

Document of  
The World Bank

Report No: ICR0002198

IMPLEMENTATION COMPLETION AND RESULTS REPORT  
(IDA Credit 3845-AF, Grant H284-AF, Grant H398-AF and Grant 498-AF)

ON ONE IDA CREDIT AND THREE IDA GRANTS  
(IDA Credit 3845-AF) IN THE AMOUNT OF SDR 27.9 MILLION

(US\$ 40.0 MILLION EQUIVALENT)

(Grant H284-AF) IN THE AMOUNT OF SDR 16.8 MILLION

(US\$ 25.0 MILLION EQUIVALENT)

(Grant H398-AF) IN THE AMOUNT OF SDR 17.1 MILLION)

(US\$ 28.0 MILLION EQUIVALENT)

(Grant 498-AF) IN THE AMOUNT OF SDR 22.7 MILLION)

(US\$ 33.5 MILLION EQUIVALENT)

TO THE  
ISLAMIC REPUBLIC OF AFGHANISTAN  
FOR THE  
EMERGENCY IRRIGATION REHABILITATION PROJECT

21 June 2012

Sustainable Development Department  
Agriculture and Rural Development Sector  
Afghanistan Country Management Unit  
South Asia Region

## CURRENCY EQUIVALENTS

(Exchange Rate Effective April 20, 2012)

Currency Unit = Afghani (AFN)

US\$1.00 = 49.00 AFN

SDR1.00 = US\$1.474

**Government Fiscal Year:** March 21 – March 20

## ABBREVIATIONS AND ACRONYMS

ANDS	Afghanistan National Development Strategy
ARTF	Afghanistan Reconstruction Trust Fund
CAS	Country Assistance Strategy
CDC	Community Development Council
EA	Environmental Assessment
EIRP	Emergency Irrigation Rehabilitation Project
EMP	Environmental Management Plan
FAO	Food and Agricultural Organization of the UN
FM	Financial Management
GOA	Government of Afghanistan
ICR	Implementation Completion and Results Report
IDA	International Development Association
IRR	Internal Rate of Return
ISR	Implementation Status Report
M&E	Monitoring and Evaluation
MEW	Ministry of Energy and Water
MIS	Management Information System
MOF	Ministry of Finance
MTR	Mid-Term Review
NGO	Non-governmental Organization
NSP	National Solidarity Program
O&M	Operation and Maintenance
PCU	Project Coordination Unit
PSC	Project Steering Committee
TA	Technical Assistance
TOR	Terms of Reference
WBG	World Bank Group
WUA	Water User Association

<p>Vice President: Isabel M. Guerrero Country Director: Robert Saum Sector Manager: Simeon K. Ehui Project Team Leader: Jun Matsumoto ICR Team Leader: Srinivasan Raj Rajagopal</p>
---

**AFGHANISTAN**  
**Emergency Irrigation Rehabilitation Project**

**CONTENTS**

Data Sheet

A. Basic Information.....	iv
B. Key Dates.....	iv
C. Ratings Summary.....	iv
D. Sector and Theme Codes.....	v
E. Bank Staff.....	v
F. Results Framework Analysis.....	vi
G. Ratings of Project Performance in ISRs.....	vii
H. Restructuring (if any).....	viii
I. Disbursement Profile.....	viii
1. Project Context, Development Objectives and Design.....	1
2. Key Factors Affecting Implementation and Outcomes.....	6
3. Assessment of Outcomes.....	12
4. Assessment of Risk to Development Outcome.....	17
5. Assessment of Bank and Borrower Performance.....	17
6. Lessons Learned.....	20
7. Comments on Issues Raised by Borrower/Implementing Agencies.....	21
Annex 1. Project Costs and Financing.....	22
Annex 2. Outputs by Component.....	23
Annex 3: Economic and Financial Analyses.....	34
Annex 4. Bank Lending and Implementation Support/Supervision Processes.....	44
Annex 5. Summary of Borrower's ICR.....	46
Annex 6. List of Supporting Documents.....	54

**Maps:** IBRD AFG 39365  
IBRD AFG 39366

<b>A. Basic Information</b>			
Country:	Afghanistan	Project Name:	AF: Emergency Irrigation Rehabilitation Project
Project ID:	P078936	L/C/TF Number(s):	IDA-38450,IDA-H2840,IDA-H3980,IDA-H4980
ICR Date:	06/26/2012	ICR Type:	Core ICR
Lending Instrument:	SIL	Borrower:	GOVERNMENT OF AFGHANISTAN
Original Total Commitment:	XDR 27.90M	Disbursed Amount:	XDR 76.29M
Revised Amount:	XDR 77.00M		
<b>Environmental Category: C</b>			
<b>Implementing Agencies:</b> Ministry of Energy and Water			
<b>Cofinanciers and Other External Partners:</b>			

<b>B. Key Dates</b>				
Process	Date	Process	Original Date	Revised / Actual Date(s)
Concept Review:	08/14/2003	Effectiveness:	03/19/2004	03/19/2004
Appraisal:	11/20/2003	Restructuring(s):		10/24/2006 04/03/2007
Approval:	12/23/2003	Mid-term Review:	09/25/2005	03/25/2006
		Closing:	09/30/2007	12/31/2011

<b>C. Ratings Summary</b>	
<b>C.1 Performance Rating by ICR</b>	
Outcomes:	Satisfactory
Risk to Development Outcome:	Substantial
Bank Performance:	Moderately Satisfactory
Borrower Performance:	Moderately Satisfactory

<b>C.2 Detailed Ratings of Bank and Borrower Performance (by ICR)</b>			
Bank	Ratings	Borrower	Ratings
Quality at Entry:	Satisfactory	Government:	Moderately Satisfactory
Quality of Supervision:	Moderately Satisfactory	Implementing Agency/Agencies:	Moderately Satisfactory
<b>Overall Bank</b>	Moderately Satisfactory	<b>Overall Borrower</b>	Moderately Satisfactory

<b>Performance:</b>		<b>Performance:</b>	
---------------------	--	---------------------	--

### C.3 Quality at Entry and Implementation Performance Indicators

Implementation Performance	Indicators	QAG Assessments (if any)	Rating
Potential Problem Project at any time (Yes/No):	No	Quality at Entry (QEA):	None
Problem Project at any time (Yes/No):	Yes	Quality of Supervision (QSA):	None
DO rating before Closing/Inactive status:	Satisfactory		

### D. Sector and Theme Codes

	Original	Actual
<b>Sector Code (as % of total Bank financing)</b>		
Central government administration	10	10
General water, sanitation and flood protection sector	10	10
Irrigation and drainage	75	75
Sub-national government administration	5	5
<b>Theme Code (as % of total Bank financing)</b>		
Other rural development	28	28
Rural policies and institutions	14	14
Rural services and infrastructure	29	29
Water resource management	29	29

### E. Bank Staff

Positions	At ICR	At Approval
Vice President:	Isabel M. Guerrero	Praful C. Patel
Country Director:	Robert J. Saum	Alastair J. McKechnie
Sector Manager:	Simeon Kacou Ehui	Gajanand Pathmanathan
Project Team Leader:	Jun Matsumoto	Mohinder S. Mudahar
ICR Team Leader:	Srinivasan Raj Rajagopal	
ICR Primary Author:	Srinivasan Raj Rajagopal	

## F. Results Framework Analysis

### Project Development Objectives (from Project Appraisal Document)

The project development objective is to provide farmers in the project areas with improved reliable and equitable distribution of irrigation water to increase agricultural productivity and farm income, improve food security and livelihoods, and reduce vulnerability due to droughts.

### Revised Project Development Objectives (as approved by original approving authority)

The Project Development Objective is to assist the Borrower in restoring irrigated agricultural production in rural areas, through improved, reliable water supply to rehabilitated irrigation schemes.

#### (a) PDO Indicator(s)

Indicator	Baseline Value	Original Target Values (from approval documents)	Formally Revised Target Values	Actual Value Achieved at Completion or Target Years
<b>Indicator 1 :</b>	Increase in irrigated area			
Value quantitative or Qualitative)				
Date achieved				
Comments (incl. % achievement)	This PDO indicator			
<b>Indicator 2 :</b>	Increase in productivity			
Value quantitative or Qualitative)				
Date achieved				
Comments (incl. % achievement)				

#### (b) Intermediate Outcome Indicator(s)

Indicator	Baseline Value	Original Target Values (from approval documents)	Formally Revised Target Values	Actual Value Achieved at Completion or Target Years
<b>Indicator 1 :</b>	Number of hectares of irrigable land rehabilitated.			
Value (quantitative or Qualitative)				
Date achieved				
Comments				

(incl. % achievement)				
<b>Indicator 2 :</b>	Number of hydro-meteorological stations rehabilitated			
Value (quantitative or Qualitative)				
Date achieved				
Comments (incl. % achievement)				
<b>Indicator 3 :</b>	Number of Feasibility Studies prepared			
Value (quantitative or Qualitative)				
Date achieved				
Comments (incl. % achievement)				
<b>Indicator 4 :</b>	Number of Ministry staff trained in various subjects.			
Value (quantitative or Qualitative)				
Date achieved				
Comments (incl. % achievement)				

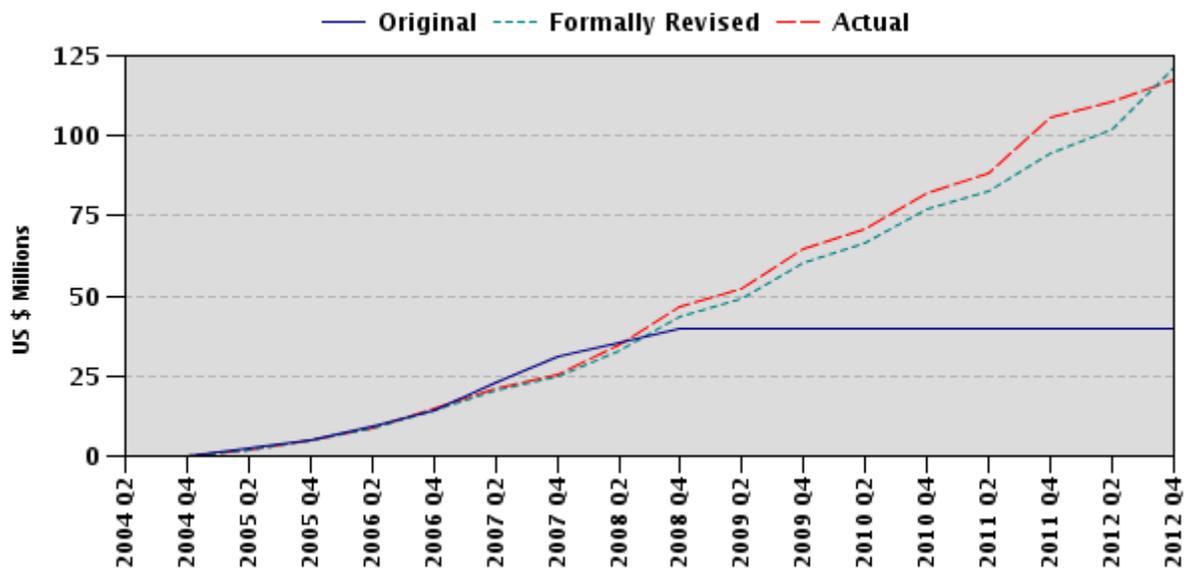
### G. Ratings of Project Performance in ISRs

No.	Date ISR Archived	DO	IP	Actual Disbursements (USD millions)
1	06/04/2004	Satisfactory	Satisfactory	0.00
2	12/02/2004	Satisfactory	Unsatisfactory	2.16
3	06/08/2005	Satisfactory	Moderately Unsatisfactory	4.83
4	12/12/2005	Satisfactory	Moderately Satisfactory	8.55
5	05/25/2006	Satisfactory	Moderately Satisfactory	13.69
6	12/07/2006	Satisfactory	Satisfactory	21.08
7	06/11/2007	Satisfactory	Satisfactory	25.76
8	12/15/2007	Satisfactory	Satisfactory	34.20
9	06/14/2008	Satisfactory	Satisfactory	45.02
10	12/26/2008	Satisfactory	Satisfactory	52.30
11	05/18/2009	Satisfactory	Satisfactory	59.94
12	11/29/2009	Satisfactory	Satisfactory	69.39
13	05/21/2010	Satisfactory	Satisfactory	82.24
14	12/05/2010	Satisfactory	Satisfactory	88.19
15	06/03/2011	Satisfactory	Satisfactory	96.46
16	12/13/2011	Satisfactory	Satisfactory	112.78

## H. Restructuring (if any)

Restructuring Date(s)	Board Approved PDO Change	ISR Ratings at Restructuring		Amount Disbursed at Restructuring in USD millions	Reason for Restructuring & Key Changes Made
		DO	IP		
10/24/2006	N	S	MS	19.11	Poor performance of the Hydro-met network resulted in it being dropped.
04/03/2007	N	S	S	24.47	Additional financing was required to cover the shortfall in ARTF Grant and to reintroduce a simplified Hydro-met component.

## I. Disbursement Profile



## **1. Project Context, Development Objectives and Design**

### **1.1 Context at Appraisal**

1. The Emergency Irrigation Rehabilitation Project (EIRP) was based on the Transitional Support Strategy (TSS) for Afghanistan approved by the Board in March 2003. The TSS was designed to support the National Development Framework (NDF) through which a national strategy for economic development was articulated by the then transitional Government of Afghanistan. The World Bank supports four key TSS sectors: Improving livelihoods; Fiscal strategy, institutions and management; Governance and public administration reform; and enabling private sector development. Among these sectors prioritized by the World Bank, the EIRP was designed to support activities that would improve livelihood opportunities in rural areas through a rehabilitated irrigation system and improved management of national water resources, including rehabilitation and modernization of a once well-functioning but now dilapidated hydromet system.

2. Agriculture production accounts for over half of Afghanistan's GDP and most of its direct exports. More than 75 percent of the population lives in rural areas and depends on agriculture as their source of livelihood. Lack of assured water supply at the farm-level in the existing irrigation systems which have been dilapidated by 25 years of conflict, neglect, droughts and floods is one of the major constraints to food production, agricultural growth and rural development.

3. The project was approved at the end of 2003. In 2002, it was estimated that the actual area under irrigation was only about one-third of the area under irrigation in 1993 and even in this area, the irrigation systems were working at a very low efficiency of about 25%. Furthermore, Afghanistan is estimated to use only about 30% of its water resources with considerable undeveloped potential for hydropower, irrigation and potable water supplies. Development and Management of water resources in Afghanistan is constrained by the lack of accurate and up-to-date hydro-meteorological information (available record pre-dates to the years before the conflict and hence is about 25 years out of date). In the same vein, it is also essential to rebuild institutions and human resources essential for sustainable development and management of the water resources.

4. The EIRP was designed to address these issues and was fully consistent with the National Development Framework and the TSS of Afghanistan. The World Bank has wide experience in supporting development in post-conflict countries and countries in transition. In addition, the Bank brings global expertise in water resources management and irrigation rehabilitation. The Government of Afghanistan recognizing the global experience of the Bank in supporting rehabilitation of irrigation infrastructure requested World Bank financing for the NDF's water resources development program including irrigation infrastructure rehabilitation on an emergency basis as part of a multi-donor multi-million dollar national program proposed by the Government to rehabilitate the irrigation system over a period of three years.

### **1.2 Original Project Development Objectives and Key Indicators**

5. The project development objective (PDO) was to provide farmers in the project areas with improved, reliable and equitable distribution of irrigation water to increase agricultural productivity and farm income, improve food security and livelihoods, and reduce vulnerability to droughts. This objective was to be achieved by (i) rehabilitating and improving the existing

dilapidated irrigation infrastructure; (ii) restoring and modernizing the hydro-meteorological network for better monitoring, planning, sustainable use and management of water resources, including contingency planning for droughts and floods; and (iii) developing the institutional capacity of public sector water institutions, existing community water organizations and farmers for operating and maintaining irrigation system in a sustainable manner. Since this was an emergency operation no Results Framework was prepared (also confirmed by the Task team Leader of the Preparation team) and no quantifiable intermediate output targets were identified. However, key performance and project monitoring indicators were provided in Tables 2 and 6 of the Technical annex and are reproduced in the following section.

