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IMPLEMENTATION COMPLETION AND RESULTS REPORT
(IDA-33870)

ON A

CREDIT

IN THE AMOUNT OF SDR 14.9 MILLION
(US$ 24 MILLION EQUIVALENT)

TO THE

REPUBLIC OF TAJIKISTAN

FOR A

RURAL INFRASTRUCTURE REHABILITATION PROJECT

December 23, 2008

Socially Sustainable Development
Central Asia Country Unit
Europe and Central Asia Region

CURRENCY EQUIVALENTS

(Exchange Rate Effective March 2008)

Currency Unit = Tajikistan Somoni
1.00 = US$ 0.29
US$ 1.00 = 3.45 Somoni

FISCAL YEAR
January 1- December 31

ABBREVIATIONS AND ACRONYMS

ADB	Asian Development Bank
AM	Aide Memoire
CAS	Country Assistance Strategy
CDD	Community Driven Development
CIS	Commonwealth of Independent States
CM	Cubic meter
DCA	Development Credit Agreement
EMP	Environmental Management Plan
FPSP	Farm Privatization Support Project
FSU	Former Soviet Union
GDP	Gross Domestic Product
GOST	Gosudarstvennyy Standart – State Standard
I&D	Irrigation and Drainage
IDA	International Development Association
IQCIE	International Quality Control Irrigation Engineer
ISF	Irrigation Service Fee
KI	Key Indicator
M&E	Monitoring and Evaluation
MIWR	Ministry of Irrigation and Water Resources
MTR	Mid-Term Review
O&M	Operation and Maintenance
PDO	Project Development Objective
PE	Polyethylene
PHRD	Japan Policy and Human Resources Development
PIP	Project Implementation Plan
PIU	Project Implementation Unit
PMU	Project Management Unit
RIRP	Rural Infrastructure Rehabilitation Project
RVK	Raivodkhoz – District water authority
SECO	Swiss State Secretariat for Economic Affairs
SNiP	Stroitelnie Normi i Pravila - Construction Norms and Regulations
TACIS	Technical Assistance to the Commonwealth of Independent States

TJS	Tajikistan Somoni
TUAS	Tajikistan University of Agricultural Sciences
TLWRMI	Tajikistan Land and Water Resources Management Institute
USAID	United States Agency for International Development
VWO	Village Water Organization
WUA	Water User Association

GLOSSARY

Oblast	Region (or province)
Raion	District
Hukumat	Administrative unit of the district
Jamoat	Administrative unit of the village or group of villages

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TAJIKISTAN
Rural Infrastructure Rehabilitation Project
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MAP IBRD 30745

A. Basic Information

Country:	Tajikistan	Project Name:	Rural Infrastructure Rehabilitation Project
Project ID:	P058898	L/C/TF Number(s):	IDA-33870
ICR Date:	01/04/2009	ICR Type:	Core ICR
Lending Instrument:	SIL	Borrower:	REPUBLIC OF TAJIKISTAN
Original Total Commitment:	XDR 14.9M	Disbursed Amount:	XDR 14.7M
Environmental Category: B			
Implementing Agencies: Project Manangement Unit			
Cofinanciers and Other External Partners:			

B. Key Dates

Process	Date	Process	Original Date	Revised / Actual Date(s)
Concept Review:	06/24/1999	Effectiveness:	12/14/2000	12/14/2000
Appraisal:	03/28/2000	Restructuring(s):		
Approval:	06/22/2000	Mid-term Review:		06/05/2004
		Closing:	03/31/2006	12/31/2007

C. Ratings Summary

C.1 Performance Rating by ICR

Outcomes:	Moderately Unsatisfactory
Risk to Development Outcome:	Substantial
Bank Performance:	Moderately Unsatisfactory
Borrower Performance:	Moderately Unsatisfactory

C.2 Detailed Ratings of Bank and Borrower Performance (by ICR)

Bank	Ratings	Borrower	Ratings
Quality at Entry:	Moderately Unsatisfactory	Government:	Moderately Unsatisfactory
Quality of Supervision:	Moderately Unsatisfactory	Implementing Agency/Agencies:	Moderately Unsatisfactory
Overall Bank Performance:	Moderately Unsatisfactory	**Overall Borrower Performance:**	Moderately Unsatisfactory

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):	Moderately Satisfactory
DO rating before Closing/Inactive status:	Satisfactory		

D. Sector and Theme Codes		
	Original	**Actual**
Sector Code (as % of total Bank financing)		
Central government administration	22	22
Irrigation and drainage	67	67
Water supply	11	11
Theme Code (Primary/Secondary)		
Environmental policies and institutions	Primary	Primary
Law reform	Secondary	Secondary
Rural services and infrastructure	Primary	Primary

E. Bank Staff		
Positions	**At ICR**	**At Approval**
Vice President:	Shigeo Katsu	Johannes F. Linn
Country Director:	Annette Dixon	Kiyoshi Kodera
Sector Manager:	Dina Umali-Deininger	Joseph R. Goldberg
Project Team Leader:	Pieter David Meerbach	Thirumangalam V. Sampath
ICR Team Leader:	Pieter David Meerbach	
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F. Results Framework Analysis

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

The Project Development Objectives were (i) to increase water supply and efficiency in the main and secondary irrigation canals supplying the farms being privatized under the Farm Privatization Support Project and adjoining farms; (ii) to develop institutional capability in land and water resources management; and (iii) to improve the quality of drinking water in selected villages.

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

(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
Indicator 1 :	Improved average water conveyance in main canals			
Value quantitative or Qualitative)	Average conveyance of main irrigation canal network is around 65%	Average target value with combination of lined and unlined canals 80%		No data on conveyance in gravity schemes Conveyance decreased 16% in pumped schemes
Date achieved	12/14/2000	08/31/2007		10/31/2006
Comments (incl. % achievement)	Target achieved: No estimate There are no reliable data on gravity schemes from RVKs or the M&E system. In pump irrigation schemes (64% of benefiting area), water conveyance decreased with 1% and 16% in 2005 and 2006 respectively.			
Indicator 2 :	Area well served with timely irrigation water in adequate quantities			
Value quantitative or Qualitative)	Irrigation water in project area reaches about 85,000 ha	147,000 ha well served		Estimate: 125,895 ha including areas benefiting from improved drainage
Date achieved	12/14/2000	12/29/2006		12/31/2007
Comments (incl. % achievement)	Target achieved: 66% (40,895 ha actual over 62,000 ha planned) Estimate based on command area of rehabilitated infrastructure.			
Indicator 3 :	# of people served by improved irrigation			
Value quantitative or Qualitative)	240,000 people	400,000 people		Estimate: 407,800 people
Date achieved	12/14/2000	08/31/2007		12/31/2007
Comments (incl. % achievement)	Target achieved: 100% (partially as a result of natural population growth) Estimate based on the increased benefiting area and annual population growth rate of 1.9% in Tajikistan (2007 figures).			
Indicator 4 :	Increased water use efficiency and reduced water use with more crop variety			
Value quantitative or Qualitative)	More than 16,000 m3 of irrigation water per ha as accepted standard - up to 18,000m3 of water used per ha in some areas for "leaching"	12,500m3/ha on average		Data from pumping stations indicate reduction of 7% in water use per ha in pumped irrigation schemes
Date achieved	12/14/2000	08/31/2007		12/31/2007

Comments (incl. % achievement)	Target achieved: 30% Accurate data are not available and absolute values cannot be estimated due lack of data available from RVKs or M&E. Cropping diversity (area under crops other than cotton or wheat) decreased in the main 4 project districts.

(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
Indicator 1 :	Rehabilitation of main irrigation and drainage infrastructure			
Value (quantitative or Qualitative)	Collapsing irrigation system, no maintenace work in over 30 years, large areas receiving no water	30 subprojects completed in the project areas		36 subprojects completed
Date achieved	12/14/2000	08/31/2007		12/31/2007
Comments (incl. % achievement)	Target achieved: 100% All 36 subprojects were completed, on average with satisfactory contract implementation and satisfactory effectiveness.			
Indicator 2 :	Establishment of WUAs at field system level			
Value (quantitative or Qualitative)	No WUAs in Project area, and disorganized and inefficient field level water distribution.	60 (later revised to 20) WUAs established with responsibility for on-farm O&M.		41 WUAs established, of which 8 with some responsibility for O&M
Date achieved	12/14/2000	08/31/2007		12/31/2007
Comments (incl. % achievement)	Target achieved: 20% 41 WUAs were established and registered, of which 8 take some responsibility for O&M. 33 WUAs are not able to take responsibility for O&M, and out of these 26 have ceased to function.			
Indicator 3 :	Establishment of Tajik Land and Water Resources Management Institute			
Value (quantitative or Qualitative)	Facilities dilapidated and lack of qualified personnel able to undertake basic irrigation research on crop water co-efficients, furrow length and discharge, etc..	Local capacity for water management and applied research in recovery		Facilities rehabilitated and some additional capacity, but no applied research resulted from project support
Date achieved	12/14/2000	12/29/2006		12/31/2007
Comments (incl. % achievement)	Target achieved: 70% Rehabilitated facilities are in use. Training on the project equipment for applied research and integration of project equipment in the applied research was partially successful.			
Indicator 4 :	Legislation and reforms to improve management and operations of main water supply organizations			
Value (quantitative	Centralized water management	Water Code and legislation to		Law on WUAs passed and ratified

or Qualitative)	responsibilities with little accountability or transparency, no cost recovery	frame Water Users groups (WUAS, VWOs) operations.		
Date achieved	12/14/2000	08/31/2007		11/30/2006
Comments (incl. % achievement)	Target achieved: 40% Law on WUAs was passed and ratified. No comprehensive Water Code to establish a sound legal framework for WUA relations with water authorities. No Water Code to frame VWOs.			
Indicator 5 :	WUA contracts for water supply to farmers			
Value (quantitative or Qualitative)	Zero water supply contracts with farmers	All farmers contract their water through WUAs		2 out of 41 WUAs have functioning contracts with less than 75% of the farmers
Date achieved	12/14/2007	08/31/2007		12/31/2007
Comments (incl. % achievement)	Target achieved: 5% Farmers in 95% of WUA areas pay directly to the RVKs, sometimes in person but mostly via investor companies.			
Indicator 6 :	Improved drinking water supply in select villages and introduce user pay concept			
Value (quantitative or Qualitative)	Drinking water supply collapsed, water drawn from irrigation canals or creeks in 23 selected project villages	23 villages with rehabilitated drinking water systems and 5 VWOs		Around 14 villages partly covered, and 17,200 out of 59,722 targeted beneficiaries.
Date achieved	12/14/2000	08/31/2007		12/31/2007
Comments (incl. % achievement)	Target achieved: 29% for 5 potable water schemes and 40% for VWOs One scheme functioning at 100%. Two schemes reported completed but not functioning at contract completion. One scheme operational at 44% of design, 1 scheme at 50 % of design.			

