Redressal Mechanism (GRM) that received and resolved a total of 493 complaints, including 43 grievances registered by women. There were three fatalities during the implementation of the project. The families of the victims were compensated per country regulations (ICR, paragraph 105).

## b. Fiduciary Compliance

**Financial Management (FM).** According to the ICR (paragraph 107), the project had on overall satisfactory FM performance. A comprehensive project reporting system was established and a contracts management database provided the project with improved oversight. Quarterly and annual financial reports were timely received and in acceptable format. The project received an unqualified audit opinion till FY 2019. However, given the existing country situation, it not clear when the final audit report would be received. Finally, the project's disbursement rate has been just above 92% (the Revised Cost (US\$M) at restructuring was \$219.7 million, and post cancellation this was US\$207 million, of which actual expenditure was US\$ 192.22 million).

**Procurement.** The ICR did not comment explicitly comment on procurement performance 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	Moderately Satisfactory	Moderately Satisfactory	
Quality of M&E	Modest	Modest	
Quality of ICR	---	Substantial	



## 12. Lessons

The ICR included three lessons. The following three are emphasized with some adaptation of language:

**1. To achieve the desired impacts on agricultural productivity, irrigation interventions need to be implemented simultaneously with a complementary program of agricultural extension and a package of selected intensification measures, and improving market linkages that could further boost productivity and improve livelihoods.** The project experience emphasized the need for a cohesive “water in agriculture” approach where modernization (rehabilitation) of irrigation canals is accompanied by a complementary program of agricultural extension and a package of selected intensification measures could further boost productivity and improve livelihoods. Also, building high value market linkages would allow farmers to move beyond subsistence farming. This requires operationalizing the institutional frameworks developed under the IRDP for improved coordination between public institutions / government departments.

**2. The full utilization of hydromet investments requires concurrent investments in analytical products.** The project experience demonstrated that without systems, frameworks, and mechanisms for data sharing, adoption and/or development of analytical products, using data generated from the hydromet infrastructure for improving water resources management remains constrained. After 20 years of investing in building, operating, and maintaining hydromet infrastructure, this still remains a major gap. While infrastructure provision has laid the foundation for a robust water resources monitoring and advisory platform, its utility will however be defined by analytical products developed at three levels; national, regional and local levels. The national for snow melt and broader climate impact analysis, the regional to cater to specific use based analytical products such as including acquiring and processing well-established and operational observational datasets on previous season snowpack, and at the local level for driving local decision-making such as simplified updates on water availability and weather disturbances, and evapo-transpiration (ET) information, among others.

**3. Adapting to deteriorating security conditions requires an agile, constructive, and multi-pronged approach for procurement, implementation, and monitoring.** The project adopted several strategies including smaller contracts executed by contractors, building trust and social cohesion with local communities, strengthening capacity of regional staff, and using technology-based M&E such as remote sensing analysis. While local contractor capacity was weak, employing local actors to deliver infrastructure projects in a smaller and more manageable manner allowed for continued engagement during active conflict. It also helped bolster the social contract between local communities and project authorities.

## 13. Assessment Recommended?

No

## 14. Comments on Quality of ICR



**Quality of Evidence.** The ICR acknowledged that the Results Framework suffered from weaknesses (see section 9a). Despite that the ICR noted that data on different indicators were triangulated through several sources to assess their validity, this Review has concerns on the accuracy of crop yield data.

**Quality of Analysis.** The ICR provided clear linking to the extent possible between evidence and findings and used the evidence base to serve the arguments under the different sections, in particular the discussion on outcomes.

**Lessons.** Lessons reflected the project experience and were based on evidence and analysis.

**Results Orientation.** The ICR included a comprehensive discussion on the achievement of the PDO. However, discussion on outcomes could have been more balance between reporting on the achievement of outcome indicators and what the project actually achieved on the ground.

**Consistency with guidelines.** The ICR successfully used the available data to justify most of the assigned ratings. Discussion of outcomes was adequate. There are concerns on the robustness efficiency analysis given the data inconsistencies and questions on the accuracy of yield increments .

**Conciseness.** The ICR provided comprehensive coverage of the implementation experience and candidly reported on shortcomings. The reporting on safeguards included an explicit statement on compliance. The ICR commented on the status of the final audit reports for the project. However, the discussion of M&E design could have benefited from further details with regards to the RF shortcomings. Finally, the ICR did not explicitly state the reason(s) for the three extension of the closing date, did not discuss the risks that materialized during implementation nor did it report on the appropriateness of the mitigation measures mentioned in the EPP. Also, procurement was not explicitly discussed and some acronyms were not reflected in the list at the beginning of the ICR.

Overall, the Quality of the ICR is rated Substantial despite some shortcomings.

**a. Quality of ICR Rating**  
Substantial