The key PDO indicators were as follows:

Component	Indicator
A	<ul style="list-style-type: none"> <li>• Number of hectares of irrigable land rehabilitated</li> <li>• Number and type of beneficiaries</li> <li>• Contribution to irrigation scheme rehabilitation by beneficiaries</li> <li>• Balanced geographical distribution of rehabilitated irrigation schemes</li> </ul>
B	<ul style="list-style-type: none"> <li>• Number of hydro-meteorological stations rehabilitated</li> <li>• Number of rating curves at hydrological stations established</li> <li>• Number of river sub-basins with water balance calculated</li> </ul>
C	<ul style="list-style-type: none"> <li>• Number of feasibility studies prepared</li> </ul>
D	<ul style="list-style-type: none"> <li>• Number of Ministry staff trained in various subjects</li> <li>• Ministry staff assessments by international consultants</li> <li>• Offices (m<sup>2</sup>) equipped and used for project implementation</li> <li>• Implementation Plan</li> </ul>

### 1.3 Revised PDO and Key Indicators

6. The Bank approved the restructuring of the project on October 24, 2006. The restructuring covered the refinement of the original PDOs and Key Performance Indicators, revision of the project outputs, cancellation of the original component B (rehabilitation of the Hydro-meteorological System) and the reallocation of funds allocated for this component among the other three remaining components, mainly for Component A (Rehabilitation of Irrigation Schemes). The revised PDO is “to assist the Borrower in restoring irrigated agricultural production in its rural areas, through improved and reliable water supply to rehabilitated traditional irrigation schemes”. The revised key performance indicators for the achievement of the PDO were:

- Increased area under agricultural production; and
- Percentage increase in agricultural production in rehabilitated schemes

7. There was another restructuring in March 2007 when additional financing of US\$ 25 million equivalent was approved to fill a financing gap. There was no revision to the PDO but the Rehabilitation of Hydro-meteorological Component was reintroduced as Component D. The revised key PDO indicators were not changed.

8. Both Afghanistan Transition Support Strategy (TSS) and Interim Strategy Note (ISN) of April 2006 anticipated more rapid transition from emergency post conflict status to a more

normalized situation (ISN) and began the transition from a short-run emergency orientation to a longer term development orientation (TSS).

#### 1.4 Main Beneficiaries

9. The primary target group is the farmers and their families living in the rural areas covered by the irrigation schemes to be rehabilitated. Government institutions as well as communities involved in the rehabilitation, modernization, operation and maintenance of irrigation infrastructure were the other target group. Capacities of the second target group were to be enhanced through the original component D and revised component C through the technical assistance provider. Even though the investment started as an emergency recovery operation, it included components for rehabilitating the hydro-met network together with the building up of the hydro-met services of Afghanistan, a vital requirement for the medium and long-term development and management of water resources of Afghanistan. Similarly the technical assistance component also focused on improving the capacity of the Ministry staff in technical, financial and managerial aspects of rehabilitating, developing and managing irrigation and associated water resources infrastructure.

#### 1.5 Original Components

10. The original project components were (A) rehabilitation and improvement of about 1,280 irrigation schemes consisting of small (1,100), medium (160) and large (20) schemes; (B) rehabilitation of hydro-meteorological network; (C) preparation of feasibility studies and monitoring; and (D) institutional development.

#### 1.6 Revised Components

11. After the original project was signed, there was 1 restructuring in 2006, and three additional financing in 2007, 2008 and 2009. History of revised components is presented below:

	Component A	Component B	Component C	Component D
Original Project	Rehab. of 1,280 irrigation schemes	Rehabilitation of hydro-meteorological network	Preparation of feasibility studies	Institutional development
2006 Restructuring	Rehab. of 750 medium/ lesser and 10 large irrigation schemes	Feasibility study for Kokcha multi-purpose water resource development	Institutional development	-
	Revised key performance indicators for the achievement of the PDO: <ul style="list-style-type: none"> <li>• Increased area under agricultural production; and</li> <li>• Percentage increase in agricultural production in rehabilitated schemes</li> </ul>			
2007 Additional Financing	Rehab. of 750 medium/ lesser	Feasibility study for Kokcha multi-	Institutional development	Rehabilitation of hydro-

	Component A	Component B	Component C	Component D
	and 10 large irrigation schemes. Target area increased from 280,000 to 390,000 ha	purpose water resource development		meteorological network
2008 Additional Financing	Rehab. of 780 medium/ lesser and 14 large irrigation schemes. Target area increased from 390,000 ha to 480,000 ha.	Feasibility study for Kokcha multi-purpose water resource development	Institutional development	Rehabilitation of hydro-meteorological network
2009 Additional Financing	Rehab. of 865 medium/ lesser and 22 large irrigation schemes. Target area increased from 480,000 ha to 571,000 ha.	Feasibility study for Kokcha multi-purpose water resource development	Institutional development	Rehabilitation of hydro-meteorological network

12. **2006 Restructuring:** After the restructuring in 2006, the original Component B (Rehabilitation of Hydro-meteorological Network) was dropped and in Component A the target of 1,100 small schemes and 160 medium schemes was changed to 750 medium and lesser schemes. The target for the large schemes was reduced from 20 to 10. The original Component C Preparation of Feasibility Studies and M&E was changed to include only one feasibility study namely Feasibility Study for Kokcha multi-purpose water resources development and was made Component B including the M&E work. The original Component D The institutional development of MEW became Component C.

13. **2007 Additional Financing:** After the first additional financing in March 2007, the Rehabilitation of Hydro-meteorological Network was reintroduced as Component D. Other components remained unchanged. The additional financing was to make up the shortfall caused by non-availability of ARTF funds originally allocated for this project.

14. **2008 Additional Financing:** After the second additional financing in June 2008, the number of medium and lesser schemes to be rehabilitated was increased by 30 to 780 and the number of large irrigation schemes to be rehabilitated was increased by 4 to 14. Other components remained unchanged.

15. **2009 Additional Financing:** After the third additional financing in May 2009, the number of medium and lesser schemes to be rehabilitated was increased by 85 to 865 and the number of large irrigation schemes to be rehabilitated was increased by 8 to 22 in Component A. Under Component C, following additional activities were included: (i) provision of academic and practical training in monitoring and evaluation; (ii) completion of the WAPECA building in

Kabul; (iii) construction of new office buildings MEW at Panjsher, Konarha, Norestan, Zabul and Konarha; (iv) construction of boundary walls of existing office buildings of MEW at Laghman, Khost, Daikundi, Kandahar, Pakteka and Bamiyan; and (v) acquisition of vehicles, digital cameras, multimedia projectors, and GPS devices for the central and regional offices of MEW. Under Component D further expansion of hydro-meteorological facilities including thirty cableways for river flow measurements and six silt measurement laboratories and other measuring equipments such as current meters, echo sounders and accessories such as motor boats were provided for.

### **1.7 Other significant changes**

16. The Bank approved restructuring of the project in October 2006. This covered the refinement of the original PDO and Key performance Indicators, revision of project outputs, cancellation of the original component B (rehabilitation of hydro-meteorological system), and reallocation of funds allotted for this component among the other three remaining components, mainly for Component A (rehabilitation of irrigation schemes). The reasons for dropping Component B were given as (i) protracted delays in procurement; (ii) overly ambitious design of the component to the then existing capacity in MEW and prevailing conditions in Afghanistan; and (iii) shortage of funds for emergency rehabilitation works, which were the highest priority of the government. At this restructuring, the targets for Component A were revised from 1100 small, 160 medium and 20 large schemes to 750 medium and lesser and 10 large schemes.

17. The original project cost estimate was approximately US\$ 75 million. It was expected to be financed by an IDA Credit of US\$ 40 million and an ARTF (Afghanistan Reconstruction Trust Fund) Grant of US\$ 35 million. IDA provided the US\$ 40 million Credit through Cr. 3845-AF but the ARTF grant financing was not made available. An additional financing of US\$ 25 million in the form of an IDA Grant was approved in April 2007 to cover the full scope of the project and the Credit closing date was extended by one year to September 30, 2008. At this time, considering the importance of hydro-meteorological data for the development and management of water resources in Afghanistan, the hydro-meteorological component (which was dropped in the restructuring exercise of 2006), was reinstated in the project as Component D with a simplified design suitable for Afghanistan's security conditions and skill levels.

18. Given the substantial requirements for rehabilitation of irrigation schemes and the reported satisfactory performance of EIRP, a second additional financing was approved in the amount of US\$ 28 million in June 2008 with an extension of Credit/Grant closing date by another two and a half years to March 31, 2011. The PDO, components, arrangements for implementation, procurement, financial management and disbursements remained unchanged except for an increase in the targets for medium and lesser as well as large schemes under Component A.

19. In 2007, when the Government requested additional financing, it had envisaged a program for about US\$ 50 million. Since funds were not available only US\$ 28 million could be provided. However, in 2009, another IDA Grant for US\$ 33.5 million was approved to scale up activities considering the additional financing as the fastest means of project processing in order not to lose the momentum generated under EIRP while a subsequent follow-on project preparation was getting under way. The PDO, components, arrangements for implementation, procurement, financial management and disbursements as well as the Credit closing date remained unchanged. The increase in scope of activities under Components A, C and D were as described in paragraph 17 above.

20. In 2011, the Credit closing date was extended to December 31, 2011 to allow more time for completion of rehabilitation work on already awarded contracts that were delayed among other reasons due to security issues.

## **2. Key Factors Affecting Implementation and Outcomes**

### **2.1 Project Preparation, Design and Quality at Entry**

21. This project was originally approved for a three year period as an emergency project to assist the then Transitional Government of Afghanistan to immediately address issues related to dilapidated irrigation infrastructure and to initiate much needed capacity building in the country. The project objective as defined originally focusing on providing reliable and equitable water supply to the beneficiary farmers through rehabilitation of dilapidated irrigation infrastructure was sound and appropriate for the country's circumstances and immediate development needs. The project was based on a sound analysis of the situation regarding irrigation infrastructure and the need to rehabilitate the hydro-met system which was functioning well until 1980 until destroyed by years of conflict and neglect. Since the irrigation schemes numbering in thousands were to be rehabilitated, the project design clearly specified selection criteria for each scheme, including the requirement for beneficiary participation and contribution. Issues related to mine risks and negative attributes were also discussed and the ways to handle these were clearly laid out. Detailed social and environmental framework templates were developed for use by the designers. The preparation team also wrote detailed terms of reference for the technical assistance needed in each discipline for the successful implementation of the project.

22. **Assessment of Project Design:** The project components cover the requirements of the project development objective. They allowed for immediate rehabilitation of schemes, preparation of feasibility studies for large-scale investments which would take some time to materialize, re-establishment of the hydro-met service together with replacement of existing non-functioning hydrological stations with modern up-to-date gauges and allocation of resources to build the capacity of the Ministry. Since Afghanistan had a well-functioning hydrological network, no detailed network design was necessary and the preparation team wisely adopted the locations of the existing stations to replace them with modern stations using technologies available in 2003. Recognition of the importance of reliable up-to-date hydrological information was one of the strong features of preparation. The rehabilitation of irrigation infrastructure was based on community requests for immediate assistance and was focused on specific repairs in existing traditional irrigation systems. Recognizing the post-conflict situation and the reluctance of internationally recognized firms to work in the country at that time, the Bank and the Borrower opted to sole source the specialized agency of the United Nations, the Food and Agriculture Organization (FAO) to provide the requisite technical assistance. The contribution from the technical assistance team was the key factor in the successful implementation of component A. In the execution of other components this arrangement has worked reasonably well although the technical assistance services provided in these areas could have been better as discussed in later sections.

23. **Government Commitment:** The transitional government in place at the time of project approval as well as the government that followed fully supported the project concept and the design. There were, however, some weaknesses during implementation, particularly with respect to the rehabilitation of hydro-met stations and establishment of hydrological services of Afghanistan.

24. **Risks identified at appraisal:** The likely risks identified at approval were related to (i) weak institutional capacity; (ii) security situation in the country; (iii) land mines; (iv)

misallocation, misuse or inefficient use of funds; and (v) riparian issues. These risks did indeed materialize and the ones related to riparian issues was handled through rehabilitation of existing infrastructure in line with Bank policies, and the risk related to misuse or misallocation of funds was handled through close monitoring by the international financial management specialist of the technical assistance team. Schemes were rehabilitated only in the areas cleared and approved by the UN mine clearance force. The other two risks did have an adverse impact on project implementation and monitoring and evaluation activities. These risks could not be avoided and it was correct to proceed with the investment recognizing the existence of these risks.

25. The quality at entry was not measured by the Quality Assurance Group but the ICR mission rates the Quality at Entry (QAE) based on the above review summary as Satisfactory.

26. Additional Financing was provided in three tranches. The first tranche was to replace the ARTF grant which was not forthcoming and was approved in March 2007 and the mission is of the view that it was correct to proceed with the emergency approach for rehabilitation of infrastructure. However, the subsequent tranches approved in June 2008 and May 2009 should have taken a more holistic view of rehabilitation and switched from emergency operation to a development operation. Since these were done during implementation, the above rating for QAE does not cover these additional tranches.

## 2.2 Implementation

27. **Factors outside the control of Government and the Implementing Agency:** When the project was approved, the overall security situation in the country was improving and was expected to stabilize. However, during the implementation period the security situation worsened which resulted in implementation delays and limitation of access to project sites. In spite of this, the project has managed to achieve most of its revised (increase from 280,000 ha to 571,000 ha through three tranches of additional financing) targets in irrigation rehabilitation.

28. **Factors generally subject to implementing agency control:** Staffing of the Ministry was under the control of the Government. The Ministry did experience difficulty in attracting and then sustaining well-qualified staff due to the dearth of such persons in Afghanistan. However, the ICR mission has concluded that the Ministry management could have paid much greater attention and should have taken required actions in (i) employing staff and encouraging the establishment of an independent Monitoring and Evaluation Unit as required by the project; and (ii) developing a hydro-meteorological service which would be the backbone of further water resources developments in the country. There were also delays in procurement of civil works and goods due to lack of adequate well-qualified staff which could have been trained by the project technical assistance program. Similarly the Ministry did not provide qualified full-time staff to be trained in financial management aspects by the international financial management specialist of the technical assistance provider.

29. **The Project Co-ordination Unit (PCU)** was established under this investment to manage and implement the project with support from the technical assistance team provided through the Food and Agriculture Organization (FAO) of the United Nations. As such they were learning project management and implementation in the initial stages of the project. The staff of PCU, both in the central office in Kabul and the regional offices in Kabul, Bamiyan, Kandahar, Herat, Mazar, Kunduz and Jalalbad have learnt substantially from this investment. However, the PCU could have strongly requested the technical assistance provider to provide world class training as envisaged in the third tranche of additional financing to improve their technical knowledge in the preparation of rehabilitation plans and designs as well as financial management and procurement skills. There were procurement delays even in the last three years of the project

which could have been avoided. Similarly, the hydro-met component could have been better handled by the PCU ensuring collaboration with the Water Management Department. In these areas, improvements have happened at the closing time of the project.

30. **Implementation Efficiency:** The rehabilitation of irrigation infrastructure has been carried out reasonably efficiently. This component has been a priority of the Government. There are some areas with respect to technical aspects of the designs, procurement and contract management which could have been done better and more efficiently. The rehabilitation of hydro-meteorological network and associated hydrological services of Afghanistan was not carried out efficiently. The mission attributes this to lack of serious commitment on the part of the Ministry and lack of cooperation between PCU and WMD. Similarly capacity building efforts have not been up to the mark due to deficiencies in the technical assistance provider as well as lack of due diligence from the Ministry. The technical assistance team could have relied much more on the technical expertise available at its headquarters in Rome, particularly for remote sensing and GIS applications in irrigation infrastructure rehabilitation and monitoring and evaluation efforts. It could have also derived much more technical support from its regional office in Bangkok.

31. **Implementation Delays:** There were delays at the start-up of the project. A major factor affecting implementation throughout the project period has been the generally unfavorable operating environment in the country. This resulted in the inability of the technical assistance provider to attract and retain well-qualified subject matter specialists in some disciplines and the inability of MEW to effectively mobilize national staff. In the early years of project implementation, project proposals were prepared by the technical assistance team. When this responsibility was gradually shifted to national staff as required in the project design, the rate and quality of project proposals preparation suffered. In addition, there were delays in procurement due to misunderstanding of Bank procurement guidelines by both the Borrower and the Contractors and lack of capacity for contract management in the PCU as well as the technical assistance team. Hence rehabilitation of some of the larger schemes was delayed. The rehabilitation of even the simplified hydro-meteorological network has been substantially delayed and only 54% of the works have been completed at the time of Credit/Grant closing.

### **2.3 Monitoring and Evaluation (M&E) Design, Implementation and Utilization**

32. **Design:** A detailed monitoring and evaluation framework was outlined in the Technical Annex (Appendix 10) which is the parent document for the entire investment. A project monitoring and evaluation system is provided in Table 2 of the Technical Annex. This captures well the parameters to be measured to evaluate achievements against each component leading to an evaluation of the achievement of the PDO. The design also incorporated a detailed terms of reference for a monitoring and evaluation consultancy. A consulting firm or independent organization was to be recruited to carry out monitoring and evaluation of project impacts. The main objectives were to evaluate the success in meeting the project objectives, and to assess its physical, agricultural, social, financial/fiscal, and economic impact. The M&E framework provided for independent and continuous feedback to the implementing entities on the project's performance and the impact of its various components so that corrective action or fine tuning could be undertaken in a timely manner.