G. Ratings of Project Performance in ISRs

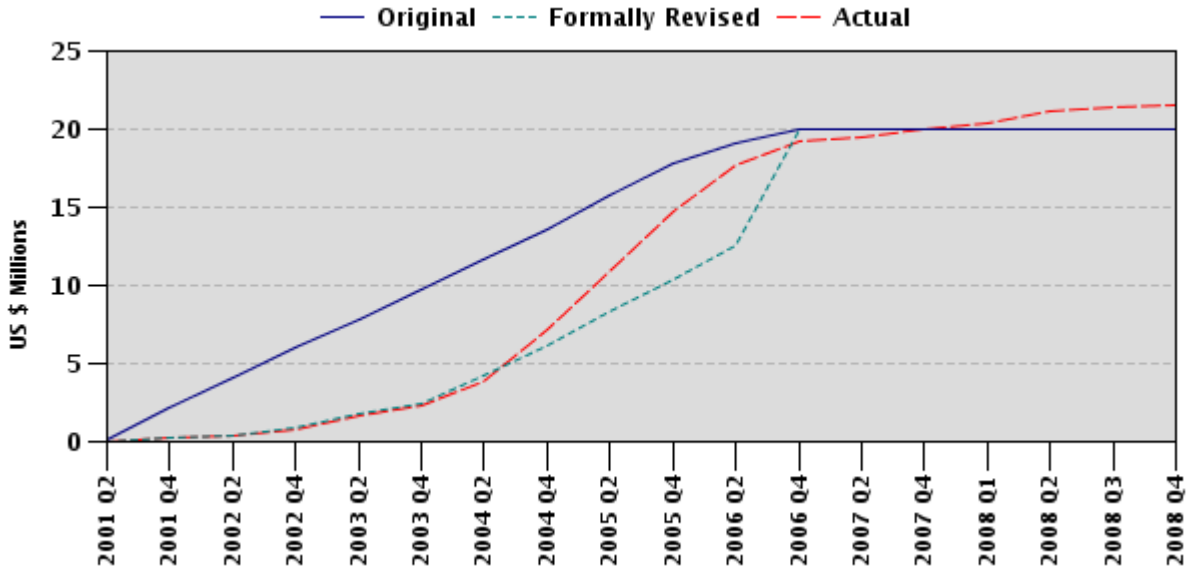
No.	Date ISR Archived	DO	IP	Actual Disbursements (USD millions)
1	06/27/2000	Satisfactory	Satisfactory	0.00
2	10/16/2000	Satisfactory	Satisfactory	0.00
3	10/31/2000	Satisfactory	Satisfactory	0.00
4	05/03/2001	Satisfactory	Satisfactory	0.25
5	10/22/2001	Satisfactory	Satisfactory	0.26
6	12/13/2001	Satisfactory	Satisfactory	0.36
7	04/11/2002	Satisfactory	Satisfactory	0.60
8	07/18/2002	Satisfactory	Satisfactory	1.00
9	11/15/2002	Satisfactory	Satisfactory	1.51
10	03/31/2003	Satisfactory	Satisfactory	2.06

11	08/14/2003	Satisfactory	Satisfactory	2.77
12	12/22/2003	Satisfactory	Unsatisfactory	3.79
13	06/29/2004	Satisfactory	Satisfactory	7.14
14	11/10/2004	Satisfactory	Satisfactory	9.80
15	11/24/2004	Satisfactory	Satisfactory	9.96
16	05/24/2005	Satisfactory	Satisfactory	13.85
17	10/14/2005	Satisfactory	Satisfactory	16.34
18	12/12/2005	Satisfactory	Satisfactory	17.49
19	03/27/2006	Satisfactory	Satisfactory	18.42
20	12/23/2006	Satisfactory	Satisfactory	19.51
21	07/25/2007	Satisfactory	Satisfactory	19.99
22	12/20/2007	Satisfactory	Satisfactory	20.79

H. Restructuring (if any)

Not Applicable

I. Disbursement Profile



1. Project Context, Development Objectives and Design

1.1 Context at Appraisal

1. At the time of project appraisal, Tajikistan was one of the most fragile and poorest of the CIS countries. The country was emerging from a five year civil war that ended in 1997, and much of the infrastructure in the agriculture sector was dilapidated. By 2000, economic growth was just beginning to recover, but the country still faced great hurdles to development, and the great majority of its population continued to live in rural areas and rely on farming for survival. The agriculture sector was (and still is) of vital importance to the economy of Tajikistan, accounting for about 30 percent of GDP and 50 percent of employment. From the end of the 1990s, Tajikistan started the gradual privatization of former state farms in order to transform the agricultural sector into a competitive market oriented system. This transition towards private farms was supported by the Bank in 8 districts, through the Farm Privatization Support Project (FPSP) which supported newly privatized farms on 18,000 ha. The FPSP started in 1999 and closed in 2006.

2. In Tajikistan, eighty percent of the cultivated lands are irrigated, but in 2000 most of the principal irrigation and drainage (I&D) infrastructure (pumping stations, delivery pipes, diversion structures, main canals, etc.) were in danger of collapse, after nearly 30 years of neglect. This was becoming a major risk for the production capacity of the agricultural sector and in particular for the viability of newly privatized farms supported under the FPSP, who relied heavily on reliable irrigation services. It was expected that in case of no rehabilitation of I&D infrastructure there would be a reduction in irrigable lands resulting in a sharp reduction in rural incomes and in migration of the rural poor to urban centers or abroad. Therefore, the Rural Infrastructure Rehabilitation Project (RIRP) emerged in response to a Letter of Development Policy from the Government of Tajikistan that highlighted the need for: (i) intervention in the rehabilitation of rural infrastructure; and (ii) introducing institutional reform to water management. Institutional reform was essential, since in the aftermath of the civil war and macro-economic instability, the organizations involved in water resources management (including the Ministry of Irrigation and Water Resources - MIWR), oblast level organizations (OMOs—Obijineniya Machinogo Orosheniya), inter-raion organizations such as Meshraivodkhoz, and raion-level water management organizations (Raivodkhoz - RVK) had shrunk dramatically because of severe budget constraints and had neither the staffing nor the capacity to operate, maintain or let alone rehabilitate the I&D systems.

3. The project was designed to complement the FPSP by focusing on the same geographical regions of Yavan, Matcho, Zafarabad, Kolkhozabad, Sharinav, Rudaki (Leninski), Khuroson (Ghozimolik) and Gissor raions, to support newly privatized farmers with improved delivery of irrigation services and potable water. Furthermore, the project was designed to contribute to the Government strategy, as expressed in the Letter of Development Policy, to introduce institutional reform in the irrigation sector by decentralizing planning, administration and management of primary and secondary irrigation and drainage canals, as well as to provide a basis to transfer the operation and maintenance (O&M) of tertiary irrigation and drainage canals to Water Users Associations (WUAs) and increase cost recovery of O&M.

1.2 Original Project Development Objectives (PDO) and Key Indicators

4. The Project Development Objectives were: (i) to increase water supply and efficiency in the main and secondary irrigation canals supplying the farms being privatized under the Farm Privatization Support Project and adjoining farms; (ii) to develop institutional capability in land and water resources management; and (iii) to improve the quality of drinking water in selected villages. The Key Indicators (KI) were: (i) Improved average water conveyance in main canals; (ii) Area well served with timely irrigation water in adequate quantities; (iii) Number of people served by improved irrigation; and (iv) Increased water use efficiency and reduced water use with more crop variety.

1.3 Revised PDO

5. There were no changes made to the PDO or to the key indicators during project implementation.

1.4 Main Beneficiaries

6. The project intended to benefit roughly 400,000 people who depend on irrigated agriculture in the project areas through improvements in water infrastructure that aimed to increase reliability of water delivery and timely water availability during critical periods of crop growth. Of the 400,000 beneficiaries, 60,000 inhabitants in 23 villages were to benefit from improved drinking water supply. Secondary beneficiaries of the project included organizations involved in the management of water in the irrigation sector. These included organizations at the raion and oblast levels, as well as the Tajikistan University of Agricultural Sciences (TUAS) and the Tajikistan Land and Water Resources Management Institute (TLWRMI).

1.5 Original Components

7. The RIRP was originally intended to be implemented over a period of five years and included the following four components:

Component One: Rehabilitation of main irrigation and drainage works (US$ 16.2 million): Under this component, the following works were planned: (i) Repair of head-works and downstream protection works addressing main water supply to the project areas, upgrade of emergency escape structures; (ii) Desilting of canals (about 1 million CM of earth works), structural repairs and replacement of damaged canal linings wherever necessary; (iii) Replacement of cross regulator gates (140) and selective rehabilitation of siphons, aqueduct structures and outlets to the on-farm canals, including repairs to gates and surrounding structures and installation of new gates and turnout boxes; (iv) Rehabilitation of drainage works, involving desilting, improvement and reformation of the main and collector drains and cross sections, cleaning and repair of vertical drains and replacement or installation of new equipment, and repairs to out-falls; (v) Rehabilitation of pump stations supplying the main irrigation systems (in about 30 locations); repair of electro-mechanical equipment; provision of essential spare parts for the pumps, motors and transformers; repair of pump station forebays and delivery bays; and replacement of delivery pipes where necessary; (vi) Repair of electric motors and submersible pumps for tube wells; (vii) Re-establishment of water measurement devices (at about 99 points) on the main canals and at the off-take points to each of the former state and

collective farms; and (viii) Selective improvement of access roads (101 km) to the main and secondary irrigation canals and pump stations, including gravel surfacing.

Component Two: Provision of community-based village water supply in selected villages (US$ 1.3 million): The project was designed to support the following activities:(i) Construction of tube wells with submersible pumps in the village of Ak-Kurgan (Rudaki raion) and water supply for nine hamlets in Matcho raion and all seven villages in Zafarabad raion; and (ii) Rehabilitation of the pump unit in the water supply pump station of Firdausi Farm and construction of a new pump station at Ittifok Farm, as well as laying of the main water delivery pipelines in Kulabad village of Yavan raion and in three villages (Rokhi-Lenin, Suyunabad, Yangiabad) of Kolkhozabad raion.

Component Three: Institutional capacity building for improved land and water resources management (US$ 2.7 million): The project was designed to support institutional capacity building to improve land and water resources management. This included several activities. First, this component aimed to improve the management and operations of main water supply organizations. Water supply organizations were located in each project raion (the RVKs) and in the oblasts. This component was designed to improve their record keeping and monitoring, analysis of water supply and demand, needs-based budget estimation, administration, setting and collection of irrigation service fees, O&M rules, regulations and procedures; and communication systems. Support for rehabilitation of offices was to be provided, as well as office equipment, office supplies, training and technical assistance.

Second, the project sought to establish a transparent system of irrigation system fees (ISFs) between farmers and RVKs, with progressive increases in order to arrive at full cost recovery for O&M for the delivery of water from source to farmers within 10 years. Therefore this component supported the establishment of WUAs of farmers at the field systems level. The main functions of these WUAs would be to operate and manage field level irrigation and drainage systems, collect water charges from beneficiaries, and pay for the irrigation services provided by the RVKs. The project was to assist in the formulation of a Water Code that would, among others, provide a legal basis for: (i) the establishment and functioning of independent and self financing Water Users' Associations in the project areas; and (ii) decentralization of water management responsibilities from RVKs to WUAs, downstream from the intakes to areas under management by WUAs. The project would provide support for the initial establishment of these organizations, like office equipment, vehicles, training, technical assistance and operating costs.

Third, the component aimed to finance the strengthening of the Tajikistan University of Agricultural Sciences. The TUAS would receive support to provide new courses at the undergraduate and graduate levels in water management, economics, finance, recent advances in I&D technology, legislation, WUAs, and the like. The project would rehabilitate facilities, upgrade the laboratories of the hydro-melioration department, provide support to the library, training equipment and materials, and support faculty exchange programs, twinning arrangements with foreign universities and study tours.

Fourth, this component aimed to establish the TLWRMI. This institute was to be established as a center of excellence for applied research, training and demonstration of the efficient use of land and water resources in the country. It would build upon the unused facilities of the Hissar Polygon (demonstration farm), where such research was carried out in the past. Emphasis would be placed on undertaking an applied research program to determine key parameters for

improved irrigation management in Tajikistan (crop coefficients, soil infiltration and run-off characteristics, salinity tolerances, etc), and providing the institute with the necessary research equipment to implement this program. This institute eventually would provide practical training for farmers and students in a variety of land and water resources management technologies and practices suitable for private farming. The project would rehabilitate the training facilities, upgrade the laboratories, provide essential equipment including office equipment, and finance operating costs, training and technical assistance.

Finally, this component was to support a study of irrigation institutional restructuring, specifically of the MIWR, to evaluate various institutional options and recommend suitable mechanisms for the sustainable development of land and water resources in Tajikistan. The study would encompass a detailed review and assessment of existing organizations, organizational and management systems, policies for land and water resources development, the legal framework, and lessons learnt from the experience from the implementation of the FPSP and the RIRP and activities being undertaken in these projects, and an evaluation of a variety of organizational structures from around the world. Stakeholder workshops would be held with all the relevant agencies, institutions and beneficiaries, and a suitable plan for the restructuring of irrigation institutions would be recommended. The project would also finance technical assistance and study tours.

Component Four: Strengthening of Project Management and Implementation Unit (US$ 3.0 million): For the management and implementation of the RIRP, the Project Management Unit (PMU) established for the implementation of the FPSP would be strengthened with additional technical, financial, accounting and procurement staff. A Project Implementation Unit (PIU) would be established under the PMU in Dushanbe for day-to-day management of the project and supervision of on-site construction and quality control. The project would finance rehabilitation of the offices, equipment, training, technical assistance and operating costs.

1.6 Revised Components

8. The components were not formally revised.

1.7 Other significant changes

9. While the project was not formally revised, it was extended by six months to close in December 2007 to take advantage of some savings in the project disbursement. These savings came about because of a favorable exchange rate with the dollar that led to about US$ 0.79 million in additional funding at the project closing. The project was extended so that the PMU could procure steel sheets that could then be made into large-diameter pipes for water delivery.

10. Component 2 was originally conceptualized as investments mainly in civil works, to construct and rehabilitate much-needed water supply infrastructure to about 60,000 people in 23 villages. Village Water Organizations (VWOs) would be established for these villages. The VWOs would not own the potable water infrastructure, but be responsible for the O&M after hand-over of the system after completion. In the first year of project implementation, it was deemed more sustainable to use a more comprehensive Community-Driven Development

(CDD) approach[1], where the VWO as a representative of the community would contribute 20% towards the cost of civil works in cash or in kind, receive the project funds, manage all aspects of subproject implementation, and afterwards would be the owner to the infrastructure. After system hand-over, the VWOs were to assume full responsibility for the O&M of the potable water supply schemes supported under the project.

11. Under Component 3, the number of WUAs to be supported under the project was gradually increased during project implementation from 16 to 41 in total under RIRP, in addition to 9 WUAs established under FPSP. This expansion beyond the original target was based on an interim evaluation at MTR in 2004, which at that time indicated that the WUA model established under FPSP was successful and suitable for replication.

2. Key Factors Affecting Implementation and Outcomes

2.1 Project Preparation, Design and Quality at Entry

12. The main feature of project preparation was that RIRP was designed to complement the FPSP, so in districts where private farming and provision of long term land lease rights were already taking place. RIRP would complement the FPSP investments with investments in improved irrigation and potable water infrastructure and increased institutional capacity. RIRP was implemented by the same PMU, and as the FPSP also provided support to WUAs, RIRP WUAs were established according to the model developed under the FPSP and partially supported with trainings and technical assistance provided under the FPSP. Preparation of the RIRP was financed under a Japanese PHRD grant.

13. Secondly, the project was conceptualized under difficult conditions. The country had recently emerged from civil war, institutional capacity was underdeveloped and the needs for rehabilitation of I&D infrastructure were immense and outstripping the investment capacity of both the Government and the IDA portfolio. Therefore, the choice was made at design to focus project investments on preventing the imminent collapse of irrigation and drainage infrastructure, in order to prevent shrinkage in irrigated area and associated loss of rural livelihoods, and with a rather low investment of around 100 US$ per hectare, instead of aiming for a more comprehensive rehabilitation that would required higher per hectare investment costs. Furthermore, as there was hardly any private sector in Tajikistan to provide quality services in design, engineering, construction, and construction supervision, rehabilitation was to be done according to the available Soviet-era designs and technical specifications.

14. A third key feature was that the project aimed to leverage the investments in irrigation and drainage infrastructure with investments in institutional capacity building, establishing WUAs, introducing progressive cost recovery of O&M and conducting a comprehensive study on irrigation and water sector reform, in order to ensure the sustainability of project investments in infrastructure rehabilitation. Based on the discussions with Government and the Letter of Development Policy, the World Bank team expected that this would be realistic and feasible, since Government had expressed its commitment to a gradual reform of the irrigation sector and

[1] According to the World Bank definitio, CDD is an approach to development that supports participatory decision making, local capacity building, and community control of resources. The key pillars of this approach are community empowerment, local government empowerment, accountability and transparency, and learning by doing. Under the CDD approach the project channels funds directly to communities and the community manages all aspects of subproject implementation.

the agriculture sector. At negotiations, a number of concrete agreements were reached with Government to support this reform. Among others it was agreed in the Development Credit Agreement (DCA) that the project would carry out a restructuring study of the MIWR and that Government would: (i) maintain the necessary policies and procedures to monitor the achievement of the PDO according to the outcome indicators; (ii) maintain arrangements for the maintenance by WUAs of operational and financial records and submit a status report on the collection rate of the ISF; and (iii) review and adjust annually the ISF, based on a system of progressive cost recovery of O&M, satisfactory to IDA. Based on these agreements, the PDO was not just to maintain the current level of water supply, but to actually increase water supply and efficiencies in main and secondary canals as a result of the complementary investments in infrastructure and increased institutional capacity resulting in improved cost recovery of O&M of the I&D systems.

15. Fourth, an important design consideration was that Government was not willing to allocate substantial budget for institutional capacity building and technical assistance for Component 1, 2 and 3 and did not consider this essential for successful achievement of the PDOs, in spite of its commitment to increasing capability in land and water resource management. Budget for technical assistance was limited and mainly allocated to strengthen the capacity of the PMU in procurement and financial management.

Component One: Rehabilitation of main I&D works

16. The main objective of this component was to increase water supply and efficiency in the main and secondary structures supplying the farms being privatized under the FPSP and to prevent further deterioration of I&D infrastructure in the project area. At the time of project appraisal as well as at project closing, the rural population of Tajikistan relied heavily on irrigated crops, but the irrigation system was deteriorating rapidly, leading to a decline in irrigation services and the failure of key structures, including headworks. A possible outcome of this could have been a rapid decline in irrigated area and rural incomes, resulting in migration of the rural poor in search of alternative employment. Given this scenario, the objective of the component was clear and important, and furthered the Bank's Country Assistance Strategy (CAS) for Tajikistan. It responded adequately to the development priorities of the Government and as a result the component benefited from a strong Government commitment. The project allocated sufficient resources for maintaining the existing level of water conveyance, but depended on Government commitment to a reform of the irrigation sector and gradual increase in funds available for O&M to achieve the PDO of an actual increase in water conveyance and ensure sustainability of project investments. This was not realistic as Government commitment to reform was not substantiated with adequate budget allocations for qualified technical assistance that would have provided outside expertise in the field of O&M cost recovery and sector reform, and during project implementation Government commitment reduced even further.

17. A joint IDA and Government assessment during the identification and preparation phases of the project concluded that the highest priority was to reverse the rapid deterioration of irrigation infrastructure and to maintain water supply through the swift rehabilitation of vital irrigation infrastructure. Therefore, the specific scope of works for subprojects was proposed by the Government and adopted by the RIRP during preparation. Rehabilitation was based on existing Soviet-era designs with a straightforward scope of activities, which was considered appropriate given that this was the first sizable attempt in Tajikistan to rehabilitate basic

irrigation infrastructure and given the limited experience of the PMU in implementation of infrastructure projects.