33. An international consulting firm was recruited to carry out the M&E activities in 2006 after substantial delays. The firm worked through 2007 and set up a foundation and baseline for M&E activities in the Ministry. At the end of 2007, the contract was terminated and an individual international expert was recruited by the Ministry to continue the M&E activities. An organization chart with job descriptions was prepared at this time but was not followed up

properly by MEW and an inadequate unit was set up. The M&E functions specific to the project were then assigned to the technical assistance team.

34. **Implementation:** From 2008 until Credit/Grant closure, the international M&E specialist of the technical assistance team located full-time in Kabul worked together with national staff on monitoring and evaluation. Since the revised key performance indicators after the restructuring exercise in 2006 were restricted to increase in irrigated area and agricultural productivity, the M&E focused on these aspects by conducting field surveys at the end of each crop season. M&E surveys and analyses covered Component A only and the outputs/outcomes of the other three components were either not covered or not covered systematically. Given the insecure operating environment in the country the M&E implementation could have benefitted substantially with the use of advanced technologies available.

35. **Utilization:** The M&E results were to be used in adjusting the implementation of the project and also to fill in data gaps identified during the monitoring. The mission held detailed discussions with the International M&E specialist as well as project management and based on the information derived from these discussions has concluded that M&E results were not utilized in implementation course correction as required. Hence the project implementation did not learn from the M&E activities and in turn did not guide further M&E activities.

36. Overall, the M&E performance of the project is rated as moderately unsatisfactory

#### **2.4 Safeguard and Fiduciary Compliance**

37. The project had a “B” environment category and “S2” safeguards classification. No significant adverse environmental or social impacts occur during the project life. The project has followed the guidelines of ESMF developed in the Technical Annex in 2003, and applied for both social and environmental screening of subprojects in the planning/design and implementation stages. Furthermore, EMPs for larger schemes were developed and shared with the Bank. Following the social and environmental screening, limited environmental and social assessments were carried out for some medium irrigation schemes which were anticipated to have some limited adverse impact. Regarding land requirements, government land has been used for building meteorological stations, offices for the provincial WMDs as well as establishment of nursery for Nahr-e-Lashkari canal green belt. Where small strips of land along the right of way of canals and rivers were required for hydrological stations, these were contributed by community or through individual voluntary donation. Such practices are very common in Afghanistan and socially accepted when impact is insignificant; however documentation of procedures followed have not been done consistently. In one case only, construction work on sub-project was stopped following a complaint from an individual land owner: construction of Panjsher Water Management Department office building was dropped when MEW was unable to find a solution satisfactory to the private owner of the land in question.

38. During project implementation a safeguard focal point was placed within M&E unit to oversee the implementation of ESMF. The project has provided training on ESMF to relevant staff and project engineers from different regions who were also assigned to work with an international consultant in developing Limited Environmental Assessments (LEAs). Hence some capacity building of MEW/PCU on social and environmental safeguard related to irrigation rehabilitation and development has taken place.

39. Since most of the rivers in Afghanistan, on which the sub-projects supported under the project were located, are international waterways Bank’s policy OP 7.50 was triggered. However, the sub-projects were emergency rehabilitation of existing infrastructure which did not involve

works and activities that would exceed the original scheme, change its nature, or so alter or expand its scope and extent making it appear a new or different scheme. The task team had determined that the rehabilitation works did not adversely change the quantity and quality of water flowing to the other riparians and were also not affected adversely by the other riparians' water use. Accordingly as provided for under OP 7.50 paragraph 7, a waiver was sought from the notification requirements and was approved by the Regional Vice President.

40. Overall, the safeguard performance of the project is rated as moderately satisfactory.

### **Procurement**

41. The project was implemented by the technical assistance of FAO. FAO provided a competent international procurement specialist (IPS) throughout the project implementation. Besides input from IPS there were national procurement officers working in the FAO/PCU team as well. The National officers were working under the guidance of the IPS. The IPS was able to develop the capacity of procurement staff in MEW to a limited extent.

42. During project implementation there were certain contract packages which were handled in the regional offices and due to weak capacity in the regional offices there were several deviations found during Post Procurement Review (PPR).

43. Delay in approval of the TOR, technical specification, bill of quantities was another issue which impacted negatively on the procurement process throughout implementation.

44. The project had problems also due to poor contract management. Majority of the contracts were not completed within initial implementation period and there were considerable delays in the contract implementation. The lack of capacity in contract management resulted also in the PCU requesting IDA for no objection of contract extensions on post- facto basis.

45. There were certain issues on the technical quality of the procurement process. For instance the client prepared an unrealistic BOQ for Nahir Lashkari Large scheme and the contractor did the construction work beyond the BOQ and due to inadequate supervision by the project staff/technical assistance provider there was considerable variation and the project had to request the Bank for no objection on post-facto basis.

46. Another procurement issue was related to the rehabilitation of WAPICA building. The project team issued bidding document without proper design and BOQ which resulted in huge contract amendment.

47. Overall, the procurement performance of the project is rated as moderately satisfactory.

### **Financial Management**

48. The project which comprised IDA 3845, H284, H398 and H498 operated under the steadily improving Project Financial Management reforms under implementation by the Government of Afghanistan with the World Bank assistance. Under these reforms proper records of grants received and disbursements through the special accounts were maintained by the Ministry of Finance, Special Disbursement Unit (SDU) which was initially manual and later migrated to Afghanistan Financial Management Information System (AFMIS). The funds flow to the project was timely.

49. Proper records of eligible expenditure for various components and activities were maintained by the implementing agency – Ministry of Energy and Water through a dedicated project coordination unit (PCU). The internal controls were adequate and the project introduced internal audit towards the end of the project. The internal audit arrangements will roll over to all MEW implemented projects. Regular IUFRRs in the agreed format were submitted during the life of the project.

50. Annual audited financial statements were submitted regularly though there were some delays in the initial years. The audit opinion of the Control and Audit Office of Afghanistan was qualified for the initial three years but thereafter the audit opinion was unqualified (clean). Audit observations were promptly resolved.

51. The financial management capacity strengthened during the course of the implementation of the project. The Bank's FM unit participated in all supervision missions and provided guidance and hand holding support to strengthen the FM arrangements. The project closed with a 'Satisfactory' FM supervision rating.

52. The project's FM performance is Satisfactory.

## **2.5 Post-completion Operation/Next Phase**

53. A follow-on operation titled Irrigation Restoration and Development Project (IRDP) has been approved by the Board and is currently under way. The IRDP with an estimated cost of about US\$ 148.7 million became effective on 15 June 2011. The project duration is about 6.5 years. IDA would finance about US\$ 97.8 million and the remaining amount would be covered by ARTF (US\$ 48.4 million) and Government of Afghanistan (US\$ 2.5 million). IRDP follows in general the approach of the EIRP but with an addition of a small dams component. There would be continued technical and managerial support to the PCU by the EIRP technical assistance team which has been asked to continue with the assignment. If the implementation lessons learned and reported in this ICR are followed, the sustainability of investments made in capacity building is likely. In the follow-on project, training should continue to be provided to the community organizations and the Mirabs of schemes rehabilitated under the EIRP as well. Given that several of the rehabilitation interventions are on streams with substantial bedloads, the operation and maintenance of structures built across or on the banks of these streams would require further technical and financial assistance to be provided to the communities to ensure sustainability. The mission found that some of the structures rehabilitated under the project were already damaged by flood flows carrying significant bed and suspended loads. Other smaller structures would be maintained by the communities themselves, particularly due to satisfactory training provided to them in operations and maintenance by the project. The mission is optimistic that the communities have the ability to operate and maintain the smaller structures.

54. The sustainability of the interventions also depends upon the capacity of the staff of the Water Management Department (WMD) of the Ministry of Energy and Water (MEW) both at the central and regional levels. Since EIRP has not involved these officers in the rehabilitation program, this would require training of these officers in the follow-on project. MEW should continue to maintain adequate skilled staff strength in the WMD offices and provide them with adequate resources such as computers and accessories, vehicles, allowances etc. (which could be reimbursed on a declining scale through the IRDP).

55. The build-up of institutional capacity, both in the MEW and the PCU would continue under the IRDP as specific substantial provisions have been made in that project. The Bank has made the correct decision to proceed with the follow-on project without gaps, as this would help in maintaining the momentum currently being generated in capacity building of staff.

56. Many of the problems encountered in the implementation of the hydro-met component in EIRP such as (i) the role of the PCU in the procurement and installation of gauging stations; (ii) role of WMD in taking over responsibility of operation and maintenance of these stations; and (iii) operationalization of the hydro-met services are being sorted out in the follow-on IRDP. MEW is now aware of the importance of vetted hydrological and meteorological data in the preparation of new water resources developments. The Bank-supported AWARD project has also brought out the requirements of good hydrological analyses in the preparation of a Bankable investment portfolio. These aspects should be nurtured and fully developed in the follow-on IRDP.

### **3. Assessment of Outcomes**

#### **3.1 Relevance of Objectives, Design and Implementation**

57. The objectives, design and implementation are just as relevant to current country and global priorities and Bank assistance strategy as they were at appraisal. The overall rationale of supporting investments in improving irrigated agriculture is in line with the strategy articulated in the National Development Framework of 2002 as well as the Afghanistan National Development Strategy (ANDS) developed in 2008. The development and management of water resources has been accorded high priority in the ANDS. Given these the ICR mission assessment is the operation is highly relevant to the needs and priorities of the sector. The design of the project was in line with these highly relevant objectives and the implementation arrangements were also consistent with the design.

#### **3.2 Achievement of Project Development Objectives:**

58. The achievement of project development objective has been assessed by the ICR mission using the key performance indicators provided in the Technical Annex of the original Credit.

59. Irrigation Rehabilitation: The final targets set after the third additional financing in May 2009 for rehabilitation of 863 medium and lesser schemes and 22 large schemes were almost met with some delays. 710 medium and lesser schemes and 19 large schemes have been completed. About 38 schemes had to be abandoned during construction due primarily to substantial security issues such as killing or kidnapping of project and contractor staff by insurgents. There has been an increase in the net irrigated area by about 25%. About 910,000 households, distributed in all the 34 provinces of the country, have benefitted from the irrigation rehabilitation investments. In terms of area covered under the project against a target of about 716,050 ha already an area of about 802,619 ha (112% against the target) has been covered which is a phenomenal achievement. The provision of more reliable water supplies through construction of permanent intake structures and resilient wash structures to handle the flood flows coming from the steep hills is contributing to increases in irrigation area (i.e. areas that were once irrigated but were abandoned or curtailed due to frequent collapses of either intake or wash structures). The rehabilitation has instilled confidence in the farmers and higher agricultural productivity has been reported by M&E specialists. More detailed description of the outputs from this rehabilitation component is

provided in Annex 2. Given the operating environment, the achievement under this component can therefore be termed as highly satisfactory.

60. **Feasibility Study:** The target for carrying out feasibility studies for large scale water resources development was narrowed down to one specific study during the 2006 restructuring due to non-availability of funds. This feasibility study for the potential Lower Kokcha Irrigation and Hydropower Development has been completed satisfactorily.

61. **Hydro-Meteorological Network:** However, the project development objective was also to be achieved through restoring and modernizing the hydro-meteorological network and through building capacity in the public sector institutions and community organizations. Establishment and operationalizing the hydrological services of Afghanistan together with the installation of the hydro-met network has not happened yet although some efforts are under way to rectify this situation in IRDP. Out of the 174 stations to be installed only 105 stations were installed after substantial delays. Data from these stations is not being collected and analyzed in an appropriate manner. Only recently, the Ministry has started paying attention to this extremely important component. The performance of this component was highly unsatisfactory.

62. **Capacity Building:** While certain amount of capacity building in the relevant institutions in Government as well as communities has been achieved, further work is still required to bring the staff of the MEW to a stage where they can begin to plan and design restoration and development of irrigation infrastructure without continuous support. This deficiency in capacity building is borne out by the fact that the follow-on IRDP has employed the EIRP technical assistance team as their technical assistance and implementation support consultants in substantially same disciplines for the entire duration of the project again. The performance of this component was moderately unsatisfactory.

63. In the context of the above ratings, based on the weighted average of the disbursement made under each component, the overall achievement of PDO is rated as satisfactory.

### 3.3 Efficiency

64. Similar to the analysis carried out at appraisal, the ICR analysis also estimated economic returns (EIRRs) by region. A summary table comparing IRRs developed at various stages is given below. The result of economic analysis reveals estimated EIRRs ranging from 21.6% to 34.7% with an overall EIRR as 25.8%. Although, no financial analysis was carried out at appraisal, it has been estimated at ICR. Results of financial analysis show FIRRs ranging from 20.8% to 31.8% with overall FIRR as 23.5%. NPV in economic terms is estimated as US\$ 197.5 million and overall BC ratio comes to 1.98:1 at 12% discount rate. NPV in financial terms is estimated as US\$ 161.8 million and overall BC ratio comes to 1.75:1 at 12% discount rate. Incremental irrigated area generated additional benefits of \$ 341 per ha per annum due to the project investments in the rehabilitated irrigation schemes. Average farm size is 0.6 ha in the EIRP command areas and average family size in rural Afghanistan is six adult units<sup>1</sup>. As such, a farm

---

<sup>1</sup> The National Risk and Vulnerability Assessment 2005, Ministry of Rural Rehabilitation and Development and the Central Statistics Office, Kabul, June.2007.

household will get increase in income by about US\$ 204, whereas, per capita income in the project beneficiary household will increase by about US\$ 51 per annum. The project will generate about 4.3 million additional person days as farm labor. Efficiency has therefore been rated as Satisfactory. Annex 3 provides more details.

Economic Analysis Undertaken at:	ERR (%)	Assumptions/ Data
Appraisal year 2003	Ranging between 17-46%; overall 31%	i) Increase in yield by 30%-75% depending upon farm size) ii) 20% increase in irrigated area. iii) Increase in intensity  iii)Wheat was taken as proxy for estimating benefits.
December 2006 (Additional Funding) Based on data of 27 completed subprojects in four out of the six regions of the project.	ERR for: 17 Schemes > 28%; One Scheme = 15% 9 Schemes < 12%	i) Wheat yield increased between 4%-54% ii) Increase in Irrigated area by 9%-33%
December 2008 (Additional Funding) Based on the data of 19 completed schemes in 5 Regions.	ERRs 6 Schemes >20%; 5 Schemes > 12%; and the remaining 8 Schemes <12%	i) increase of 10% to 32% in the irrigated area  ii) increase in cropping intensity of 10% to 33%;
Project ICR March 2012 Based on total project costs incurred actually and benefits taken from the data collected by M&E Team of the project.	EIRRs by Regions ranging from 21.6% to 34.7% with an overall EIRR as 25.8%  Financial analysis was also undertaken with FIRR as 23.5%	i) Increase in intensity; wheat 3%-17% Maize 5%-38%; and Vegetables 17%-75%  ii) Increase in irrigated area as 25.8%. iii) Increase in yield; wheat 30%-41% Maize 21%-36%; and Vegetables 40%-75% iv) All the four crops were considered for the financial and economic analysis.

### 3.4 Justification of Overall Outcome Rating

65. Since the relevance is High, the achievement of the PDO is overall satisfactory and the efficiency is rated as satisfactory, the overall outcome rating is Satisfactory.

### 3.5 Overarching Themes, Other Outcomes and Impacts

66. **Poverty Impact:** According to annual impact assessment reports farmers (landowners and sharecroppers), Mirabs and elders confirm substantive increases both in crop yield and cultivated land across all regions as a result of the project. It has been estimated by the ICR economist that annual production of wheat will increase by about 680,700 tons, maize by 104,000 tons and vegetables by about 1023,000 tons at full development. As such the additional production of crops (wheat, maize and vegetables) from the benefited area is estimated at about 77% (more than the WOP production). It will improve the food security of the beneficiary farm households in the project area. The project has enabled some crop diversification with increasing emphasis placed on vegetable production (onions, tomatoes and carrots), which has meant more nutritious food available within the household, more money available to purchase goods for the household. Farmers have reported a significant increase in the value of their land holdings following completion of the project. They attributed this to enhanced water availability and the general scarcity of irrigated land. There was little evidence of land exchanging hands within villages with the exception of returnees from Iran and/or Pakistan who had reclaimed their land. However, farmers in several of the projects have pointed to problems of limited technical advice available from extension agents, the high cost of inputs such as fertilizer and difficulties in selling some crops at local markets.