18. In the eight project raions, only about 48,000 ha or 38% of the total project area was equipped with gravity fed systems, and 62% with pumped systems. Since most of the pumping stations were in a very poor condition, it was estimated at preparation that these pumping stations were likely to stop functioning within the next 3-5 years, leading to further declines in the irrigation service area and in agricultural production. Therefore, around US$ 10.2 million (around 67%) out of the US$ 15.3 million total funds allocated under Component 1 were designated for the rehabilitation of pumping stations with the main intention to render them operational for the next 8-10 years.

19. Project design envisaged the support of an international technical team to review designs and design cost-effectiveness, and assist with the adherence to appropriate technical and quality standards. Budget allocated to design and construction supervision was around 2.2% of the rehabilitation works, which was low compared to similar engineering projects, which allocate around 8% to 12% of the costs of rehabilitation to implementation planning, design and construction supervisions. As a result, the RIRP used the standard designs from the Soviet-era (of which cost-effectiveness is not a key design parameter), and supervision of the implementation of works was done by the oblast and raion water authorities, with support of one international quality control irrigation engineer (IQCIE).

20. The main risks for Component 1 were adequately assessed at project design, including a substantial risk resulting from an unstable political environment, a substantial risk for the timely implementation of acceptable quality of project works, and a moderate risk resulting from the lack of availability of skilled specialists. In the risk framework, the continuation of the Government reform program was identified as a mitigation measure to avoid the risk that farmers incomes would not rise as rapidly as envisaged, whereas it would have been more realistic to identify a decrease in the commitment from Government to the reform of the sector as a substantial risk for the achievement of the PDOs.

Component Two: Provision of community-based village water supply in selected villages

21. The main objective of this component was to improve the quality of drinking water in selected villages, through the construction and rehabilitation of community-based potable water supply systems serving 60,000 people in 23 villages[2]. Since 80% of rural areas in Tajikistan at the time of project appraisal and of project closing does not have a reliable water supply from clean water sources, and people mainly draw water from irrigation and drainage canals, the objective was important and responsive to the development priorities in the project districts. However, the component was marred by a number of significant shortcomings both in the design of the CDD approach as well as in the technical designs, which eventually contributed to a unsatisfactory outcome of this component. Most importantly, the CDD approach whereby the project channels funds directly to communities and the community manages all aspects of subproject implementation, was relatively new in Tajikistan, and was a significant deviation of the top-down project management that was common practice. The PMU had no expertise or experience with this approach, and no alternative implementation partners with experience in

[2] The number of 23 villages was reported through project supervision, but in the BCR 30 villages are reported. The 7 additional villages are in fact a number of neighborhoods (mahalas) part of the 23 villages originally targeted.

CDD were identified, nor where funds allocated to provide adequate technical assistance to the PMU to build this capacity and have an appropriate staffing level to manage this component. Second, at project appraisal, it had been noted that based on lessons-learned from the EU TACIS program, villagers were too poor to make advance cash payments to the contractor for construction of the works. In spite of this, the project design included a community contribution of 20% in order to enhance the perception of the community ownership over the system. This 20% was to be provided both in cash (2% or more at the start of implementation) and in kind (18% or less in labor and materials). The rationale for setting the level of 20% community contribution was not based on an affordability and willingness-to-pay analysis, and given the poverty of the project areas, the assumption that communities would be able to contribute significantly towards the civil works reduced the likelihood of the component meeting its objective.

22. The PMU reported that technical designs were finalized by relatively inexperienced design engineers. Beneficiaries and system operators reported that technical designs included pump capacities that were too low for the required head (elevation) and did not specify the appropriate electrical devices to control power supply to potable water pump stations. As a result, the World Bank evaluation team observed that a number of pumps were not functioning because the electrical switchboard or the pump motors had burned. Little funds were allocated to staffing for the supervision of civil works, and it was reported, and confirmed by observations from the evaluation team, that construction of civil works was of poor quality and included equipment that was not according to specifications and hence not adequate to meet the design objectives. During project implementation some trust funds became available for a short-term CDD consultant to build capacity in the PMU and the VWOs, but eventually the lack of management capacity at the PMU in combination with the lack of construction supervision resulted in very poor contract implementation, low capacity of the VWOs and unsatisfactory achievement of this component.

23. No specific risks were identified for Component 2 in the risk table. General risks rated as substantial were the lack of a supportive environment for independent functioning of water organizations resulting from resistance to change from raion administrators and the timely implementation of acceptable quality of project works. This was correctly identified, as the strict control of raion authorities over the activities of the rural population, proved not to be conducive to the implementation of CDD approach and the establishment of independent and autonomous VWOs. Risks not adequately mitigated included the substantial risk of the low financial capacity of the communities to contribute to the project costs and the limited capacity of the PMU to implement the CDD approach.

Component Three: Institutional capacity building for improved land and water resources management

24. The main objective of this component was to develop institutional capacity in land and water resources management, through support to oblast and raion water management organizations, establishing WUAs responsible for O&M, providing support to the TUAS, establishing the TLWRMI and supporting a study on the restructuring of the irrigation sector. This component was designed to address the poor state of water infrastructure management in Tajikistan and facilitate the gradual increase of ISFs to meet real O&M costs over a period of 10 years. At project design, the actual budget for O&M of irrigation infrastructure was one-eighth of the budget allocated during the Soviet times. Therefore, this component was highly relevant,

given the role of region and district water management organizations in the implementation of Component 1, and the role of WUAs in improving the efficiency and sustainability of the project infrastructure investments, through improving on-farm water management and generating fees for increased O&M. Continued dialogue between Government and IDA during preparation and implementation were adequate to ensure that at negotiation agreements were reached on ISF record keeping and procedures for the gradual increase of ISFs under review of IDA. However, at the level of the district authorities, it was noted that there was insufficient commitment to especially the creation of WUAs, as it was not perceived in the interest of the authorities to transfer ownership and management of on-farm irrigation structures to independent farmer-based groups. At appraisal it had been envisaged that Government commitment to a gradual reform of the irrigation sector and continued dialogue with district authorities would eventually ensure and increase in their commitment.

25. The component was complex and relatively new to Tajikistan, but the component design had some significant shortcomings. Most importantly, as under component 2, there were insufficient budget allocations to technical assistance for this complicated component, and no dedicated staff within the PMU to coordinate and be accountable for the component outputs and outcomes. Secondly, oblast and raion water management agencies were supported with equipments and with a limited amount of training (9 in total) conducted by local institutes, with limited input from external consultants with relevant expertise in water sector reform. The project would have benefited from a more long-term and hands-on involvement of qualified technical assistance and follow-up by the RIRP to provide backstopping in the implementation of training skills and to ascertain that training skills would materialize in improved record keeping, improved water management, gradual increase in ISFs and improved institutional arrangements. Thirdly, support to the TUAS and the TLWRMI consisted of the provision of equipments, facility rehabilitation and short-term training input provided by international consultants. A longer-term arrangement, allowing for a more continuous involvement of experienced consultants could have contributed to proper training, hand-over and use of the equipments in applied research, eventually did not materialize.

26. With respect to the WUA subcomponent, project design deviated from best-practice examples of projects with a WUA component from the World Bank and other agencies. This resulted in a number of critical shortcomings that contributed eventually to the unsuccessful functioning of these organizations:

- Due to its complexity, support to WUAs under World Bank projects in general had a dedicated component with a significant amount of technical assistance. Under the RIRP support to the establishment of WUAs was a subcomponent.
- WUAs were supported partially with equipment, training and management costs (payment of salaries through a declining contribution of 100% in the first year to 25% in the third year), but the project design did not dedicate adequate technical assistance and responsible staff within the PMU to coordinate the component, provide hands-on assistance and guidance to the WUAs, monitor their functioning and implement mitigation measures identified in the risk matrix.
- Lessons-learned from other projects with a WUA component show that payments of WUA salaries by projects instills the perception among farmers and water authorities that WUAs are created as part of the project, and not with the objective to become the main organization responsible for water management in WUA areas. Therefore this

practice was known among World Bank sector specialist to be detrimental to the sustainability of WUAs, and in the RIRP it contributed to the unsuccessful outcome of this subcomponent, as many WUAs stopped functioning shortly after the project ceased to contribute to salary costs. Even as the financial situation of farmers was dire, mainly as a result of increasing debts to cotton investors and low financial returns at the farm household level, payments of WUA salaries was not essential for establishing successful WUAs, as some WUAs established independently or by other projects[3] are functioning relatively well without external salary contributions.

- The project established WUAs on administrative boundaries, along the boundaries of the kolkhoz brigades. Lessons-learnt from similar projects, show that WUAs preferably are established on the basis of hydraulic boundaries. WUAs established on hydraulic boundaries provide irrigation water to their members from water intakes under the operational control of the WUA, and as such O&M is less complex and the potential for water conflicts is reduced.
- A key element at design was for Government, through the PMU, to ensure that accurate records would be kept and collected from WUAs regarding their operations and financial conditions. This commitment was also included in the DCA and indicators were established. However, the staffing level at the PMU and procedures included at design to gather data were inadequate to collect and maintain these records.

27. Regarding the WUAs the component appropriately identified the need for a suitable and comprehensible legal framework and set of procedures for the creation and operation of WUAs to ensure the orderly transfer of the O&M of I&D infrastructure from state control to the water users. The project emphasized the need for an appropriate legislative framework to be passed by the Government, and on intensive training and provision of technical assistance for the creation and functioning of WUAs.

28. The main risks were identified at project design in the risk matrix, including the substantial risk of the lack of a supportive and facilitating environment for independent functioning of water supply and delivery organizations resulting from resistance to change from local administrators. Proposed mitigating measures were generally adequate and included continued dialogue with national and district authorities, demonstration of the benefits of decentralization, wide information dissemination and consensus building, and encouraging participatory approaches.

29. The second risk rated substantial was the setting of adequate levels of irrigation service fees by WUAs, and the ability and willingness of farmers to pay to cover O&M costs. Proposed mitigation measures were generally adequate and included a gradual increase of price of water and energy prices for agricultural purposes, provision of intensive training to WUAs, strengthened record keeping, financial and management information systems, internal audit from the outset; and information dissemination of collection rates, use of funds. However, project design did not envisage sufficient financial and human resources to proper implement these risk mitigation measures.

[3] Under CARE and Winrock projects, as reported by Winrock

Component Four: Project Management

30. Component 4 was not designed adequately. Sufficient budget was allocated to provide technical assistance to the procurement and financial capacity within the PMU, but the staffing plan only provided for 1 irrigation engineer in charge of implementation of Component 1, with support by the IQCIE, and no staff dedicated to Component 2 and 3 of the project.

2.2 Implementation

2.2.1 Factors that have affected general implementation progress:

31. The main factors affecting project implementation progress were: (i) decreasing commitment from Government to a gradual reform of the agricultural sector and the irrigation sector; (ii) an environment in the agricultural sector which became increasingly restrictive for farmers to obtain sufficient income from agriculture and for independent community-led organizations like WUAs or VWOs to function effectively; (iii) the lack of accurate and reliable information from the M&E system regarding the outcome of project implementation; (iv) poor capacity of contractors; (v) insufficient technical assistance to the PMU and organizations established by the RIRP; and (vi) inadequate staffing levels and capacity at the PMU. Most notably, and discussed in more detail in Section 2.3, as a result of the significant short-comings in the M&E system, a number of implementation issues were not identified during implementation. Based on the M&E reports, implementation progress and achievement of project outcomes were reported satisfactory throughout the duration of the project, while in the meantime a gradual decline in the achievement of project outcomes occurred.

32. A core underlying element during implementation was and still is the agricultural policy in Tajikistan, most notably in the cotton sector. The 2007 World Bank strategy for agriculture sector development in Tajikistan[4] noted that: (i) the impact of agricultural reforms from the end of 90s onwards are limited, markets for commodities and farm inputs are weak, and there is a flawed agricultural policy inhibiting rural poverty reduction; (ii) Government control of cotton production and marketing is based on production targets and is combined with local Government coercion of farmers to achieve these targets and to work with specific cotton gins and investors; and (iii) by charging above market prices for on-farm inputs and paying below market prices for cotton fiber, local governments collude with investors who squeeze profits and oblige farmers to rely on them for inputs and seasonal finance, pushing farmers into increasing debts. The 2007 Bank strategy drew on the findings of the 2004 Poverty and Social Impact Analysis[5] which already had identified that local authorities had incentives to collude with rent-seeking stakeholders (i.e. cotton investors) in the cotton sector. As a result of this environment, returns for farmers from cotton cultivation were decreasing during the lifetime of the project, debts were increasing, and farmers were increasingly not able to determine the agricultural production and management at their farms.

33. The agricultural policy was also reflected in a reduced Government commitment to a gradual reform of the irrigation sector. The power imbalance between rural communities and

[4] World Bank and SECO, 2007. "Republic of Tajikistan – Priorities for sustainable growth: A Strategy for Agriculture Sector Development in Tajikistan". World Bank, Washington DC.
[5] World Bank, 2004. "Poverty and Social Impact Analysis of Cotton Farmland Privatization." World Bank, Washington DC.

district authorities inhibited the decentralization of water management and the effective functioning of WUAs, as RVKs were instrumental in exercising local Government control over the WUAs and enforcing water allocation schedules to meet cotton production targets. As farmers' margins decreased, fewer funds became available to gradually increase ISFs to meet O&M costs, and hence adequate funding to ensure the sustainability of investments was jeopardized. This reduced commitment from Government was demonstrated by the lack of reporting on the progress in ISF collection and cost recovery from the MTR in 2004 onwards, and eventually also the study on restructuring of the MIWR was not carried out under the RIRP.

34. For the three project components, specific factors affected implementation progress and project achievements and are discussed in Section 2.2. A number of more general factors listed below affected implementation of the RIRP, most notably in hindering implementation timelines, but by project closing, these general factors did not significantly effect the achievement of the PDOs:

> **Procurement**: Several factors contributed to a weak procurement process. First, the staff within the PMU had limited knowledge of procurement rules, leading to delays and confusion over procurement procedures. This was coupled with an overall country environment where procurement of private company goods and services did not exist, the lack of private companies (and related lack of knowledge to prepare bidding documents), as well as a weak banking sector, lack of security instruments (such as letters of credit) and poor knowledge of public procurement processes all contributed to delayed procurement and disbursement of funds.
>
> **Delayed counterpart financing**: Significant delays within the Government to release counterpart financing caused additional delays in project expenditures, as well as led to the Bank to postponing reimbursement of counterpart financing pending compliance with procedures and a temporary downgrading of implementation performance to unsatisfactory. Much of this delay was caused by staff turnover that made training programs and knowledge retention difficult, and also led to increased staff trainings.
>
> **External environment**: In 2000, a major drought was followed by an influx of emergency drought relief funds. Many of the staff working on the RIRP were engaged in the distribution of these emergency funds, and the implementation activities of RIRP were delayed for several months. At the close of the disbursement of these funds, project staff returned to their responsibilities, and implementation of project activities resumed.

35. These general factors were identified by regular supervision on the part of the Bank team and the resulting delay was made up in 2004 under an accelerated implementation schedule that, combined with supervision, led to the timely closing of the project. Other aspects of supervision were judged less satisfactory by a quality supervision assessment (QSA) conducted in 2006, which rated the supervision as moderately satisfactory. The QSA identified that supervision was mainly conducted within multitask missions, which contributed to a diluted focus on core implementation issues. Boundaries between RIRP and the FPSP were blurred and hence the QSA identified the main challenge to be the measurement of attributable outcomes. The QSA identified the Bank team's failure to update KIs as a major contributing factor to this problem, but rated supervision moderately satisfactory based on the assumption that the project would achieved the PDOs. In response to the QSA findings the supervision team from the end

of 2006 onwards tried to update the KIs, but a lack of data and data accuracy provided by the PMU restricted an adequate KI assessment.

2.2.2 Specific factors that affected implementation progress by component:

Component One: Rehabilitation of main I&D works

36. The main factor that affected the timely implementation of this component was the difficulty in obtaining appropriate and reasonable bids from nascent private companies in the country both for design as well as for the implementation of civil works, and the lack of adequate technical assistance for design and construction supervision. Because of the civil war, Tajikistan remained behind other FSU countries in the development of a private sector that could actively compete through a bidding procedure for works contracts. In addition to this, weak capacity of the PMU regarding procurement and high staff turnover delayed implementation of this component in the first years of the project. In general, the construction works were undertaken under difficult conditions, as harsh weather conditions and the obligation to ensure continuous water supply during the irrigation season limited construction to relatively short time periods. In addition, most of the local contractors lacked previous experience with work planning and this type of extensive rehabilitation; and were not aware of international standards and how to prepare bidding documents. Finally, original estimates for I&D works turned out to be more expensive than anticipated, due, in large part, to an increase of the prices of goods (pump equipments) imported from Russia. Especially in the first years of the project, up till 2003, this negatively affected quality of works and construction progress.

37. In the absence of a team of supervising engineers, considerable efforts both by the PMU and IDA supervision teams were made during project implementation to improve quality of both design and civil works under this component. A main contributing factor was the recruitment of the IQCIE to assist the PMU from 2002 to 2005, who provided a series of trainings to staff and contractors to explain the contracting and contract implementation mechanisms and who was instrumental in improving compliance of civil works contract implementation with quality standards. Eventually this positively affected the project implementation schedule and the quality of the works implemented from 2004 onwards, as observed by the evaluation team. The rehabilitation restored water conveyance to previous levels, but as reform of the water sector did not materialize, and O&M allocations remained stable, an actual increase in water conveyance as targeted in the PDOs, was not achieved. This was not adequately noted by World Bank supervision, and hence no additional measures to either increase water conveyance or to modify the PDOs were proposed during implementation.

Component Two: Provision of community-based village water supply in selected villages

38. Design of this component did not provide a strong basis for successful achievement of the component's objective, and also during implementation several factors contributed to the unsuccessful outcome of this component, both at the institutional and project management level as well as at the technical level:

39. The component was supported with a trust fund for a CDD specialist, who provided training to the PMU and the VWOs. No other technical assistance was provided. During implementation of the component, it was reported by the CDD specialist to the World Bank supervision team that the PMU was not the most appropriate organization to build capacity at

the community level, since their main expertise was project administration. Also, it was noted that the communities were committed to the approach, but that in the absence of a structured approach to VWO capacity building, project activities continued to be implemented in a top-down manner, much according to the Soviet legacy of project administration and implementation, and not according to the principles of the CDD approach. Project funds were not made available to the VWOs, and in practice implementation of the potable water subprojects was done by the PIU, as they supervised the works, managed the contracts, and disbursed funds to the contractors. From the start of the project, implementation was affected by the low amount of cash community contributions and reportedly in Macho part of the system was not constructed as a result of this. It was reported by beneficiaries to the evaluation team that the level of community contribution was not adequately discussed with the beneficiaries and had not been agreed upon with the community in general meetings. The community contribution in cash and in kind was not adequately recorded in the certified Bill of Quantities and as a result there was little clarity how much each of the communities contributed to the implemented works. Poor capacity and ownership by the VWOs of the systems after hand-over resulted in low collection rates from communities, improper O&M and a rapid deterioration of the parts of the system that were functioning after hand-over. Support of the raion authorities proved to be key for the functioning of the VWO and the quality of the implemented works. In case of Zafarabad, the VWO has been merged into the jamaot and has full support from the authorities. In other areas the VWOs have less support and in the case of Yavan local authorities removed equipments on the balance sheet of the VWO to sites under the control of the raion authorities.

40. Civil works contracts in practice were managed by the PIU, who also made payments to the contractors, with limited input from the VWO. This procedure did not contribute to transparent implementation and empowerment of the VWO. Contract management and supervision of the construction of civil works was inadequate and, in combination with the poor quality of designs, resulted in the installation of equipment that was not according to specifications, delays in construction progress, and eventually in non-functioning systems in Yavan and Kolkhozabad districts, and partially functioning systems in Matcho and Rudaki districts. Poor contract implementation at times had negative externalities, as in the case of Matcho, where back pressure on the spring during excavation caused the spring discharge to decrease significantly, in the case of Yavan where pressure in the potable water network existing prior to the project was reduced, and in the case of Kolkhozabad where construction debris had not been removed by the contractor. Contract management documentation was not according to engineering standards, as for several contracts changes were made without amendments to the contract or variation orders and as-built drawings and O&M manuals were not available.

41. The PMU did not address these issues adequately during implementation, and also did not provide correct information to the World Bank supervision team on the lack of achievements of the component. For example, it was not noted by the supervision team that project funds were not disbursed to the VWOs and that effectively project implementation was done by the PMU and not according to the principles of the CDD approach. Beneficiaries in Yavan stated to the evaluation team that during field visits the World Bank supervision team was not provided with full and accurate information, in spite of the fact that VWO reportedly highlighted implementation problems with the PMU. General problems of poor VWO capacity and low community contributions were noted by the World Bank supervision team in summer 2005, and from that time onwards the team consistently urged the PMU to address this issue and

further the capacity building of the VWOs through the recruitment of an international training specialist. However, the supervision team did not note the extent of the problems with this component, and continued to rate the outcome satisfactory, even when only a minority part of the target population had been provided with water.