67. **Gender Aspects:** Irrigation management is an almost exclusive preserve of men and initial consultations on EIRP sub projects were with male village elders only. Despite playing a key role in many aspects of agriculture women do not seem to have been either directly informed/consulted at the design stage of EIRP projects or involved in subsequent stages of project development. However, it is important to note that project benefits are shared with all members of households, including women.

68. **Social Development:** Interventions under EIRP have strengthened the traditional Mirab system through establishment of water user associations involving more community elders, CDCs and other stakeholders during decision making process. EIRP has strengthened cooperation and coordination between MEW, MAIL and FAO regarding protection and management of water resources as well as building the capacity of water user associations. The Mirabs as well as farmers of the irrigation schemes rehabilitated under the project have received extensive training in the operation and management of their schemes. Thus the Mirab system already functioning in these schemes has been strengthened.

69. The annual impact assessment also noted general agreement following rehabilitation of structures, that, the distribution of water between upstream and downstream users had been satisfactory. This assessment also found that respondents farming in the tail end of schemes reported that equitable sharing had substantially increased. Availability of water was reported to have improved after the rehabilitation work in some of the EIRP projects and as a result previous conflicts were said to have been eliminated.

#### **4. Assessment of Risk to Development Outcome**

70. The major risk to development outcome is the external environment. The International Security Assistance Force (ISAF) is scheduled to leave the country by 2014 and the security of the country would be transferred to the Government of Afghanistan. If there is any substantial impact on the governance of the country then the institutional components related to restarting the hydro-meteorological service and building capacity within the MEW to undertake irrigation infrastructure rehabilitation would suffer. In an unstable governance environment, trained personnel would leave the country thus creating a shortage of talent in the country again. The risk of this happening is rated as substantial.

71. In terms of the infrastructure already rehabilitated, the risk of it not being maintained and operated properly is rated as low in the medium and lesser schemes since the farmers have been involved in the rehabilitation from the time of project planning to completion of rehabilitation works including providing 10% contribution to cover the costs of rehabilitation. The ownership from the communities is high. In addition to ownership, they have also received substantial training in operations and maintenance. The schemes where larger structures have been built may have maintenance problems since the local communities may not have the capacity and resources to maintain them at present. The risk of deterioration of some of these structures built across or on the banks of streams carrying large bedloads and substantial floods is rated as high. The provincial WMDs would have to take a lead role in either directly maintaining or in assisting the communities to maintain these structures. Since the follow-on project is already approved, the risks associated would be mitigated through further capacity building of the WMD as well as the communities.

72. Overall the risk to development outcome is rated as Substantial.

#### **5. Assessment of Bank and Borrower Performance**

##### **5.1 Bank Performance**

73. **Bank Performance in Ensuring Quality at Entry at original project approval in 2004:** The project was initiated soon after formal hostilities ended and a Transitional government in place. The Bank along with other donors was involved in providing immediate short-term assistance to get the country moving. In that respect the EIRP designed as a three-year investment was appropriate. The Bank team did a thorough analysis of the situation and identified specific components that were in line with the interim development strategy of both the Government and the Bank. The need for immediate rehabilitation of a large number of small and medium schemes together with a limited number of large schemes to get the rural economy moving was recognized and financing was provided through Component A. A flexible but monitorable framework was developed for selection of schemes to be rehabilitated with community participation and social and environmental safeguards. The most significant feature is that the whole of Afghanistan was covered under this project unlike investments made by other donors which targeted secure areas of the country. The country had just emerged from war and civil strife and there was almost no capacity in the Government to undertake the studies, designs and irrigation infrastructure rehabilitation work. A solid capacity building program was built in with the technical support to be provided by FAO. The rehabilitation and new development of the irrigation infrastructure needed reliable hydrological and other climate data and since the entire hydro-meteorological network was damaged, financing was provided for rehabilitating and modernizing this network

taking advantage of recent developments in the world. As such the mission considers the quality at entry in 2004 as Satisfactory.

74. However, the design of additional financing efforts in 2008 and 2009 followed the same approach which was not quite appropriate. The original design was for emergency rehabilitation. Both TSS and ISN of April 2006 anticipated more rapid transition from emergency post conflict status to a more normalized situation and began the transition from a short-run emergency orientation to a longer term development orientation. Progressively, the approach should have been modified to use normal rehabilitation and modernization procedures such as holistic treatment of a scheme, adequate planning of rehabilitation measures and relaxing the cap on investments to reflect actual rehabilitation needs of the system. The additional financing modality was used to maintain the momentum generated in the project but there should have been a balanced approach. Considering these factors, the mission judges the quality at additional financing as Moderately Satisfactory.

75. **Quality of Supervision:** In the initial stage, the project was managed from Washington. After one year, the Bank decided correctly to move the task management responsibility to Kabul which resulted in regular supervision and follow-up. The task leadership had good continuity in that only two task leaders covered the entire period from 2006 to 2011. The deteriorating security environment in the country made it almost impossible for the supervision team to visit various sites after 2007. Prior to 2007 supervision missions undertook field visits and after 2007 the performance of rehabilitated schemes was ascertained mostly through secondary data. In the last few years of the project, the task team started using innovative techniques using GPS-enabled cameras which were a marked improvement. In 2010 after the Bank strengthened security by deploying the close protection guards, the team was able to undertake more field visits. These and other support provided by the task team enabled the component related to irrigation rehabilitation to be carried out successfully with some deficiencies in supervision of quality control of civil works in the latter years. Bank oversight of the outputs of the technical assistance team with regard to rehabilitation designs pertaining to Large Irrigation Schemes, implementation scheduling and contract management could have been better. Some of these deficiencies are being corrected in the follow-on IRDP where the Bank team has ensured that a contract management specialist and an experienced design engineer are added to the technical assistance team. Overall, the task team did an excellent job supervising this important component and was even recognized by an award from the Bank management.

76. However, the supervision and implementation support provided for the other three components of the project had moderate shortcomings. The task team employed experts to review bid documents and specifications for cableways as well as an expert to review the specifications for snow gauging stations and telemetry. However, limited oversight was provided for the non-performing aspects related to re-establishment of the hydrological services of Afghanistan. This resulted in the non-achievement of the key PDO indicators associated with this component. Even though the hydro-met component was performing unsatisfactorily, there was no hydrologist or instrumentation specialist in any of the implementation support missions. Similarly even though there were Bank M&E specialists in some of the implementation support missions, the outputs from the M&E team of the technical assistance provider had some shortcomings. Bank oversight of the M&E work of the technical assistance provider could have been more focused. Given this mixed performance, the quality of supervision averaged over components and over the implementation period of eight years is rated as Moderately Satisfactory.

77. **Justification of Rating for Overall Bank Performance:** Given the above, taking into account the two ratings the overall Bank performance is rated as Moderately Satisfactory in accordance with ICR guidelines.

## 5.2 Borrower Performance

78. **Government Performance:** The government commitment and ownership for the project was good throughout the project. They generally ensured smooth implementation of this project in terms of allotment of funds. However, there were procurement delays from the actions of the Special Procurement Unit. Overall the Government performance was moderately satisfactory.

79. **Implementing Agency Performance:** The Ministry of Energy and Water which is the primary implementing agency had full commitment towards the irrigation infrastructure rehabilitation component and their performance was satisfactory. However, the MEW ownership of the hydro-meteorological component which is essential for the future long-term development of irrigation and hydropower was less than satisfactory. The Water Management Department of MEW did not take the required actions to establish and build upon the hydrological service and it did not participate to the extent required in the reinstallation of the hydro-met stations. The Ministry also did not set up and equip an independent M&E unit as required by the project and this function was transferred to the technical assistance team after substantial delay. In these respects the MEW performance was less than satisfactory. Officially the implementing responsibility rested with the PCU with support from the technical assistance provided. However, the technical and managerial capacity of the PCU was non-existent in the early years of project implementation and the technical assistance provider gradually became *de facto* the implementer as well. Hence the discussion in the following paragraph refers both to the PCU and the technical assistance consultants.

80. **The PCU**, both at the Center and at the regional offices has built up good staff capacity with the assistance of the technical assistance team. At the time of Credit/Grant closure, they are in a position to prepare sub-project proposals according to the template provided by the consultants. However, the template provided has certain deficiencies with regard to command area surveys, hydrological analyses, and quality control during implementation. While the target numbers for the schemes have been met, the quality of the plans and designs and in some instances the quality of construction is less than satisfactory.

81. There were some delays and problems associated with procurement of civil works contracts and contract management. The procurement performance of the project has been rated as moderately satisfactory by the designated procurement specialist of the Bank.

82. Financial management of the project has been rated as moderately satisfactory by the designated financial management specialist of the Bank. However, as noted earlier, the financial management capacity has not been built within the PCU. The PCU/MEW did not assign a full-time financial management specialist to be trained with the result that the follow-on IRDP is fully dependent on the international financial management specialist of the technical assistance provider.

83. The PCU did not coordinate well with the WMD officers in the rehabilitation of hydro-meteorological services. They concentrated on establishing the stations but the sustainability of these stations was not addressed. This is of course both the PCU as well as the WMD responsibility.

84. Since the M&E effort was transferred to the technical assistance provider, the mission would like to comment on this aspect here. The M&E efforts were substantially delayed and got under way only in 2009. Since the revised key indicators only referred to the rehabilitation component, the M&E efforts were focused on this. The tools used could have been more modern and the results should have been used in improving the performance of the PCU and the technical assistance team. Given that a number of schemes were rehabilitated each year through the period 2007 to 2011, the project economics would have benefitted greatly if panel data had been assembled. Other aspects of the project appear to have been ignored in the monitoring and evaluation. Overall the monitoring and evaluation efforts were unsatisfactory.

85. Given this mixed performance, the mission rates the implementing agency performance as Moderately Satisfactory.

86. **Justification of Rating for Overall Borrower Performance:** Based on these two ratings, the overall Borrower performance is rated as Moderately Satisfactory.

## 6. Lessons Learned

### Lessons of general application:

87. **Technical Assistance Team:** In order to address the capacity, accountability and governance risks in a weak capacity and poor governance environment, the need for implementation support technical assistance should be carefully assessed, and the terms of reference for each individual expert should be clearly defined and agreed with implementing agency, and advance procurement action taken so that technical assistance teams can be mobilized by project approval.

88. **Emergency Operations:** In a post-conflict environment, emergency re-construction effort should target interventions that yield quick returns, with appropriate attention to putting in place basic building blocks to support transition from emergency recovery to regular reconstruction and development.

89. **Development Oriented Phase:** Emergency re-construction effort should be restricted to short-term investments that are required to assist the communities affected by conflicts so that they can concentrate on immediate needs. After the initial support, assistance should move gradually to a development oriented phase.

90. Investments related to **capacity building** are usually given a secondary role by the Borrowers facing emergencies. The Bank should be proactive in getting this capacity building exercise carried out successfully so that medium to long term developments can be carried out by national experts with specific targeted assistance from external experts.

91. Investments related to **developing knowledge base** such as hydrological information also get a secondary treatment from the Borrower. Proactive measures are required from the Bank to implement such components which are vital to meet the long-term development needs of the country.

### Project-specific lessons:

92. **Irrigation Project Criteria (\$/ha):** While establishing a norm of US\$/ha is reasonable to start an emergency operation, it would be good to relax this criterion based on actual

requirement of a system as the project moves from an emergency phase to a development phase. There were several instances in EIRP where a reasonable holistic technical solution could not be implemented due to this. In the follow-up IRDP this lesson should be reflected as implementation progresses.

93. **Monitoring and Evaluation:** While regular monitoring of physical and financial progress can and should be done by the implementing agency, monitoring and evaluation activities related to evaluation studies and impact assessment surveys should not be carried out by the institution responsible for the implementation. These should be independent activities which should be carried out by a third party through outsourcing or by an independent unit in the implementing Ministry.

94. **Use of advanced technologies:** In the extremely insecure environment in Afghanistan, where access to project sites is limited, innovative concepts such as the use of GPS-enabled cameras developed by the project should be further enhanced and used. In addition M&E activities must use information that can be obtained from analyses of satellite imageries.

95. **Twinning Arrangement:** A twinning arrangement with an operating hydro-meteorological service in other developed countries would benefit the hydro-met component. Similarly a twinning arrangement with an operational irrigation administration or well-run Government irrigation departments in countries with similar topographic and climatic conditions would provide support to implement rehabilitation projects in a capacity-constrained situation.

96. The department responsible for **hydrological services** in Afghanistan (WMD) should be completely involved in the implementation of the hydro-meteorological component including installation of gages. This was not the case in EIRP where the installation was done by the PCU and there was a lack of ownership from the WMD. The lack of ownership further contributed to unsatisfactory performance in retrieval and analysis of hydrological data. In the follow-up IRDP this lesson should be reflected as implementation progresses and the WMD should be made an important implementing partner together with the PCU.

## **7. Comments on Issues Raised by Borrower/Implementing Agencies**

No comments have been received from the Borrower.

## Annex 1. Project Costs and Financing

(a) Project Cost by Component (in USD Million equivalent) some of these numbers have to be revised.

Components	Appraisal Estimate (USD millions)	Actual/Latest Estimate (USD millions)	Percentage of Appraisal
IDA Cr. 3845 AF	40.00	38.35	95.86
Government of Afghanistan	35.00	7.47	21.33
Component A Rehabilitation of Irrigation Schemes	45.00	24.79	55.09
Component B Rehabilitation of Hydro-meteorological Network	8.50	0.20	2.35
Component C Preparation of Feasibility Studies and Monitoring	5.00	3.85	77.02
Component D Institutional Development	16.50	16.98	102.88
IDA Grant I H2840 <sup>2</sup> (2007)	25.00	24.87	99.46
Component A Rehabilitation of Irrigation Schemes	20.00	19.91	99.57
Component B Rehabilitation of Hydro-meteorological Network	5.00	4.95	99.06
Component C Preparation of Feasibility Studies and Monitoring	-	-	-
Component D Institutional Development	-	-	-
IDA Grant II H3980 (2008)	28.00	25.44	90.86
Component A Rehabilitation of Irrigation Schemes	7.10	7.44	104.8

### (b) Financing

Source of Funds	Type of Cofinancing	Appraisal Estimate (USD millions)	Actual/Latest Estimate (USD millions)	Percentage of Appraisal
Borrower		8.0	8.0	100
International Development Association (IDA)		40.0	134.5 <sup>3</sup>	

<sup>2</sup> The original project cost estimate at appraisal was US\$75 million. It was expected to be financed from IDA (US\$ 40 million Credit) and Afghanistan Reconstruction Trust Fund (US\$35 million Grant). IDA provided US\$40 million in the form of a Credit, but ARTF grant financing was not made available. The first additional financing of US\$25 million was in the form of an IDA grant which was required to cover the full scope of the project.

<sup>3</sup> In addition to the US\$ 40 million provided at appraisal, IDA provided three subsequent Grants (US\$ 25 million, US\$ 28 million, and US\$ 33.5 million) totaling US\$ 134.5 million at closure. See (a) above for details.

## **Annex 2. Outputs by Component**

### Component A: Rehabilitation of Irrigation Schemes

1. Component A is designed to restore irrigated agricultural production in rural areas, through improved and reliable water supply to rehabilitated traditional irrigation schemes – the major EIRP component that contributes to the project development objective. This component was revised to include additional schemes in each of the additional financing.

2. Overall about 728 schemes (medium and large) have been rehabilitated covering about 802,619 ha. Incremental area brought under irrigation through this intervention is about 164,823 ha an increase of about 25% from pre-project situation. EIRP is reported to have benefited about 910,000 farming households, across the 34 provinces. The targets and achievements in each of the financing changes are summarized in Table 1 below and discussed briefly in the subsequent paragraphs.

Table A2.1 Component A: Rehabilitation of Irrigation Schemes Dated: 31 Dec, 2011

S.No.	Type of Funding	Agreed Target					Completion / Achievement against Target						
		Number of Schemes	Rehabilitation Cost (\$ in M)	Command Area (ha)			Number of Schemes Awarded	Awarded Cost (\$ in M)	Number of Schemes Completed	Completion Cost (\$ in M)	Command Area (ha)		
				Before project	After Project	Incremental					Before project	After Project (expected)	Incremental
1	<b>IDA Credit/Grant-I and co-financing</b>												
	Small	1,100	10.0	110,000	137,500	27,500	426.0	11.36	406.0	10.93	296,010	346,692	50,682
	Medium	160	25.0	120,000	150,000	30,000	197.0	21.68	189.0	20.92	173,684	219,523	45,839
	Large	20	15.0	50,000	62,500	12,500	10.0	13.72	9.5	12.14	66,100	100,000	33,900
	Sub-Total	1280 *	50.0	280,000 **	350,000 **	70,000 **	633.0	46.76	604.5	43.99	535,794	666,215	130,421
	revised target	760		390,050	470,050	80,000							
2	<b>Second IDA Grant</b>												
	Medium	28	3.6	64,270	96,700	32,430	28.0	3.57	23.0	3.02	20,115	23,534	3,419
	Large	4	3.5	25,730	35,300	9,570	3.0	4.76	1.0	2.76	2,000	7,000	5,000
	Sub-Total	32	7.1	90,000	132,000	42,000	31.0	8.33	24.0	5.78	22,115	30,534	8,419
	Total up to Grant-II			480,050	602,050	122,000							
3	<b>Third IDA Grant</b>												
	Medium	85	15.8	78,070	96,150	18,080	101.0	17.02	92.0	16.50	68,817	90,320	21,503
	Large	8	4.4	12,930	17,850	4,920	10.0	6.10	8.0	5.40	11,070	15,550	4,480
	Sub-Total	93	20.2	91,000	114,000	23,000	111.0	23.12	100.0	21.90	79,887	105,870	25,983
Grand Total		885	77.3	571,050	716,050	145,000	775.0	78.21	728.5	71.67	637,796	802,619	164,823

\* Based on the recommendations of the mid-term review in April 2006, the project was restructured in October 2006. It's PDO and outputs were revised. Component A Revised targets included:

Rehabilitation of 750 medium and lesser schemes, and 10 large schemes [the target for the key outcome indicator (incremental area brought under irrigation) was set at 80,000 ha]

\*\* In April, 2007 targets were revised upward with an estimated covered area of 390,050 ha to be increased to 470,050 ha including an incremental area of 80,000 ha.

\*\*\* In total 38.5 schemes (20 small schemes, 15 medium schemes and 3.5 large schemes) with an awarded cost of \$ 6.3 M are terminated. Pre-project covered area was 46,652 ha planned to increase to 66,347ha including an incremental area of 19,695 ha.

3. Depending on their size (in terms of area under irrigation), their water conveyance system (one or several canals supplied by one water source), and the estimated rehabilitation cost, the existing irrigation schemes were divided into three broad categories: small, medium and large. The rehabilitation of all irrigation schemes required engineering surveys and design. The final selection of all (small, medium and large) irrigation schemes for rehabilitation under the project, were designed to meet the appropriate scheme selection criteria agreed with the Government. In order to ensure sustainability of irrigation schemes, community water organizations or local water users' associations were actively involved in rehabilitation starting from the planning stage through completion of physical implementation. These organizations were also provided extensive training in operation and maintenance of the rehabilitated structures. Community ownership was also ensured through their paying 10% of each scheme rehabilitation cost. As indicated in the main text, the financing was given in different tranches. The targets and achievements for each tranche are given below.

#### Credit, Co-Finance & Grant-I Initial Target

4. A total of approximately 1,280 irrigation schemes covering 280,000 ha were proposed for rehabilitation under the project during the three year project period, including 1,100 small irrigation schemes covering 110,000 ha; 160 medium irrigation schemes covering 120,000 ha; and 20 large irrigation schemes covering 50,000 ha. Due to the expected increase in water use efficiency and/or water availability, it was expected that the irrigated area after rehabilitation would be about 25% larger than the irrigated area before rehabilitation, bringing the total irrigated area having benefited from the Project to an estimated 350,000 ha. Each scheme (sub-project) was identified, selected, promoted, appraised, approved, carried out and monitored in accordance with procedures and other provisions outlined in the Technical Annex with a total budget of USD 50 million allocated to the component.

#### Revised Target

5. Based on the recommendations of the mid-term review in April 2006, the project was restructured in October 2006. Revised target for Component A included; Rehabilitation of 750 medium and lesser size schemes, and 10 large schemes covering 390,050ha area which was expected to increase to 470,050ha after rehabilitation. The target for the key outcome indicator (incremental area brought under irrigation) was set at 80,000ha instead of initial 70,000ha with same budget of USD 50 million for rehabilitation.

#### Achievement

6. Against the target, the project has awarded 633 small, medium and large size schemes with an awarded cost of USD 46.76 million. From the awarded schemes 20 small, 08 medium and the second phase of a large size scheme Band-e-Sultan (BES) were terminated mainly due to security reason and to some extent due to non-performing contractors as well. In total 604 schemes and one phase of BES were completed with a rehabilitation cost of USD 43.99 million covering an area of 535,794ha which was increased to 666,215ha including an incremental area of 130,421ha.

#### Grant-II Target

7. In May, 2008 an additional grant of US\$ 7.1 million was provided with additional scope of work based on the good performance under this component. Additional target included rehabilitation of additional 28 medium / lesser and 4 large size scheme covering an additional area of 90,000ha which was expected to increase to 132,000ha including an incremental area of 42,000ha.

#### Achievement

8. Against the target, the project awarded 28 medium/lesser and 3 large size schemes with an estimated cost of USD 8.33 million. From the awarded schemes 4 medium and 1 large size schemes have been completed while 1 medium/lesser and 1 large size scheme are in advance stage of completion and will spill-over beyond the credit closing date to the follow-on project IRDP. Actual cost of the completed schemes under EIRP is USD 5.78 Million and two remaining schemes will be completed with remaining cost of USD 0.52 million under IRDP. Completed schemes under EIRP are covering an area of 22,115 ha which was increased to 30,534 ha including an incremental area of 8,419ha.

#### Grant-III Target

9. In March 2009, a further grant of US\$ 20.2 million was provided with additional scope of work. Additional target included rehabilitation of additional 85 medium / lesser and 8 large size scheme covering an additional area of 91,000 ha which was expected to increase to 114,000 ha including an incremental area of 23,000ha.

#### Achievement

10. Against the target, the project awarded 101 medium/lesser and 10 large size schemes with an estimated cost of USD 23.12 million. From the awarded schemes 3 medium and 2 large size schemes were terminated mainly due to non-performance of contractors and to some extent due to security reasons. In total 92 medium/lesser and 8 large size schemes have been completed while 6 medium/lesser size schemes are in advanced stage of completion and will spill-over to the follow-on IRDP. Actual cost of completed schemes under EIRP is US\$ 21.9 million covering an area of 79,887 ha which is increased to 105,870 ha including an incremental area of 25,983ha.

11. Overall target from all funding was 885 small, medium and large size schemes covering a total area of 571,050 ha which was expected to increase to 716,050ha including an incremental area of 145,000 ha with a total rehabilitation cost of US\$ 77.3 million. Against the overall target, the project awarded a total of 775 small, medium and large size schemes with an estimated cost of US\$ 78.21 million. From the total awarded schemes 728 and first phase of BES have been substantially completed covering a total area of 637, 796 ha which will increase to 802,619 ha including an incremental area of 164,823 ha with actual rehabilitation cost of US\$ 71.67 million. The project has achieved the covered and an incremental area targets. On the whole, the average cost of rehabilitation works for one hectare of incremental area is about USD 434.8.

12. In large measure, EIRP has helped further improve relations between the Government of Islamic Republic of Afghanistan and the communities as well as in the strengthening of peace in the areas where rehabilitation of traditional irrigation schemes have been carried out. In general, EIRP staff and contractors' site engineers have managed to implement many projects in areas under tense security situation with strong support of elders and communities.

13. Despite the substantial efforts of all involved, contracts for about 18 schemes were terminated mainly due to security reasons. For instance, in the case of a large irrigation scheme at Band-e-Sultan, only one German Construction firm approached to purchase the bidding documents as others were reluctant due to security reasons. When two members of the firm's technical team visited the site, they were abducted by the Taliban. While one died in captivity, the other was released after 3 -4 months. In another rehabilitation work in Pusht Rud District of Farah Province, when the contractor's vehicles were on the way from Farah Rud to Farah Centre, the Taliban surrounded them, took three staff of the firm including the driver along with two

vehicles and one excavator. They killed one person (Admin/ finance officer of the firm) and released the remaining two after 29 days.

14. Another 9 schemes were terminated due to internal community discard. The communities changed their demands conflicting with the riparian rights of downstream beneficiaries which led to the termination of work on some schemes.

15. About five schemes were terminated due to poor contractor performance. Some schemes were terminated to avoid duplication as other partners/donors came in to assist the concerned communities and hence rendering it unnecessary for EIRP to continue its assistance.

16. **ICR Assessment:** This component has been implemented satisfactorily as per design. The one drawback in the design was that the initial emergency approach was continued in subsequent additional financing stages as well. This should have been avoided and a more holistic approach to rehabilitation should have been taken. Otherwise, the implementing agency and the technical assistance team did a good job in meeting the targets and rehabilitating schemes in a difficult environment.

## **Component B: Feasibility Studies and Monitoring and Evaluation**

### **B1. Feasibility Studies**

17. Funds were allocated to carry out feasibility studies of multipurpose water resources development projects. Out of several identified feasibility studies, the Lower Kokcha Irrigation and Hydropower Project (LKIHP) feasibility study was selected and a contract was signed with an international consulting firm from Germany (FICHTNER) in 2006. The LKIHP is a multipurpose project, providing irrigation water to the agricultural sector and electrical power for the operation of the lift irrigation parts of the scheme and for sale to the public. The project's cultivable area is 131,902 ha with a gross command area of 141,830 ha which is divided into six zones.

18. There were some delays in the execution of the feasibility study due to security problems in and around the project site. Mine clearing took a number of months. When two German technical experts from another German firm were abducted by the Taliban, FICHTNER suspended the study for some months until the security situation improved. There was also limitation related to the availability of reliable topographic maps. The study has been completed and several options for the development have been found to be feasible.

19. **ICR Assessment:** The feasibility study appears to meet international standards. The Bank and the Borrower should pursue efforts to mobilize funds for the final design and construction of the LKIHP.

### **B2. Monitoring and Evaluation**

20. A Monitoring and Evaluation Unit was to be created in MEW to provide independent and continuous feedback to the implementing agencies on the project's performance and impact on a regular basis so that corrective action could be undertaken on a timely manner. A budget of US\$ 1.5 million was provided to achieve this objective. However, such a unit was not created and maintained throughout the implementation period due to lack of commitment from MEW as well as difficulty in recruiting and maintaining skilled staff.

21. A basic M&E framework was described in the Technical Annex with terms of reference for an international firm specializing in M&E to be deployed who were supposed to develop the full framework and assist in establishing and training the M&E unit in the Ministry. An international consulting firm from the United States was recruited and they developed a monitoring and evaluation framework, carried out a baseline study and the first seasonal project impact assessment report in April 2007. At this point, the Ministry terminated the consulting firm's contract and a short-term individual consultant was hired to continue with the assignment. No capacity building of the fledgling M&E unit in the Ministry was provided. The survey for the 2nd Season was also carried out in late 2007, but the report was finalized only in early 2009.

22. The consulting firm focused in delivering the baseline and survey reports. It appears that they did not contribute to the creation of an in-house capability to have a functioning M&E unit in MEW.

23. After the recruitment of an International M&E Specialist under the aegis of the technical assistance provider in August 2009, work began on gradually building up an M&E unit in MEW but this was not successful and the M&E functions related to the project were carried out by the technical assistance provider together with PCU staff. A more realistic organizational chart for M&E was adopted in 2010, additional staff identified, and relevant TORs were developed. However, even though the organization structure provides for an M&E Unit that fully extends M&E activities into monitoring and evaluation of project implementation progress, project activities and outputs for all project components, such work has not been carried out to date. Only outcome assessment surveys of dubious quality have been carried out.

24. MEW has not yet taken a decision on how to integrate the M&E Unit within the MEW structure. This will be considered when the government takes a decision on the creation of an integrated M&E function within the MEW organogram.

25. **ICR Assessment:** The M&E function has not provided requisite information which was used in shaping the implementation performance of the Project and its technical assistance consultants. Annual impact assessment reports were prepared but it appears that these were not actually utilized. There are issues with the quality of data as well as the data collection mechanisms. Available techniques such as satellite imageries, and GIS have not been deployed even though the technical assistance consultants have been talking about this over the past three years. Similarly an adequate Management Information System incorporating the requirements of M&E has not yet been developed. Essentially, therefore, M&E has been restricted to assessing project development, training outcomes, including operational and maintenance training provided for beneficiary farmers, because of lack of an integrated MIS. Compilation of panel data would have enabled the project team to arrive at more robust conclusions regarding sustainability of investments. These are lessons learned and to be reflected in the follow-on IRDP. Overall, the mission rates the M&E performance as unsatisfactory.

## **Component C: Capacity Building**

### **C1. Construction and rehabilitation of buildings**

26. Construction of new and rehabilitation of existing office premises have been completed together with the procurement of requisite office equipment (including laboratories and power facilities), vehicles and field equipment for the diverse project activities. However, these were provided mostly to PCU staff at Kabul and regional offices. In the offices of WMD visited by the mission, there was a disparity among office space and computer and other facilities between PCU

staff and WMD staff. While the provision of new facilities has enabled the PCU staff at Kabul and provincial levels to accommodate new equipment, assure quality of works, fill vacant positions, add comfort in performing duties, provide training space, help in improving staff attendance, add parking space for vehicles, increase safety standards in the offices and minimize security risks the same has not been the case with WMD staff.

27. Construction of buildings for technical facilities, including silt laboratories for hydrological purposes has also been completed in each region but no tests have been conducted so far.

28. **ICR Assessment:** Similar office facilities and equipments should be provided to the WMD staff in order to enable them to take over progressively the functions related to preparation of future sub-projects and operation and maintenance of rehabilitated facilities as required. The Borrower should make every effort to make use of the excellent silt laboratory facilities, particularly in view of proposed dam construction on rivers with heavy silt-laden flows.

## C2. Training

29. As at end of December 2011, 658 training sessions were conducted for different targets of participants for a total duration of 3447 days. In these sessions, a total of 4355 technical staff and 6545 farmers and Mirabs participated. Information on the training program is given in Table 2 below.

**Table 1: Summary of All Trainings Conducted**

No	Type and place	Total No of trainings	Duration (days)	No of participations	
				Engineers/Technicians	Mirabs/Farmers
1	General trainings	39	153	1,310	0
2	Overseas training	14	286	180	0
3	Hydrology	24	121	505	0
4	Large schemes	2	15	8	0
5	Kabul & Bamyan Regional Team	153	845	856	1,458
6	Kandahar Regional Teams	68	334	207	389
7	Kunduz Regional Teams	97	332	316	1,560
8	Jalalabad Regional Teams	120	671	337	1,520
9	Mazar Regional Teams	53	194	161	807
10	Herat Regional Teams	88	496	475	811
	Total	658	3,447	4,355	6,545

30. **ICR Assessment:** The training activities coupled with on-the-job training in the preparation of sub-project proposals have been instrumental in improving the capacity of the regional teams in implementing Component A. More such training with focus on specific subjects such as construction quality control, contract management and holistic planning of rehabilitation of schemes is recommended.

## C3. Operation and Maintenance (O&M) Training for Beneficiary Farmers

31. Training in O&M of rehabilitated structures was initiated based on the recommendation of the Mid Term Review (MTR). The rationale was that training farmers on appropriate O&M methods would enhance sustainability of outcomes gained as a result of EIRP intervention. The

project adopted the recommendation, contracted a consultant to develop an O&M training manual, by augmenting traditional knowledge with appropriate new technologies and processes. After training of trainers on O&M the program started in earnest in 2007.

32. Training activities have been successfully completed in about 60% of the sub-projects rehabilitated under the project. However, as shown in Table 3 farmers in about 40% (295) of completed sub-projects have not yet received O&M training. MEW, in collaboration with the WB, plans to undertake this activity in the follow-on project IRDP. As testified by communities who took the training, such programs would enhance sustainability of EIRP outcomes.

**Table 2: EIRP Community O&M Training - Region-wise status as on 31-Dec-2011**

S. No	Region	Sub-Project submitted	Sub-Project approved	Sub-Project awarded	Sub-Project completed	O&M Training conducted	O&M % progress of completed SP	Balance O&M Trainings yet to be conducted
1	Bamyan	67	67	67	62	53	85.5%	9
	Kabul	118	118	118	113	44	38.9%	69
2	Herat	114	114	114	104	70	67.3%	34
3	Mazar	96	96	96	96	49	51.0%	47
4	Kunduz	97	97	97	91	66	72.5%	25
5	Jalalabad	158	158	158	145	86	59.3%	59
6	Kandahar	125	125	125	117	65	55.6%	52
Sub - Project Total		775	775	775	728	433	59.5%	295

33. It has been reported by the technical assistance consultants that the training also resulted in a reduction in the number of person-days spent on O&M activities by an average of about 31% compared to the situation before rehabilitation of surveyed schemes.