Component Three: Institutional capacity building for improved land and water resources management

42. The support to oblast and raion water management organizations did not face significant implementation problems in the achievement of its' main outputs, training and the provision of equipment. However, the project did not provide continuing support to operationalizing the acquired training skills and equipments in the daily activities of these organizations, and as a result M&E and record keeping of water management, ISF collection and O&M cost-recovery in the districts remained weak. The implementation of support to the TUAS and the TLWRMI were hampered by similar difficulties: trainings on equipment were limited, and reportedly O&M manuals were poorly translated and not understood by staff trained in the use of the equipments. It appears that this went unnoticed both by the PMU and the supervision missions, as no issues were reported with the outcomes of this subcomponent.

43. This component also aimed to establish local level WUAs to take over the O&M of secondary and tertiary canal structures. At the project's inception, it was understood that this task would be monumental, given the lack of (i) private ownership of land holdings; (ii) support from raion authorities to the emergence of independent farmers organizations; and (iii) political will to pass a legal framework that would adequately equip these organizations with the ability to collect fees. However, the lack of adequate technical assistance and staffing within the PMU did not contribute to the effective implementation of this monumental task. In the first years of the project, WUA salaries were paid by the project and WUAs received training under the technical assistance component of the FPSP. Through the FPSP PIU field office, the PMU was able to provide some backstopping to WUAs, and had a continuous dialogue with RVKs, centered around the rehabilitation of works, but also to ensure RVK support to WUAs. At this time, WUAs were relatively effective and farmers were satisfied with their performance. As the project reduced the salary levels, from 2005 onwards, most of the WUAs started to lay-off staff because of insufficient resources, and at the same time were not able to increase their revenue through collecting ISFs, since: (i) the RVKs would interfere when WUAs would manage the water supply not according to the priorities of the district authorities, which were set to meet the cotton production targets; and (ii) farmers were indebted to cotton investors. A training program provided by RIRP in 2006, by local trainers mostly in the training center in Dushanbe, was providing extra skills to WUA staff, but was not able to reverse the negative trend. Eventually, by the end of 2007, most WUAs stopped functioning altogether, and the ISFs were paid mainly by investors directly to the RVKs.

44. After 9 revisions of the original draft were reviewed by the Cabinet, the Law on WUAs was eventually passed in November 2006, close to the project's closing date. It granted WUAs the right to establish themselves as independent organizations registered with the Ministry of Justice, to collect fees from WUA members and enter into contract with RVKs. However, there is no supporting legislation within the Water Code to ensure that RVKs would have to cooperate with WUAs, and as a result many RVKs had the legal mandate to by-pass WUAs in critical water allocation decisions. Eventually, it was reported that in general the RVKs considered the WUAs an unnecessary nuisance to meeting the objectives of the district

authorities, namely to allocate irrigation water to farmers growing cotton. For example, in three out of the eight project districts (Khuroson, Matcho, Yavan), the RVKS effectively did not agree to the WUAs collecting ISFs from farmers and fees were paid directly to the RVKs by the investor companies to whom the farmers are indebted, or by the farmers. In two districts (Matcho and Rudaki), WUAs reported that in the early days of WUA establishment, WUAs were not allowed by raion authorities to halt water delivery to farmers who did not pay ISFs, whereas in Rudaki raion WUAs were instructed by the RVK to only admit farmers with more than 5 ha under cotton cultivation as members to the organization.

45. Similar to the performance under Component 3, the PMU did not address these issues adequately during implementation, and also did not provide correct information to the World Bank supervision team on the lack of achievements of the component, in spite of repeated requests from the World Bank for an inventory of the status of the WUAs. Beneficiaries reported to the evaluation team that the PMU was aware of the serious capacity and implementation issues regarding the establishment of WUAs. The PMU provided an update report in the draft BCR at project closing, but when the evaluation team found that these data were partially incorrect, a more accurate report was submitted by the PMU only in the final BCR, 4 months after project closing.

46. During implementation, and in spite of repeated request from the World Bank supervision team, the PMU did not provide the Bank team with an inventory of the status of the WUAs, nor did the PMU contract with an international WUA training specialist. These requests from the Bank were made after the supervision team noted from 2005 onwards that the capacity of WUAs should be strengthened. Given the extent of the poor performance of WUAs, the Bank's recommendation for the provision of additional training would have been insufficient to reverse the declining trend in the achievement of the component outcomes. Because of the poor progress reporting by the PMU, the supervision team did not identify the gradual decline in performance indicators and the extent of the threats posed to the WUAs and continued to rate the establishment of WUAs satisfactory based on performance indicators that were not updated. Mitigation measures identified in the risk matrix to minimize the risk to WUA functioning, like a continued dialogue with oblast and raion level water organizations, and demonstrating the benefits of decentralization, were eventually not implemented.

Component Four: Strengthening of Project Management and Implementation Unit

47. The greatest challenge to this component was the adoption and implementation of appropriate procurement procedures. Reliance on foreign technical assistance for capacity building led to higher costs within this component than originally anticipated, but was essential for building up the procurement capacity within the PMU, as major procurement issues were not identified during project implementation. Project management costs also ended up higher than originally estimated because of a six month extension, additional consultancies required to address issues of weak procurement capacity and staff turnover, and increases in unit costs. The second factor that affected implementation was the absence of a functioning M&E system to inform the World Bank supervision team of not only the project outputs but also of the project outcomes.

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

2.3.1 M&E Design

48. At the project's inception, a series of indicators were identified to measure the progress made in achieving these objectives. Intermediate outcome indicators were designed for all 3 project components, but were not reflected adequately in the outcome indicators, since these indicators focused mainly on the results obtained through Component 1. The indicators under this monitoring and evaluation (M&E) framework included:

(i) *Infrastructure indicators:* These included an increase in: (a) water conveyance efficiency in the main and field canals, (b) energy efficiency of the pumping stations selected for rehabilitation,(c) area serviced with timely delivery of water in optimal quantities for crops; and (d) number and types of farm groups being serviced by the improved I&D infrastructure.

Key indicator used was the improved average water conveyance in main canals. Taking into account the water measurement and accountability practice in the main conveyance systems in Tajikistan and the lack of capacity of local staff at the time of project development, as well as the objective of the component, more relevant indicators in the result framework could have been identified. Due to the lack of a proper M&E database and system, and given the lack of adequate funds for system O&M (especially pumping stations) a more proper indicator would have been an increase in the functional lifetime of infrastructure supported by the project.

(ii) Water Users' Associations and irrigation cost recovery indicators: These included: (a) formulation and adoption of a Water Code providing a suitable legal basis for the establishment and functioning of independent organizations providing water supply, delivery, and O&M; (b) increase in number of Water Users' Associations (WUAs) responsible for O&M of water delivery systems from the hydro-post to the individual farmers' fields; and (c) establishment of a transparent system of irrigation service fees, with progressive increases in level and improvement in collection rates in each of the project schemes.

(iii) Drinking water indicators: These included: (a) improvement in quality of drinking water; (b) increase in the number of independent, community-based VWOs with responsibility for O&M of the drinking water supply facilities in their villages; (c) increased level of community contributions of labor, local materials or funds for village drinking water supply facilities; and (d) increase in number of families receiving safe drinking water.

(iv) *Capacity indicators:* These included: (a) increase in number of persons trained in water resources management; (b) adoption of improved agriculture and irrigation practices; (c) increased level of practical applicability of the new subjects and training courses being introduced; (d) increase in the number of multi-disciplinary land and water resource management programs; and (e) increase in other forms of collaboration of water resources management faculty with specialists outside their departments and disciplines.

2.3.2 M&E Implementation

49. Implementation of M&E was adequate in the first years of project implementation, but inadequate in the last 3 years. A baseline study was prepared in 2001 for both the FPSP and the

RIRP, since the two projects were designed to be complementary and had the same target areas and beneficiaries. The weakness of the survey was that FPSP was already under implementation whereas RIRP was beginning implementation. An update to the survey was prepared at MTR in 2004, for both projects simultaneously. Semi-annual progress reports were produced in a timely fashion and of good quality regarding the outputs of the project, but with inaccurate data on the achievement of outcomes. The PMU also prepared a mid-term evaluation report including quantification of the indicators established under the results framework. However, since MTR, few updates were provided, and towards the completion of the project, the PMU did not report accurately on the outcomes achieved under the project. Most notably, after 2005 the Government did not meet the reporting requirements regarding the condition of the WUAs and the progress in ISF collection and cost-recovery as agreed during negotiations. The Bank response to this omission could have been more adequate, as no explicit reference is made in the project supervision documents to the reporting required under the DCA. Eventually, M&E activities were limited to monitoring physical outputs and financial monitoring. Indicators to evaluate the impact of component interventions were not followed systematically and managed in a database, and as a result most of the data available at project evaluation were mainly based on estimations of PMU staff and an extensive evaluation by the evaluation team through field visits and review of data from the RVKs.

50. The outcome indicators for Component 1 proved to be practically difficult to measure because of the existing and persisting O&M practices at the water organizations, in spite of their increased skills resulting from the training provided under RIRP. Also, neither the PAD nor the Project Implementation Plan (PIP) identified any systematic data collection mechanisms, and relevant baseline data were available for only a few of the subprojects. Furthermore, during implementation of the project, discrepancies emerged between the indicators used in the PAD and the indicators used at the MTR. For example, at the MTR an unrealistic increase of overall efficiency of the main conveyance system from 65% to 80% objective was targeted, whereas in the results framework a more realistic target of improved average water conveyance in main canals was set. Therefore, PMU progress reports and Bank supervision reports did not adequately describe the achievements obtained for this indicator.

51. While the outcome indicators for Component 2 were measurable, the draft and final Borrower Completion Report (BCR) did not contain adequate and accurate information on the final outcome of these indicators. For example, in the draft BCR it was reported that 100% of the target number of 60,000 beneficiaries were being supplied with potable water, whereas the evaluation team observed that in fact only around 17,000 people were being supplied. In the final BCR, the coverage area remained overstated, and reductions in gastrointestinal diseases are attributed to the project in a district (Yavan) that eventually was not provided with improved water supply by the project.