**Table 4: Comparative labor savings in man/days due to O&M training provided to beneficiaries**

S. No	Operation and Maintenance	Average Operation and Maintenance Cost in man/days per surveyed scheme		
		Before	After	Savings in Overall Cost %
1	Cleaning Canals	266	168	37
2	Repairing structures destroyed by floods	385	215	44
3	Routine Maintenance	331	258	22
4	Repairing canals and fields damaged by wash water	515	405	21
5	Total Cost of Labor	1,497	1046	31

34. **ICR Assessment:** The training of farmers is essential and the technical assistance team is to be commended for undertaking this work successfully. It is recommended that the training be given periodically to the farmers in the rehabilitated sub-projects so that sustainability of the investments is really ensured. In addition, provision of small equipment and continued technical advice is necessary,

particularly in those schemes where interventions such as river regulation works have been completed.

#### **C4. Technical Assistance and Consultancies**

35. The technical assistance team has been working to improve the technical, managerial and administrative capacity of both the PCU staff as well as the MEW staff. The final cost of this assistance was about US\$ 28 million against the total project cost of about US\$ 135 million, a substantive portion.

36. The mission was informed that FAO TA comprised regular backstopping missions, Panel of Experts from the Technical Centre for Investment and other consultants recruited on a need-based approach as agreed with the Bank. Backstopping involved among other activities, report reviews and technical clearances, clearing work scope and consultants' TORs, approving training curricula and capacity building plans in addition to interventions as and when requested by the project Chief technical Adviser (CTA).

FAO team in Kabul provided the following technical assistance:

37. Managed international consultancy services provided for MEW/PCU relating to: feasibility studies on rehabilitation of large schemes, project management, individual personnel contracted to support WMD/PCU activities, M&E services, and developing technical and managerial training programs.

38. Supported the MEW Project Coordination Unit (PCU) develop and institutionalize irrigation rehabilitation project management systems, including: the preparation of a functioning Construction Management Manual, Construction Bidding Process, Bids Evaluation Framework, Construction Supervision and Quality Control procedures and processes, Financial Management System, Project Management and Proposal development, , and Monitoring and Evaluation System.

39. Supported the improvements made in work performance of trainees in terms of productivity, quality of outputs, timeliness, and degree of executing their respective duties without or less guidance and mentoring support. These results are by and large attributed to mentoring and guidance provided by FAO Technical Assistance international staff, whose respective terms of reference included building capacity of national staff.

40. Assisted MEW to develop a six-year follow-on Irrigation Restoration and Development project, to be funded by the World Bank

41. **ICR Assessment:** The technical assistance provided in implementing Component A has been satisfactory in that almost all the targeted investments have been completed. However, the assistance provided regarding M&E and Hydrometeorology has been unsatisfactory. The mission found inadequate backstopping from the headquarters of the technical assistance provider HQ in that worldwide knowledge and expertise of the TA provider were not brought to this technical assistance assignment worth several million dollars (perhaps the largest such TA contract this technical assistance provider has in the world). Given this, even though the technical assistance team in Kabul has tried its best to provide good technical assistance, the mission rates the overall TA performance as marginally satisfactory. It is recommended that in the follow-on project specific agreements to be written in regarding the backstopping and other expert support for the team working in Kabul.

## Component D: Hydro-meteorological network

42. This component aims to restore and modernize the hydro meteorological network for better monitoring, planning and management of water resources including contingency planning for drought. Since 1980 the hydro meteorological facilities have been dilapidated denying Afghanistan the use of regular and updated information for water resource development planning.

43. Network of 174 Automatic Hydrologic Stations, 26 Automatic Weather Stations, 30 Snow Survey Stations, and 60 (40+20) river gauging sites with cableway facility has been carefully designed to restore and modernize the hydro meteorological network in the country. Due to the existence of a network of hydrologic stations, albeit not functioning due to damage sustained during decades of conflict, there was no need for the project to design of a new hydrologic network altogether.

**Table 5: Status of Installation of Hydrology and Meteorology Sections**

S. No	Name of Contract	Total plan	Actual up to end of Dec 2011
1	S&I of 174 Hydrological stations	174	105
2	2a.Cableways at 40 Gauging stations	40	36
	2b.Winch cum Guard rooms at cableway sites	40	36
3	Meteorological Network	30	10
	2a. Snow Survey Stations		
	2b.Weather Stations	26	17
	2c. Guard rooms	30	18
4	Installation/Commissioning of 6 silt Laboratories	6	6
5	Supply of Hydrological Equipments	*	-
6	O&M of 105 Hydrologic Stations	105	53

\*Lot 1:60 current meters, Lot 2: 12 Doppler current meters, Lot 3:6 echo sounders, Lot 4:68 sediment samplers, Lot 5: 12 boats,40 taglines etc

44. After almost ten years of project operation, out of the 174 planned hydrologic stations only 105 (60%), of the 56 meteorological stations only 27 (48%); out of 40 cable ways 36 (80%) and all the planned 6 silt laboratories have been installed.

45. By project completion, on-the-job training for operation and maintenance has been completed only for 53 out of the 105 installed hydrological stations. Again the main cause has been reported to be the lack of adequate capacity of the Contractor and the local sub-contractor. About 17 of the remaining stations are also in very insecure areas.

46. Due to delayed installation of cable ways, rating curves for only 50 sites out of the 105 installed hydrological stations have been established. Non-availability of adequate data has also inhibited to calculate water balance using at least one year new stream flow data to adjust long-term series of known river sub-basins.

47. Difference in original installation schedule and actual installation schedule is considerable, in the case of some of the lots the delay ranged up to 18 to 20 months.

48. The data collection was to be based on a tele-transmission system for the remote stations whilst observers were to be engaged to manually record the observations elsewhere. At present, data from the 105 automatic hydrologic stations which have been installed is being transferred manually to the Water Management Department at Kabul. There have been considerable delays in transmission of data to WMD due to lack of monitoring capacity. With proper supervisory control and monitoring of the tasks assigned to the staff, delays in transmission and compilation of the data could have been avoided. On-the-job training/guidance has been regularly provided to the staff for compilation and processing of the data.

49. The Ministry has not done any due diligence to establish the hydrological services of Afghanistan. It has not employed the key professional staff required and has not actively participated in the establishment and operation of the gauging stations. The project, therefore has not contributed to improving the institutional capacity of MEW in this very important and crucial field to the levels required.

50. Creating in-house repair and maintenance capability of the hydrological and meteorological instruments is necessary to ensure sustainability of the observation program in the country.

Availability of accurate, adequate and up to date hydro meteorological data very much depends on sustainability of stations' operation and maintenance plan and effective implementation of capacity building plan.

51. **ICR Assessment:** Installation of hydro meteorological facilities has not progressed as planned because of inadequate management of contractors and poor attention paid to this component by PCU, and WMD. About 69 stations could not be rehabilitated during project period due to deteriorating security situation. The hydro-meteorological service expected to be established and strengthened with requisite analytical capabilities has not materialized due to lack of commitment from MEW. Only in the last year of project operation, efforts are under way to correct this situation. It is regrettable that after several years of project operation, no new verified and usable data has been added in even one river basin and this does impact on analyses related further water resources development in the country. Given the importance of this component, the implementation performance is rated as highly unsatisfactory.

## Annex 3: Economic and Financial Analyses

### Background

1. At project appraisal in 2003, it was expected that the major project benefits would come from increased agricultural production resulting from availability of reliable supply of irrigation water. The increased agricultural benefits were expected to result from: (i) an increase of yield in the irrigated areas (30% - 75% increase depending on the farm size); (ii) an increase in irrigated land (20% increase that is conversion of 20% *rainfed* areas to irrigated areas), and; (iii) where climatic conditions allow, an increase in cropping intensity. It was also estimated that irrigation rehabilitation was economically viable with Internal Rates of Returns (IRRs) ranging from 17-46% with an average of 31%, even if only wheat is produced. Since farmers grow other crops, particularly orchards, that are more profitable than wheat, the overall IRR was expected to be much higher than 31%. No financial rate return was calculated at appraisal.
2. The economic evaluation of the project was repeated during December 2006 based on 27 completed subprojects in four out of the six regions of the project. The results indicated: (i) average increase of wheat yield in the regions by 4% - 54%.; (ii) increase in irrigated area by 9% - 33%; (iii) net return of US\$60-160 per hectare after the rehabilitation; and (iv) higher IRRs – 17 out of 27 subprojects showing IRR greater than 28%, one showing 15% and the remaining 9 subprojects below 12%. Based on results of this economic analysis, additional funding for the project was considered economically justifiable.
3. In December 2008, another exercise was done for estimating the economic returns/ result parameters, covering 19 completed rehabilitation schemes located in five of the six regions, where the project activities were underway. The results of economic analysis indicated: (i) increase of 10% to 32% in the irrigated area, with 70% of this increase in the tail and middle reaches of the irrigation system, which previously were high and dry. It also indicated improvement in equity of water distribution; (ii) increase in cropping intensity of 10% to 33%; (iii) an average increase of US\$ 389 in the farm income per hectare; and (iv) generally acceptable economic rates of returns (ERRs): 6 schemes had ERRs greater than 20%; 5 above 12%; and the remaining below 12%. These results were found similar to the economic analysis carried out in 2006 and the expectations at appraisal. The results proved economic viability of the rehabilitation of the schemes and was thus considered economically viable for further and additional financing.
4. At appraisal in November 2003, the project cost was estimated at US\$75 million, an additional grant was approved at US\$25 million (March 2007); second additional funding was made available at US\$28 million (May 2008); and third additional funding was approved for US\$33.5 million (April 2009), making the total estimates as US\$161.5 million. Some scaled up activities were also included against these additional funding. Latest estimates for completing the project are as about US\$125.22 million (December 2011). The project defrayed up to seven years against an estimated period of three years planned at appraisal. The development objective of the project was to provide farmers in the project areas with improved, reliable and equitable distribution of irrigation water to increase agricultural productivity and farm income, improve food security and livelihoods, and reduce vulnerability due to droughts. The project expected to achieve this objective through (i) rehabilitating and improving the existing dilapidated irrigation infrastructure; (ii) restoring and modernizing the hydro-meteorological network for better monitoring, planning, sustainable use and management of water resources, including contingency planning for droughts and floods; and (iii) developing the institutional capacity of public sector

water institutions, existing community water organizations and farmers for operating and maintaining irrigation system in a sustainable manner.

5. At appraisal, the analysis estimated the economic returns likely to benefit from the investments in rehabilitating the irrigation schemes which were damaged as a result of decades of war and conflict and in particular because of lack of resources for effective operation and maintenance. Deteriorated infrastructure led to the significant reduction in irrigated land, low irrigation efficiencies and tail end deprivations. Benefits to the farm households and to the economy were expected to derive from (i) improved yields; (ii) increased area of irrigated land; and (iii) increased cropping intensity. In the absence of reliable data on production of all crops grown in Afghanistan, wheat being the dominant primary crop was taken (at appraisal) as proxy for all the crops. The analysis was carried out to determine the impact of water availability on the production of wheat in all the eight climatic regions of the country, as a result of implementation of the project activities. No other benefits were quantified at appraisal. In this ICR analyses all the three crops namely wheat, maize and vegetables have been taken into account.

6. The purpose of economic analysis at completion of the project is to re-evaluate the financial and economic impacts of the Emergency Irrigation Rehabilitation Project (EIRP) completed by December 2011.

### **Summary**

7. EIRDP rehabilitation of irrigation schemes, together with the institutional reforms would result in the following benefits: (i) reduced water losses and costs of irrigation; (ii) farm area returned to irrigation; and (iii) increased productivity and diversified agriculture towards higher value crops, as a result of improved availability of water (in quantity and opportunity). Reduced water losses would also reduce the economic cost of irrigation water to users and increase the availability of water in the irrigation systems.

8. Similar to the analysis carried out at appraisal, the ICR analysis also estimated economic returns (EIRRs) by region. Worth of incremental production is estimated as US\$ 102.0 million per annum at full development. The project will also generate about 4.3 million person days per annum as farm labor at completion. The result of economic analysis reveals estimated EIRRs ranging from 21.6% to 34.7% with an overall EIRR as 25.8%. Although, no financial analysis was carried out at appraisal, however, it has been estimated at ICR. Results of financial analysis show FIRRs ranging from 20.8% to 31.8% with overall FIRR as 23.5%.

## Summary of All Economic Analyses Carried Out for EIRP

Sr.	Economic Analysis Undertaken at:	ERR (%)	Assumptions/ Data
1.	Appraisal year 1994	Ranging between 17-46%; overall 31%	i) Increase in yield by 30%-75% depending upon farm size) ii) 20% increase in irrigated area. iii) Increase in intensity  Wheat was taken as proxy for estimating benefits.
2.	December 2006 (Additional Funding) Based on data of 27 completed subprojects in four out of the six regions of the project.	ERR for: 17 Schemes > 28%; One Scheme = 15% 9 Schemes < 12%	iii) Wheat yield increased between 4%-54% iv) Increase in Irrigated area by 9%-33%
3	December 2008 (Additional Funding) Based on the data of 19 completed schemes in 5 Regions.	ERRs 6 Schemes >20%; 5 Schemes > 12%; and the remaining 8 Schemes <12%	iii) increase of 10% to 32% in the irrigated area  iv) increase in cropping intensity of 10% to 33%;

### Methodology

9. The initial project design and objective remained unchanged over the project implementation period. Therefore, the current analysis re-estimates the project benefits from the irrigation infrastructure rehabilitation following the appraisal methodology but by applying actual size of rehabilitated area, changes in cropping yields, benefit accumulation phases, project costs and other parameters based on the findings of M&E Team who collected all the data during and after implementing the irrigation schemes.

10. The analysis estimates net incremental returns attributable to the project by comparing returns in the without project (WOP) scenario and with project (WP) scenario over 25 year project life and using a 12 percent discount rate. The net incremental benefits are estimated at crop level, by developing per hectare crop budgets of major crops including wheat, maize and vegetables. For estimating the net benefits, incremental benefits have been estimated considering the total area benefitted by the project (i.e. rehabilitated area of 637,796 ha plus *rainfed* area of about 164,823 ha brought under irrigation – total area rehabilitated as 802,619 ha).

11. The analysis mainly based on the data available in the Survey Reports of M&E Team of the project and particularly presented in the final report issued in December 2011. Data given in the reports describe socio-economic characteristics of farm households, agricultural production technology and output and input prices in the project areas. All this data represent: (i) project area that received rehabilitation assistance from the project; and (ii) control groups, where no rehabilitation support was available.

12. The rehabilitated lands are located in six regions with distinctive cropping intensities and yield levels. Therefore, similar to the appraisal the separate EIRRs are estimated for each region, as well as at overall project level.

13. The analysis uses December 2011 constant prices for all inputs and outputs for the entire project period. Conservatively, the cost of all components of the project is taken into account including investment for the rehabilitation of hydro-meteorological network and institutional improvement.

14. In the economic analysis, the financial prices were converted into economic values by removing taxes and subsidies from input and output prices and calculating import and export parity prices of major inputs and outputs (wheat and fertilizers). In the case of Afghanistan, maize is considered as non-tradable commodity. A shadow wage rate of 0.9 was used to convert a financial price into an economic value for labor and for non-tradable goods. The financial analysis is carried out in similar manners and using the same methodology adopted in the economic analysis except using the financial prices in place of economic values.

15. **Database:** The database is drawn from multiple sources as follows: (i) impact assessment surveys conducted by M&E unit of the PCU during 2006 and 2011 covering more than 30% of the completed irrigation schemes; (ii) Final Report on third seasonal Impact Assessment issued by M&E Unit; and (iii) secondary data including statistical data published by GoAfghanistan. Technical coefficients of the major crops (seed rate, fertilizer rate, labor days, yield etc.) are compiled from impact assessment surveys for differentiating them by six agricultural planning regions. Financial price data and labor wages by regions are collected from the published agricultural commodity price bulletins.

16. Data for investment costs by project's component has been taken from project records available with the project implementation team . Project costs and benefits are estimated at constant prices over a period of 25 years.

17. **Prices:** For the economic analysis, prices of inputs and outputs have been expressed in December 2011 constant prices. Data on open market prices was collected through various sources for determining the farm-gate financial prices, including price bulletins issued by the GoA as well as by the FAO. Economic evaluation has been carried out using economic prices. Import parity prices have been derived for wheat and fertilizers using commodity price data issued by World Bank in January 2012.

### **O&M Costs**

18. *Without and with Project Scenario:* At appraisal, it was conservatively assumed that: (i) the before project situation would remain unchanged under the "without project" scenario (which underestimates benefits since the system would continue to deteriorate and wastage of available water would increase); (ii) the current situation (2003) would remain unchanged in the future. Under "with project" scenario; (i) considering requirement for smooth operation and for maintaining equitable distribution of water through *mirabs*, a provision for administrative and for routine maintenance is considered at 10% of the investment costs, similar to the one used for the analysis carried out at midterm evaluation of the project; and (ii) the benefits of possible

reduction<sup>4</sup> in operation and maintenance cost has been ignored, if the reduction in O&M cost is taken into account the ERR would be higher.

### Main Assumptions

19. Following are the main assumptions used in the analysis:
- The life of the civil works supported under the project would be 25 years including the investment period of seven-years;
  - A standard conversion factor (SCF) of 0.9 has been used for converting cost of non-tradable goods to economic/shadow prices;
  - Total project cost (US\$125.22 million) defrayed over seven years has been accounted for as per cost incurred actual, again considering this a conservative approach;
  - Possible reduction in operation and maintenance has been ignored
  - All the project investments have been brought to the level of December 2011 by using MUV Index Values<sup>5</sup>.

### Irrigation Infrastructure Rehabilitation

20. Despite slow start up of the project, the project implementation gained pace and momentum after year 2006. Based on two years of implementation experience and in the context of other efforts and events the PDO was refocused and targets were revised during implementation. The number of schemes was fixed as 750 medium and lesser and 10 large schemes altogether. Area under these schemes was estimated at about 390,050 ha against the original target area of approximately 280,000 ha. This target was further increased to 571,050 ha (Grant-II & Grant-III). As of December 31, 2011, irrigation rehabilitation supported an existing irrigated area of about 802,619 ha, which is 2.87 times of the original targeted area. The EIRP also brought under irrigation a *barani* area over 164,823 ha against the targeted area as 145,000 ha which is about 13.6% above the target. Total irrigated land developed under the project is summarized in the following Table A3.1:

**Table A3.1: Summary of Land Developed under Irrigation Rehabilitation Schemes by Region (Ha)**

Sr. No.	Regions	Scheme Area	Command Area (Ha)		
			Total Benefitted Area (ha)	Area Rehabilitated (ha)	Rain-fed area brought under irrigation (ha)
1	West Region	Heart	113,284	80,295	32,989
2	Eastern Region	Jalalabad	72,665	62,851	9,814
3	Central Region	Kabul	140,985	116,353	24,632
4	South West Region	Kandahar	156,653	97,330	59,323

<sup>4</sup> During field visits, mission collected data from farmers and *Mirabs* on operation and maintenance costs. It is clear that the farmers spend considerable resources (time, labor and money) to keep the system functional even at the low efficiency, before rehabilitation. After rehabilitation, the O&M cost will reduce substantially. However, the benefit of reduction savings in O&M cost has not been accounted for in the analysis.

<sup>5</sup> World Bank Price Forecast Bulletin Nov 2011.

Sr. No.	Regions	Scheme Area	Command Area (Ha)		
			Total Benefitted Area (ha)	Area Rehabilitated (ha)	Rain-fed area brought under irrigation (ha)
5	North East Region	Kunduz	234,170	202,995	31,175
6	Northern Region	Mazar	84,862	77,972	6,890
		Grand Total	802,619	637,796	164,823

## Benefits

21. It is general wisdom that the investment for irrigation system rehabilitation generally yields high economic returns. This is particularly true for Afghanistan. Because of highly dilapidated state of irrigation infrastructure, large tracts of land which used to receive water in the past are out of command. Even those areas that do receive water had very low irrigation efficiencies. Because of the temporary nature of diversion structures and frequent damages caused by “flood washes” (high velocity run-off or hill torrents) farmers have to constantly invest labor and time in repair and maintenance of in-takes and other structures to keep the system functional. In such conditions, rehabilitation including improvement of intake/diversion structures, and construction of appropriate protective structures (flood water bridges or over-passes) typically result in (i) substantial increase in irrigated area; improvement in the reliability of irrigation supplies; and (iii) reduction in O&M Costs. All these lead to increased yields and productivity.

22. For quantification of project benefits, it is assumed that the incremental benefits from expansion and from restoration of irrigation facilities will occur with a one year time lag following the completion of rehabilitation investments and handing over to the beneficiaries. And also the benefits will start at 20% level and increase to reach 100% in five years in equal increments. The time lag and step-wise realization of benefits is due to the fact that about 60% of the incremental benefited area has been kept either under fallow and/or under *rainfed* crops for several years now. Since some abandoned activities are needed to restore the neglected area for enabling the irrigated crops to be cultivated following the improvements in the irrigation infrastructure, and for gradual increase in the realization of incremental benefits. As such the Project’s full maturity is expected to come in Year 7-12 depending on the start of rehabilitation activities and the completion year for each scheme, individually.

23. Analysis of data shows that the yields for some crops have also increased even in the non-rehabilitated areas (control groups). This natural trend is applied to the without-project scenario and availability of such data contributes to a more accurate estimation of the incremental benefits deriving solely from Project activities.

24. Non-quantifiable and indirect benefits: In addition to the direct and quantifiable economic benefits the project would also have various other benefits that are not quantifiable either at appraisal stage or at ICR level, these include: (i) the hydro-meteorological network in the project area will generate information for improved future planning<sup>6</sup>, development, sustainable use and management of national water sources; and (ii) the benefits of building capacity in the MEW.

---

<sup>6</sup> In the absence of hydrological data, design engineers tend to be conservative and often overdesign structures leading to higher costs

## Economic Analysis

25. *Project costs:* Economic analysis is based on the analyses of the schemes spread over all of the six regions. The total investment cost including the other three components has also been accounted for, which is again a conservative approach for carrying out the project appraisal.

26. *Economic Rate of Return by Regions:* The analysis indicates that irrigation rehabilitation is economically viable in all the regions, with internal rates of returns (ERRs) ranging from 21.6-34.7% as summarized in the following Table. The overall ERR is expected to be 25.8%.

**Table A3.2: Summary of Results by Region - Economic analysis**

Region	Scheme Areas	ICR Estimates		Appraisal Estimates
		ERR %	NPV (M US\$)	ERR %
West Region	Heart	21.6%	20.1	27
Eastern Region	Jalalabad	24.3%	20.5	36
Central Region	Kabul	28.7%	51.8	42
Southern Region	Kandahar	19.4%	23.3	36
North East Unit	Kunduz	34.7%	66.5	32
Northern Region	Mazar	23.8%	15.3	42
<b>Overall</b>		<b>25.8%</b>	<b>197.5</b>	<b>31</b>

NPV in economic terms is estimated as US\$ 197.5 million and overall BC ratio comes to 1.98:1 at 12% discount rate.

## Sensitivity Analysis-Economic

27. Following is the summary of results for the sensitivity analysis:

**Table A3.3: Response to EIRR (%) – Economic Analysis**

Region	Scheme Areas	Cost Increased by 20%	Benefits Reduced by 20%	Cost Increased by 20% & benefits reduced by 20%	Benefits Delayed by Two Years
West Region	Herat	19.2%	17.8%	15.6%	16.1%
Eastern Region	Jalalabad	21.9%	20.5%	18.3%	18.4%
Central Region	Kabul	25.9%	24.5%	21.9%	21.3%
South West Region	Kandahar	17.6%	16.6%	14.9%	15.4%
North East	Kunduz	31.9%	30.6%	28.0%	26.2%
Northern Region	Mazar	21.1%	19.7%	17.3%	17.6%
<b>Overall</b>		<b>25.1%</b>	<b>23.3%</b>	<b>22.0%</b>	<b>19.8%</b>

## Financial Analysis

28. *Financial Rate of Return by Regions:* The analysis indicates that irrigation rehabilitation is financially viable in all the regions, with internal rates of returns (FRRs) ranging from 20.8-31.8% as summarized in the following Table. The overall FRR is expected to be 23.5%.

**Table A3.4: Summary of Results by Region - Financial analysis**

Region	Scheme Areas	ICR Estimates	
		ERR %	NPV (M US\$)
West Region	Herat	20.8%	17.7
Eastern Region	Jalalabad	21.8%	16.4
Central Region	Kabul	26.3%	43.1
Southern Region	Kandahar	17.1%	15.5
North East Unit	Kunduz	31.8%	57.4
Northern Region	Mazar	21.3%	11.7
<b>Overall</b>		<b>23.5%</b>	<b>161.8</b>

NPV in financial terms is estimated as US\$ 161.8 million and overall BC ratio comes to 1.75:1 at 12% discount rate.

## Sensitivity Analysis-Financial

29. Following is the summary of results for the sensitivity analysis in financial prices:

**Table A3.5: Response to FIRR (%) – Financial Analysis**

Region	Scheme Areas	Cost Increased by 20%	Benefits Reduced by 20%	Cost Increased by 20% & benefits reduced by 20%	Benefits Delayed by Two Years
West Region	Herat	18.3%	16.9%	14.7%	15.4%
Eastern Region	Jalalabad	19.6%	18.3%	16.3%	16.7%
Central Region	Kabul	23.7%	22.3%	19.9%	19.7%
South West Region	Kandahar	15.5%	14.4%	12.9%	13.6%
North East	Kunduz	29.2%	28.0%	25.6%	24.4%
Northern Region	Mazar	18.8%	17.4%	15.2%	15.9%
<b>Overall</b>		<b>21.3%</b>	<b>20.0%</b>	<b>17.9%</b>	<b>18.0%</b>

## Project Impacts

30. *Impact on Yield:* Data on rain-fed wheat yield was collected from the published statistics, and the data on crop yields for irrigated areas was provided by M&E Team of the project. Summary of yield under with and without project scenarios has been given at the following Table.

**Table A3.6 : Impact of Project on Yield Per Hectare (kg)**

No.	Regions	Scheme Area	Crops	Without Project		With Project		
				Yr 2006	Yr 2011	Yr 2011	Net Increase	% Change
1	West Region	Herat	Wheat Irrigated	2,338	2,530	3,223	693	22%
			Wheat Barani	1200	1200	3,223	2,023	63%
			Maize	2,380	2,674	3,240	566	17%
			Onion	6,965	9,144	9,998	854	9%
			Potato	3,510	5,339	6,450	1,111	17%
2	Eastern Region	Jalalabad	Wheat Irrigated	2,143	2,549	3,038	489	16%
			Wheat Barani	1203	1203	3,038	1,835	60%
			Maize	1,989	2,245	2,561	316	12%
			Onion	8,845	13,763	15,841	2,078	13%
			Potato	6,955	10,624	12,630	2,006	16%
3	Central Region	Kabul	Wheat Irrigated	2,280	2,521	2,969	448	15%
			Wheat Barani	1000	1000	2,969	1,969	66%
			Maize	1,850	2,041	2,375	334	14%
			Onion	7,765	10,270	12,560	2,290	18%
			Potato	7,125	10,167	13,165	2,998	23%
4	South West Region	Kandahar	Wheat Irrigated	2,335	2,618	3,165	547	17%
			Wheat Barani	1,206	1,206	3,165	1,959	62%
			Maize	2,085	2,393	2,617	224	9%
			Onion	5,075	6,265	7,867	1,602	20%
			Potato	6,675	8,019	9,490	1,471	15%
5	North East	Kunduz	Wheat Irrigated	2,275	2,476	3,185	709	22%
			Wheat Barani	1,250	1,250	3,185	1,935	61%
			Maize	2,052	2,172	2,495	323	13%
			Onion	7,673	10,137	13,985	3,848	28%
			Potato	7,856	9,036	11,150	2,114	19%
6	Northern Region	Mazar	Wheat Irrigated	1,695	1,996	2,350	354	15%
			Wheat Barani	1,080	1,080	2,350	1,270	54%
			Maize	1,895	2,173	2,455	282	12%
			Onion	4,845	6,285	8,251	1,966	24%
			Potato	4,993	7,862	8,750	888	10%

31. *Production Impacts:* With project, both cereals and vegetables production, realized from the rehabilitated as well as incremental irrigated area.

**Table A3.7: Summary - Incremental Production ('000 tons)**

<b>Crops</b>	<b>Kunduz</b>	<b>Mazar</b>	<b>Kandahar</b>	<b>Kabul</b>	<b>Jalalabad</b>	<b>Herat</b>	<b>Total</b>
Wheat	220.5	45.8	172.4	102.3	42.2	97.6	680.7
Maize	24.6	4.2	24.7	18.7	5.8	25.9	104.0
Vegetables	447.0	76.5	124.1	202.4	109.2	64.0	1,023.2

32. As depicted in the above table, annual production of wheat will increase by about 680,700 tons, maize by 104,000 tons and increase in vegetables is estimated at about 1023,000 tons at full development. As such the additional production of crops (wheat, maize and vegetables) from the benefited area is estimated at about 77% (more than the WOP production). It will improve the food security of the beneficiary farm households in the project area.

33. *Income Impacts:* Incremental irrigated area generated additional benefits of \$ 341 per ha per annum due to the project investments in the rehabilitated irrigation schemes. Average farm size is 0.6 ha in the EIRP command areas and average family size in rural Afghanistan is six adult units<sup>7</sup>. As such, a farm household will get increase in his income by about US\$ 204, whereas, per capita income in the project beneficiary household will increase by about US\$ 51 per annum. As per estimates of World Bank, per capita income in Afghanistan is US\$ 501 (year 2010).

34. *Poverty/Employment Impacts:* The project will generate about 4.3 million additional person days as farm labor.

35. *Conclusion:* Although it is too early to fully document the entire Project impact on agricultural performance, yet the results of the ICR analysis suggest that the project will reach its development objectives.

---

<sup>7</sup> The National Risk and Vulnerability Assessment 2005, Ministry of Rural Rehabilitation and Development and the Central Statistics Office, Kabul, June.2007.

#### Annex 4. Bank Lending and Implementation Support/Supervision Processes

(a) Task Team members

Names	Title	Unit	Responsibility/ Specialty
<b>Lending</b>			
Mohinder S. Mudahar	Adviser	SASRD	Task Team Leader
Masood Ahmad	Lead Irrigation Engineer	SASRD	Engineering
Garvey	Consultant		Hydrology
<b>Supervision/ICR</b>			
Xiaokai Li	Water Resources Specialist	SASRD	Task Team Leader
Christensen	Social Development Specialist	SASRD	Community Development
Mir Ahmad Ahmad	Operations Officer	SASRD	Civil Engineering
Christoph Bosch	Environmental Specialist	SASES	Environmental
Shawkat Hasan	Senior Procurement Specialist	SARPS	Procurement
Asta Olesen	Senior Social Development Specialist	SASES	Social Development
Garvey	Consultant	AFTS1	Water Resources
Agrawal		SARFM	
Nihal Fernando	Senior Irrigation Engineer	SASRD	Task Team Leader
Theodosia Karmiris	Program Assistant	Washington DC	
Vardah Khalil Malik	Investment Officer	Islamabad	
Amit Ramchandani	Operations Analyst	Delhi	
Zabiullah Ahrary	Program Assistant	Kabul	
Mohammed Arif Rasuli	Senior Environmental Specialist	SASES	
Kirmani	Consultant	Kabul	
R.K. Malhotra	Consultant	Delhi	Construction Management Specialist
Juan Morelli	Project Economist	FAO	
Asis Mondal	M&E Specialist	FAO	
Deepal Fernando	Senior Procurement Specialist	SARPS	
Kenneth Okpara	Senior Financial Management Specialist	Kabul	
Usman Qamar	Senior Water Resources Specialist	SASRD	Task Team Leader
Rahimullah Wardak	Procurement Specialist	SARPS	Procurement
Wahida Obaidy	Team Assistant	Kabul	
Asila Wardak Jamal	Consultant	Kabul	
Mio Takada	Rural Development Specialist	DC	
Abdul Mohammed Durrani	Consultant	Kabul	Social Development
Wazhma Khalili	Team Assistant	Kabul	
Andres Garcia	Young Professional	AFTFE	
Jun Matsumoto	Senior Water Resources Specialist	SASDA	Task Team Leader
Srinivasan Raj Rajagopal	Consultant	DC	Water Resources



## **Annex 5. Summary of Borrower's ICR**

### **Summary -Implementation Completion Report presented by the Borrower (Unedited)**

1. EIRP was signed in January 2004 and became effective on March 19, 2004. The project has been successfully implemented; all the project components designed under the project have been effectively put into operation. The project costed USD 134.5 Million, funded by WB credit of USD of 73 Million (including USD 8 Million through co-financing) USD 28 and USD 33.5 Million of grants awarded (H398 SDR 17.1 Million and H498 SDR 22.7 Million respectively) to allow for more flexible implementation. The credit/grants were closed in December 2011.
2. Project Development Objective (PDO): The PDO is to restore irrigated agricultural production in rural areas, through improved and reliable water supply to rehabilitated traditional irrigation schemes. Key indicators for this PDO are increase in irrigated area and increase in agricultural productivity. This will assist in reducing rural poverty in rural areas; accelerating the transition of the existing agricultural system; and laying the foundation for a dynamic rural economy.
3. The status of these indicators, based on results from the latest monitoring and evaluation (M&E) surveys carried out in Autumn 2010 is summarized below:

### **PROJECT DEVELOPMENT OUTCOMES**

#### **Increase in Irrigated Area**

4. EIRP project appraisal was approved with the justification (among others) that the overall projected increase in irrigated area of 25% after rehabilitation. The project has achieved 25.8 %, overachieving by 0.4%.
5. EIRP has attained significant achievements in the rehabilitation of irrigation systems, overachieving in important targets. In total rehabilitated area, the project overachieved by (86,569 ha) 12.09% over the target of 716,050 ha, and in total incremental irrigated area by 13.7%; and in increase in irrigated area by an average of 25.8% against project target of 25.4%, overachieving by 0.4%. In terms of number of completed sub-projects, 728 were rehabilitated (93.9%) compared to the target of 775, the variance in number is on, covering all 34 Afghanistan provinces.
6. Thirty nine (39) sub-projects were terminated due to various constraints including, security and insufficient contractors resource capacity; and 8 (1 large and 7 small) were spilled over to the follow-on Irrigation Restoration and Development Project (IRDP).