52. The outcome indicators for Component 3 were measurable, and at MTR basic data were available. However, since MTR the data on WUA were not regularly monitored or updated, although they were reported as satisfactory in the results framework included in the supervision reports. As a result, at project completion, no accurate data were available on the status of the WUAs, and rapid data collection was necessary after project closing to update the data on the WUAs' performance.

2.3.3 M&E Utilization

53. During project implementation, the key indicators as reported by the supervision team progressed in a satisfactory manner, but the World Bank supervision team did not ascertain whether the quantifiable indicators reported during implementation accurately captured the achievements of improvements made. This is especially true for indicators that measured improvements in institutional capacity, since many of the key output and impact indicators in the results framework used quantifiable units and could have been verified by the World Bank during supervision. As the reported data were inaccurate and at times incorrect, they were not adequate in informing the supervision team of the appropriate course of action. This situation was not rectified by the PMU and hence the full picture of the achievement of project outcomes, especially regarding Component 2 and 3, emerged not during supervision but after project closing. During field visits, the evaluation team noted that the PMU did not provide representative information to the World Bank: project beneficiaries (farmers, WUAs and VWOs) that were introduced by the PMU to the evaluation team stated that the project had a positive and sustainable outcome. Project beneficiaries that were visited on request of the evaluation team stated that the project did not have a positive or sustainable outcome.

2.4 Safeguard and Fiduciary Compliance

2.4.1 Safeguards

54. The RIRP was classified as category B. The project triggered safeguards OP 4.01 (Environmental Assessment) and OP 4.09 (Pest Management). Compliance with all safeguards triggered was not rated for most of the duration of the project. During the first years of operations, there were ample problems with implementation of the environmental management plan (EMP) and the environmental conditions in the implementation of civil works, but at MTR it was reported that most parts of the EMP had been implemented satisfactorily. As the EMPs provide the required guidance for compliance with the environmental safeguards, the supervision team did not further report on environmental issues in Aide Memoires (AMs) since the MTR in May 2004.

55. Under Component 1, each design report of a subproject included an environmental impact assessment. No significant negative environmental impact was observed at evaluation, since the implemented works were rehabilitative in nature and were carried out on the existing canal systems without any disruption to arable land. Overall the environmental impact of the component activities could be classified as positive, since rehabilitated main systems allow for more efficient conveyance and use of water as well as improved opportunity to control the groundwater table and drainage water. Some negative impact was observed under Component 2, as the evaluation team observed that construction debris had not been cleared from the site in Kolkhozabad after the contractor considered the contract closed, and it was reported that in Matcho during project implementation one spring was damaged due to backpressure during excavation. These issues went unnoted during project implementation and no remedial action was taken during the lifetime of the project.

2.4.2 Fiduciary

56. Financial management under the project was reportedly weak in the first years of project implementation but increasingly considered satisfactory, as it was done according to Bank guidelines and the DCA. Although overall satisfactory, some errors occurred; on two occasions the PMU reported the contract for potable water supply in Kolkhozabad completed, although it was observed and verified in the field that this was not the case.

57. Procurement capacity within the PMU reportedly remained weak throughout project implementation. As a result of the use of international procurement specialists, works, services and goods procurement typically complied with Bank procedures and guidelines and PIU staff was trained in the use of standard Bank documents. Post-reviews were carried out by IDA staff and major issues were not identified.

58. Documentation for civil works contract management was inadequate and not according to common engineering practice and SNiP standards. This hampered the ability of the evaluation team to assess whether civil works that had been paid by project funds had actually been built according to specifications and handed-over to the designated beneficiaries in satisfactory condition. The international technical assistance could have been more effective in assisting the PMU with establishing an effective system for contract amendments and other documentation, and with adequate procedures for filing and maintenance of contract and procurement records.

2.5 Post-completion Operation/Next Phase

59. It was recognized at appraisal that institutional reform would be necessary to sustain O&M of infrastructure investments established under the RIRP and arrangements were agreed with Government during negotiations to increase O&M cost recovery. However, under the RIRP there was no formal attempt of restructuring of the Ministry of Water Resources and Irrigation, since this was considered premature for a first operation and in the political and economical climate in Tajikistan after the civil war. At project closing, funds for O&M were insufficient, and it is estimated that at the current level of maintenance, rehabilitated pumping stations will gradually fall out of order again within 2 to 3 years. Funds for operation are also increasingly limited, as more than 60 percent of the irrigation water in the project areas is pumped up from the source to the field, with lifts sometimes exceeding 100 m. As the electricity that powers these pumps is priced well below the full economic cost, this represents a substantial subsidy to agriculture. A 2003 World Bank[6] study calculated that if electricity (as well as every other aspect of production) were priced at world market prices, the cotton cultivation of between half and two thirds of irrigated land in eight representative districts in Tajikistan would not be economically viable.

60. Few arrangements are in place to ensure sustainable operation of the VWOs established under Component 2. VWOs are still functioning in two districts (Matcho and Zafarabad) and partially functioning in Ak-Kurgan. The VWOs in Yavan and Kolkhozabad are not operating sustainably as of project completion. With all VWOs, collection of fees are not

[6] Bucknall, Klytchnikova, Lampietti, Lundell, Scatasta and Thurman. Irrigation in Central Asia: Social, Economic and Environmental Considerations. World Bank, 2003.

recovering the cost, leaving most of the VWO staff without salary and often the VWOs are unable to repair broken equipments or to operate water disinfection systems.

61. Since the staff of the TUAS and the TLWRMI was not properly trained under Component 3 to use the research equipment provided by the project and incorporate it in their on-going research and operations, it is not likely that the required capacity for sustaining project outcomes is in place. Regarding the WUAs, the evaluation team noted adequate support from raion authorities in 1 out of 7 project districts (Zafarabad), whereas in other districts the institutional environment in the agriculture sector is not conducive to maintaining the WUAs as an independent organization responsible for O&M of the on-farm systems. As a result, a significant number of WUAs ceased to operate once salaries were not paid anymore by the project. A positive contributing factor that could potentially reverse the downward trend in WUA performance is the establishment in 2007 of a WUA unit within the MWRI, mainly as a result of the policy dialogue with a USAID funded WUA program. This unit is gradually gaining momentum within the MIWR and might be able in the future to incorporate the lessons learnt under RIRP and other projects and incorporate them in future WUA development programs.

62. No viable M&E system is in place to monitor project outcomes after project closing, and RVKs do not collect adequate data on the operation of the I&D systems. Performance indicators suitable for continued monitoring by Government are similar to the indicators adopted at project appraisal.

63. In the current environment within the agricultural sector, the Bank cannot contribute significantly to sustaining the benefits achieved under the project in the water sector. Since O&M of the I&D system depends strongly on the current financial arrangements between Government, cotton investors and farmers, World Bank projects and analytical work on the I&D sector should be conducted within a framework of reform of the cotton sector. Whereas the problems in the agricultural water sector are enormous and of serious detriment to the rural economy, this sector should remain a focal point for the World Bank, but any engagement should be built on solid analytical work identifying the main constraints to the water sector and possible solutions for a restructuring of water management institutions and finances.

3. Assessment of Outcomes

3.1 Relevance of Objectives, Design and Implementation

64. Considering the continued contribution of agriculture to the country's economy, to employment (70% of project area population), and to reduction in rural poverty the project development objectives were and still are highly relevant, and are in line with the priorities of the Tajikistan 2006-2009 Country Partnership Strategy to improve business opportunities in the agriculture sector and income opportunities for farmers. The agro-climatic conditions in Tajikistan and in the project area in particular mean that growth in agricultural output depends, to a large extent, on ensuring a guaranteed irrigation water supply, and therefore focusing on irrigation rehabilitation proved to be relevant.

65. As for Component 2, according to the MIWR, 80% of the rural areas in Tajikistan remains not connected to a reliable water source and draws on water mainly from irrigation ditches, which is similar to the situation at the start of the project. Therefore, in the few localities where project supported infrastructure was functioning, beneficiaries highly

appreciated the project. In localities where the project was not successful, intended project beneficiaries drink unsafe canal water, or spend significant time and effort hauling water from reliable water points. Targeted beneficiaries in Kolkhozabad, which eventually at project closing had not received any potable water from the project, reported to the evaluation team paying TJS 55 per 3 CM of potable water, delivered by water truck, which is equivalent to TJS 17 (US$ 5) per CM of potable water. This is very high given the low household incomes, and almost twice as much as what Washington DC residents pay for their water.

66. Due to the lack of funds for O&M and the dire state of on-farm irrigation systems, project support to WUAs was and is still highly relevant. Since RVKs do not have the budget or the staff capacity to do the O&M of on-farm I&D systems, the creation of farmer-based WUAs is the most viable alternative, and has shown to be a successful alternative in other countries. In addition, as more and more independent farms with small areas are created, O&M will become more complex, and will increasingly render the RVKs and the old water brigades ineffective for the on-farm water management. Therefore, there is an important role to play for WUAs, provided they are enabled to function effectively.

3.2 Achievement of Project Development Objectives

Component 1: Rehabilitation of main I&D works

Satisfactory

67. The project development objective for this component to increase water supply was not achieved, since the limited data available show that irrigation water supply remained stable or even decreased. However, notwithstanding the difficult circumstances in which the activities of the component were implemented, the component managed to rehabilitate essential I&D infrastructure, and as a result maintained the level of water supply in project districts. Given the design of the project, the poor state of I&D infrastructure, the continuing lack of resources for O&M as a result of the absence of a significant water sector reform in Tajikistan, this is probably the most that could have been accomplished by the project. Therefore the achievement of this component is rated satisfactory.

68. Although not systematically documented by the M&E system, observations by the evaluation team showed that most of the rehabilitated systems, with some exceptions, were functioning and in reasonable technical condition (see Annex 2 for more details). The component achieved most of the contract targets, and as a result of 36 subprojects executed under the project with moderate to satisfactory quality compared to similar works in Tajikistan, about 127,500 ha (compared to 140,000 ha targeted) currently have a more reliable irrigation water supply. The difference between the target area and the achieved area is mainly related to the rising costs of goods (mainly pump equipment) during the implementation of the project. However, the most important achievement is that the most critical and defunct sections of irrigation systems were rehabilitated and replaced and it is expected by oblast and raion water organizations that the project investments will keep the systems operational for at least the next 8 to 10 years provided there is adequate funding for O&M. At the current level of O&M funding however, it is expected that systems operation and irrigation water conveyance will decrease within 2-3 years, from 2010-2012 onwards, as pumping stations are deteriorating and funds for O&M will remain insufficient.