#### **Increase in Agricultural Yield**

##### **Increase in Wheat Yield**

7. Average wheat yield has increased by 50.5% after rehabilitation compared to project baseline, overachieving by 68.3% compared to the 30% projected productivity target in EIRP appraisal. Wheat, being by far the most important crop in Afghanistan, accounting for 83% of cereal consumption, the increase in its productivity, suggests that EIRP intervention has promising potential contribution to improved food security and poverty alleviation in Afghanistan.

8. Compared to control group irrigation schemes (those that do not benefit from project) wheat yield for rehabilitated schemes is 39.2% higher, indicating effect of rehabilitation.

### **Yield Increase for Major Crops**

9. With regard to other major crops, Maize, cotton, onion and potato, yield has increased by 44.4% 117.9%, 197.7% and 65.4% respectively compared to baseline.

### **Intermediate Outcomes**

10. Achievements of Intermediate Outcomes, i.e. the lower level results which contribute to project development outcomes, are presented below in summary form:

- Land Utilization: increased from 42.9% to 56.4%, as a result of EIRP intervention
- Cropping Intensity: has increased from 92% to 108.8% (an increase of 18.3%).

11. Irrigated Land Value: increased (from 23 076 to US\$32 114 per hectare) by an average of 10.4% after rehabilitation, ranging from 6.9 to 15.5% across EIRP regions.

12. Increase of access to irrigation water: improved by an average of 24.6% after rehabilitation of irrigation structures with regard to supply of irrigation water, hence the higher change in access. The highest improvement in access to water, was registered in Herat (35%) followed by Mazar (34%).

13. Prevention of Flood Induced Agricultural Destruction: significant percentage of beneficiary farmers attributed reduction of flood damages to:

- good quality of rehabilitation works (76%),
- provision of appropriate O&M training offered (70%),
- sound diagnosis and design of irrigation structures (64%) , and
- carrying out regular maintenance regime by applying new methods gained from O&M training (61%)

14. Reduction in Water Related Disputes: according to the 65 Mirabs interviewed in the survey, water related disputes have been reduced from about 98 to 44 per year per sub-project, a reduction of 55.8%, as a result of EIRP intervention.

15. Training: As at end of December 2011, 658 trainings were organized for different targets of participants for a total duration of 3447 days. In these trainings, a total of 4355 participants were from the technical staff and 6545 farmers and Mirabs benefited from O&M trainings. These trainings represented over 50,000 man/days in the life of the project.

16. Over eighty percent of participants rated "Very Good" and "Excellent" for three impact indicators:

- 51% and 36% of participants stated trainings helped improve their respective work performance;
- 51% and 33% enhanced their knowledge and skills; and
- 54% and 30% helped improve their motivation.

17. In relative terms, training provided for PCU/MEW technical personnel and the beneficiaries farmers made stronger impact. The survey showed that project management personnel, particularly those responsible for supervision and monitoring require more systematic training, in order to gradually take over the independent running of follow-on project.

18. Operation and Maintenance (O&M) Training Efficacy: on the average the number of man/days spent on maintenance has been reduced by 31% compared to the situation before rehabilitation of surveyed schemes, as a direct result of training. Overall beneficiary farmers are appreciative of O&M training provided by the project. Of the 195 interviewed farmers, 145 (74.3%) find training content as practical and 158 (81%) affirm that training is relevant to their needs. The provision of effective operation and maintenance, as confirmed by beneficiary farmers, is the key factor for enhancing sustainability of project outcomes.

19. Level of Community Involvement in Project Processes: substantial proportion of respondent Mirabs confirms reasonable degree of involvement:

20. 89% state that communities get involved in the crucial first steps of sub-project identification stage, when outcomes the community wants to achieve are explained and perceived problems hampering those objectives are outlined;

21. 85% in the articulation of current irrigation problems in greater detail, including, for example, weak intake structures, low conveyance, lack of flood protection structures and maintenance skills, etc;

22. 76% in the determination of location and mix of irrigation structures required.

23. This high degree of participation has strengthened community ownership, which in turn ensured project relevance and sustainability of project outcomes.

24. Community Perception on Key Outcomes: There has been clear convergence on value attached to project outcomes by beneficiaries with those two PDO indicators set in the project document; affirming strong project relevance to beneficiary needs.

25. Beneficiaries attach values to the following indicators in the following ranking order: 1st, "incremental irrigated area", 2nd, "increase in agricultural productivity (yield)", 3rd, "improved access to irrigation water" and 4th, "reduction in operation and maintenance burden". The high ranking three intermediate outcomes directly contribute to the two PDO indicators. The 4th ranking indicator, reduction in operation and maintenance burden, is also very significant. It shows the magnitude of pressure communities had to face in the period before rehabilitation: in the prevention of damages from floods, need to coping with repeated clearing of canals from silt deposits, maintaining irrigation structures, controlling water seepage seems to have been burdensome. This burden has been reduced by 31% due to EIRPs O&M initiative.

### **Hydro-meteorology**

26. Against the three key output indicators, EIRP achievement has not been particularly impressive under this component:

27. Number of Hydro-meteorological stations rehabilitated: From 174 planned for rehabilitation/installation, only 105 (60.3%) have been installed at project completion, as at 31st December 2011, in both existing and new locations.

28. Number of rating curves at hydrological stations established: Rating curves have been established at 63 gauging stations out of the 105 stations installed.

29. Number of river sub-basins with water balance calculated (using at least one year new stream flow data to adjust long-term series): No water balance has been calculated.

## **LESSONS LEARNED**

### **Component A: Irrigation Schemes Rehabilitation**

30. As outlined in the preceding paragraphs, while EIRP has achieved significant outcomes for beneficiaries, the national project team has also gained invaluable experience from project implementation. Future projects will benefit from lessons learned at the managerial, technical and administrative levels of MEW/PCU personnel.

#### Sub-project Technical Proposal Preparation

31. Sub-project technical proposal is a key project document, which seeks to establish technical diagnosis and rehabilitation measures of irrigation systems on the basis of survey and analysis of socio-economic, agricultural and engineering issues as well as target community perceptions and expectations. Experience has shown that the quality of this document much determines efficiency and effectiveness of subsequent project processes.

32. PCU realizes that there is room for improvement in: the skills of relevant staff, community consultation modalities, and determining the timing of proposal preparation to avoid the need for redesigning engineering solutions.

33. Communicating with Project Partners - Contractors

34. Contractors are key partners who exert substantial impact on sub-project rehabilitation performance. The project has prepared user-friendly general guidelines on duties and responsibilities of contractors based on World Bank and MEW requirements. A workshop was also organized for contractors to discuss recurring problems and mitigation measures related to implementation.

35. PCU recognizes that in future projects much more should be done to help contractors improve their efficiency and performance: six-monthly workshops for contractors, training to contractor site engineers, including, on work scheduling, supervision and quality control. Invested resources in such support activities could pay in better quality work and shorter completion times.

#### Strengthening Monitoring and Evaluation Tools

36. Experience has revealed that time and cost monitoring and adherence to quality control could be improved to ensure cost-effective implementation. The timeline monitoring approach for activities including sub-project identification, preparation of technical project proposal, bid document preparation and processing, bid award and approval has helped PCU to monitor this implementation phase.

37. For future projects, M&E has been arguing that the physical implementation phase, i.e. post-award to rehabilitation completion and handover, require a more rigorous system of

monitoring and evaluation. Agreed sub-project work plans for activities and outputs should be organized around practically monitorable milestones with corresponding timelines and costs. Regular status reporting along this approach could enable the M&E unit to identify milestones and sub-projects experiencing time and cost over runs; and variances and their respective causes could be further investigated, and mitigation measures solicited, and lessons learned consolidated.

38. Establishing an MIS which incorporates the above outlined M&E requirements is critical in order to monitor and evaluate implementation of hundreds of sub-projects distributed over all Afghanistan. Instituting this monitoring approach would go a long way for project management of such scale to benefit from useful information to take proactive management decisions.

## **Component B: Feasibility Studies and M&E**

### Feasibility Studies

39. Out of many identified sites, the study of “Lower Kokcha Irrigation and Hydropower Project (LKIHP)” was selected, and a contract signed with FICHTNER effective from 1st March 2006. It was successfully completed in 2010.

40. The LKIHP is a multipurpose project, providing irrigation water to the agricultural sector and electrical power for the operation of the lift irrigation parts of the scheme and for sale to the public. The project’s cultivable area is 131,902 ha with a gross command area of 141,830 ha which is divided into six zones.

41. There has been some delay in the execution of the feasibility study due to security problems in and around the project site. Mine clearing took a number of months. When two German technical experts from another German firm were abducted by the Taliban, FICHTNER suspended the study for some months until the security situation improved. The fact that only outdated Russian Maps were available for use also affected the progress of the study.

42. In support of further MEW efforts, EIRP has also assisted MEW in identifying potential dams in the closed river basin (the Northern Region) and prepared a TOR for 22 potential small dams for the preparation of pre-feasibility and feasibility studies for 10 dams. Out of which 2-3 sites will be selected for construction in the follow-on project.

43. While it is wise to prepare such studies in line with the overall water resource development strategy, in parallel a funding mobilization strategy should be drawn and acted upon. Such project ideas raise community expectations, and when not realized within reasonable period, government credibility could be undermined in the perception of communities. Technically, studies may also need revising to reflect changing realities on the ground existing at the start of implementation in the future. For example, funding for the implementation of Lower Kokcha Irrigation and Hydropower Project (LKIHP) has not yet been secured, and could face this fate.

### **Monitoring and Evaluation**

44. M&E has prepared EIRP baseline and five successive Impact Assessment survey reports over the duration of the project. These annual reports provided valuable information assessment of PDO and Intermediate outcome indicators.

45. However, the project has not fully benefited from Monitoring and Evaluation function. Various constraints hampered M&E performance, including: i) delay in establishing the M&E

unit early on; ii) lack of MIS incorporating M&E requirements, particularly relating to the monitoring of Component A outputs, activities and inputs on a regular basis; iii) recruitment and retention of qualified staff; v) not using modern technology, including satellite imagery to measure impact of irrigation rehabilitation on agricultural production, yield and incremental irrigated area; and vi) to some extent, M&E's place in the organization may have also inhibited the impartial and independent reporting.

46. MEW recognizes the role of M&E in strengthening knowledge management and organizational learning, and to this effect some necessary measures have already been taken to rectify the above identified constraints. But M&E will need time to evolve and become fully effective.

### **Component C: Institutional Strengthening**

47. The project employed technical and managerial trainings for the executing agency staff, operation and maintenance (O&M) Training for beneficiary farmers and Mirabs, technical assistance and management of consultancy services. Although the above improved the situation existing at the start of project implementation, there is still the need to continue to institutionalize the above gains in order to achieve the capacity to plan and implement similar projects independently in the future.

48. The above institutional capacity outcomes were achieved through various approaches, including, developing management systems and tools, formal training, on-the-job training and mentoring, on-project site training for beneficiaries, and provision of equipment, which all combined resulted in very good capacity building outcomes.

### **Component D: Geo-meteorology**

49. Investigation into the major constraints that hampered the performance of this component reveals the following:

50. Delayed arrival of equipment from suppliers

51. Lack of capacity of local contractors awarded to install hydrological stations across the spread of the country.

52. Considerable delay in transmission of data to WMD due to lack of monitoring capacity.

53. Quality of observed data has been found to be poor in some cases as the staff assigned to the task lack sufficient technical capacity.

54. In many cases, security problems have also hampered timely installation of hydro-meteorological stations.

55. PCU has recognized the foregoing short-comings and will consider taking the following actions in the medium-term:

- a. In addition to short term trainings, there is a need for longer term training/degree level education in relevant subjects. Importantly MEW realizes that there is a need for finding ways and means of improving staff motivation.

- b. Creating in-house repair and maintenance capability of the hydrological and meteorological instruments is necessary to ensure sustainability of the observation program in the country.
- c. A National Institute of Hydrology (NIH) should be established to take care of hydrological research and development and capacity building needs of the water resource sector of the country. The MEW/WMD's recently established Vocational Centre, with accommodation and class room facilities, could be further strengthened and upgraded to gradually assume research and training responsibilities. In the longer term, the Institute could create collaboration with international and foreign institutions for capacity building in a planned manner

### **Economic Analysis**

#### Non quantifiable and indirect benefits

56. In addition to the direct and quantifiable economic benefits of irrigation rehabilitation, the project would have other benefits which are not quantifiable at ICR stage. The hydro-meteorological network in the project area will generate information for improved future planning, development and sustainable use and management of national water sources, as well as the benefits of institutional capacity building in the MEW.

57. Internal Rate of Return (IRR) and Economic Rate of Return (ERR)

58. Project Costs: economic analysis is based on the analyses of the schemes spread over all of the six regions. Total investment costs, including the other three components have also been accounted for.

59. Economic Rate of Return by regions: the analysis indicated that EIRP's rehabilitation of irrigation schemes in all of the regions is economically viable with internal rate of returns (IRRs) ranging from 20.9% - 31.5%. The overall ERR is expected to be 26.9%, as summarized below:

60. The incremental production of wheat will increase by 361,874 tons, maize by 63,207 tons, onion by 172,820 tons and potato by 153,922 tons at full development. In addition, incremental irrigated area generated an average income of US\$694 per ha as a result of the project investments in the rehabilitated irrigation schemes.

61. Although it is too early to fully document the entire project impact on agricultural performance, the results of the ICR analysis suggest that the project will reach its development objectives.

### **Sustainability**

62. This section outlines possible risks and opportunities for sustainability of EIRP achievements (outputs and outcomes and institutional benefits) and recommended sustainability enabling measures.

63. Enabling Policy Environment: The priority given to water resource development in the ANDS as well as the establishment of the River Basin Commission is concrete evidence of the existing government's commitment at the highest level. It can be assumed that government support to irrigation community will extend to broader geographical coverage and beyond

emergency and rehabilitation to development and strategic transformation of irrigation systems, pace and scale conditional to availability of funding.

64. Institutional Internalization of developed Management and Human Capacity within MEW Structure: Incorporating the PCU along with the project management systems developed through the technical assistance provided under the project and retaining the trained personnel are key to ensuring the sustainability of what has been achieved through EIRP.

65. Sustainability of Community Benefits: According to EIRP M&E annual survey reports, improving training Operation and Maintenance is one of the most important measures that could enhance sustainability of achieved outcomes and introduced irrigation management methods. MEW is seriously considering how to provide relevant O&M support services to traditional irrigation communities.

66. Improving Organizational Learning: The culture of consolidating and learning from experience should be solidly instituted within MEW. Instituting systematic regular performance evaluation of policies, programs and projects, including Monitoring and Evaluation systems is vital to build on what has been achieved. MEW is considering restructuring its internal performance review processes and structure, which will be anchored on program performance.

67. Establishing Irrigation National Technical Institute: Modernizing irrigation management system to support irrigation communities maintain irrigation systems are also strategic in the improvement of irrigation efficiency thereby improving food security in Afghanistan.

## **Annex 6. List of Supporting Documents**

- 1 Technical Annex – Emergency Irrigation Rehabilitation Project; Report No. T7608-AF
- 2 Project Paper: Emergency Irrigation Rehabilitation Project; Report No. 38944-AF
- 3 Project Paper: Emergency Irrigation Rehabilitation Project; Report No. 43115-AF
- 4 Project Paper: Emergency Irrigation Rehabilitation Project; Report No. 47594-AF
- 5 Development Credit Agreement; 3845-AF
- 6 Agreement Amending Development Credit Agreement; H284-AF
- 7 Financing Agreement; H398-AF
- 8 Financing Agreement; H498-AF
- 9 Implementation Status Reports; June 2004 (sequence #1) through June 2011 (sequence #15)