69. In the absence of a functioning system for water measurements in canals, in spite of hydroposts rehabilitated under the project, it is not possible to obtain reliable and realistic data

for gravity schemes on increased canal water conveyance (i.e. the yearly volume of water conveyed through the canal system). The PMU reported an increase in efficiency of main conveyance systems from 0.5 to 11.5 % and an increase of conveyance (total flow) from 65% to 83%, but these estimates are not substantiated with reliable data. More reliable data are available from pumping stations rehabilitated under the project, serving around 64% of the project area. Based on these data, provided by the PMU, overall water conveyance did not increase in these areas, but actually decreased with 1% and 16% in 2005 and 2006 respectively[7]. For the rehabilitated pumps, the average energy consumption per million CM of pumped water reduced from 266 kWh/MCM to 261 kWh/MCM, a decrease of 2%. This is most likely mainly due to the replacement under the RIRP of old pumps and electric motors. For 9 out of 21 pumps supported with relatively small investments, energy consumption per MCM increased, indicating that minor rehabilitation works were only partially successful in reversing the decline in the functioning of the pumping stations. Pumped water conveyance per hectare decreased by 7% on average, mainly as a result of decrease in Zafarabad (17%) and Macho (12%). In Kolkhozabad it decreased by 1%, in Yavan by 2% and in Sharinav it increased by 40%. Reductions in water delivery per hectare could be related to (i) lower crop water demand due to higher rainfall and lower evapotranspiration; (ii) decrease in electricity supply and hence pump operating hours; and (iii) in case of Zafarabad more efficient on-farm system water management by WUAs and increased field application efficiencies.

70. The per annum area benefiting from investments in I&D (in the irrigation season following I&D rehabilitation, when investments have an impact on irrigation water supply) and the level of investments are shown in the table below:

Table 1
Estimation of areas benefiting from the improved reliability of irrigation water supply

Raion	Areas benefiting from improved reliability of irrigation water supply (ha) [1]								Total investment (US$)	Per Hectare Investment (US$/ha)
	2001 (pre-project) [2]	2002	2003	2004	2005	2006	2007	2008		
Sharinav	3,411	3,411	3,411	*4,161*	*4,161*	*4,161*	*3,411*	3,411	434,202	104.33
Gissor	0	0	0	0	0	0	0	*400*	456,768	1,141.92
Rudaki	38,000	38,000	38,000	38,000	38,000	38,000	38,000	38,000	678,318	17.85
Yavan	10,376	9,500	9,500	*15,600*	*15,600*	*15,600*	*15,600*	*15,600*	3,760,927	241.09
Kolkhozabad	7,400	6,500	6,500	6,250	*9,520*	*9,520*	*9,520*	*8,670*	2,081,767	218.67
Zafarabad	15,298	15,298	15,000	15,000	15,000	*36,250*	*36,250*	*36,250*	5,874,292	163.17
Matcho	10,515	10,500	10,800	*11,500*	*11,500*	*20,521*	*23,564*	*23,564*	2,483,808	106.08
Total	**85,000**	**83,209**	**83,211**	**90,511**	**93,781**	**124,052**	**126,345**	**125,895**	**15,780,081**	**125**
% of 2001 area	100%	98%	98%	106%	110%	146%	149%	148%		
Sub – Total [3] 4 main districts	**43,589**	**41,798**	**41,800**	**48,350**	**51,620**	**81,891**	**84,934**	**84,084**	**14,200,974**	**167**
% of 2001 area	100%	96%	96%	111%	118%	188%	195%	193%		

1. Note: Areas based on calculations of evaluation team, which are slightly different from areas noted in the BCR
2. This signifies areas that already had a reliable water supply at the start of the project
3. Sub-total for Yavan, Kolkhozabad, Zafarabad, Matcho

[7] Water conveyance is partially a function also of irrigation water demand, which is related to rainfall. No correlation between rainfall and water conveyance could be observed, as from 2001 to 2005 water conveyance decreased and rainfall increased, but from 2005 to 2006 both water conveyance and rainfall decreased. One would expect that water conveyance would decrease if rainfall increases.

Fluctuations in these areas result mainly from pumps falling into disrepair or being relocated from one raion to different raion. Overall level of investments per hectare was low compared to similar projects in other World Bank regions but more or less equal to the level of investments made under similar projects in the region, like the Rural Enterprise Support Project in neighboring Uzbekistan. This project, with similar per hectare investments was able to bring about a significant increase in yield levels of cotton and wheat.

71. Under RIRP, investments were most significant in Yavan, Kolkhozabad, Zafarabad and Matcho, where the project investments covered 80% or more of the total district irrigated areas. The incremental impact of these investments on total cultivated areas and cropping areas is analyzed by comparing these 4 main project districts with adjacent non-project districts with similar agro-climatic and socio-economic conditions. Crop areas for the different districts, based on data from the State Statistical Agency (SSA) are indicated in the figures below.

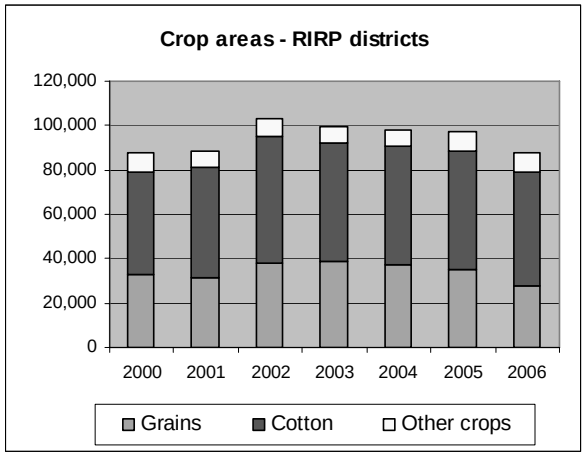


Figure 1 Crop areas in 4 main RIRP districts

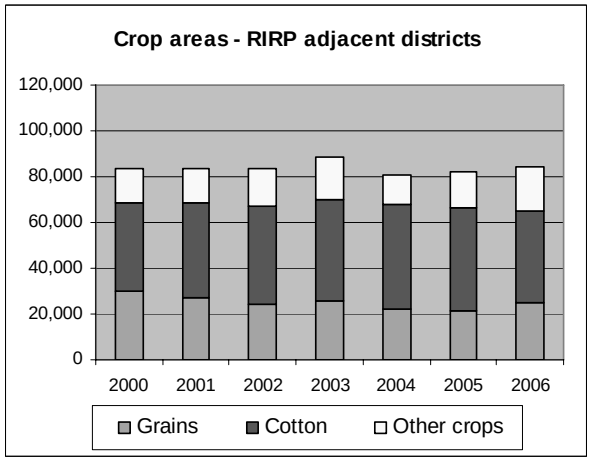


Figure 2 Crop areas in 4 adjacent districts

72. It should be noted that crop areas are determined by a multitude of factors, of which irrigation water availability is an important factor, and that there is likely to be a time gap between increased irrigation water availability and changes in the cropping pattern. Therefore, no strong conclusions should be based on these data. From Figure 1 and Figure 2 figures it is observed that from 2000 – 2003, crop area (≈106,600 ha) is higher than the area with adequate water supply (≈ 41,800 ha). In 2004, 2005 and 2006, when the area with improved irrigation service reliability was increasing by 11%, 18% and 88% respectively, total cropping area actually decreased from 108,151 ha in 2003, to 108,103 ha in 2004 to 107,635 ha in 2005 to 99,447 ha in 2006. Cotton area decreased slightly in project districts from 53,302 ha in 2003 to 51,399 ha in 2006, as did the area under wheat and other crops. In non-project areas, also a slight decrease in crop area is noted from 88,294 ha in 2003 to 83,959 ha in 2006, but less pronounced as in project districts and mainly as a result of a reduction in the area under cotton. From these data it appears that: (i) a stark reduction in irrigated area as anticipated as the without-project scenario at project design did not occur; and (ii) the increase in the area with adequate water supply is not reflected in an increase in the cultivated area or in crop diversification. It was reported by farmers to the evaluation team that the dominant factor in determining crop areas are the strict production targets set by the district authorities and the low

margins for farmers on cotton. Farmers reported that many of them plan their area under cotton cultivation to closely match the production targets of the district authorities and their own household demand for fuel wood for the winter, and do not expand the crop areas beyond this, as it is not profitable.

Component 2: Provision of community-based village water supply in selected villages

Unsatisfactory

73. The project was not successful in meeting the development objective to improve the quality of drinking water to 60,000 people in 23 villages. In total, it is estimated that only 17,237 (28%) out of 60,000 targeted beneficiaries benefited from the project, as a result of major shortcomings described in more detail in Annex 2. First of all, the disinfection facilities that guarantee a water quality according to standards are not functioning in all five schemes supported under the project. Secondly, in three out of the five schemes (Yavan, Kolkhozabad and Matcho) deficiencies in design but mainly in contract implementation resulted in either no provision of potable water (Yavan and Kolkhozabad districts) or in a very limited coverage of the population (Matcho). As a result, in Yavan raion, zero out of the targeted 28,000 people, in Kolkhozabad also zero out of a targeted 4,564 people, and in Matcho an estimated 2,737 out of 6,158 people targeted, received potable water through RIRP supported infrastructure.

74. In Yavan raion, pump engines and pipe sections provided by the RIRP to the VWO were reportedly removed by raion authorities for use in a potable water or irrigation scheme at a different location. In Matcho, the low coverage was partially a result of poor contract management and partially a result of low community contributions. In Rudaki raion, the picture is less clear, but as a result of mainly design problems and missing submersible pumps, it is estimated that around 6,500 people of a targeted 13,000 people actually receive water as a result of the RIRP. Finally, at the time of project completion, VWOs were not functioning in Yavan and Kolkhozabad, functioning in part of the coverage area in Matcho, although indebted to the contractor, and partially in Rudaki raion. Only in Zafarabad raion the project was implemented satisfactory and the functions of the VWO were taken up adequately by staff from the village authorities. The main problem of the system in Zafarabad is the absence of a water tower, since water is supplied only part of the year in summer, when electricity is available, and for a limited number of hours during the winter months, if electricity is available. In Zafarabad, the VWO has an average collection rate of 51%, with higher collection percentages in neighborhoods were 15% of revenues are provided to the collector as a salary.

Component Three: Institutional capacity building for improved land and water resources management

Moderately Unsatisfactory

75. The outcome of the project support to the capacity of TUAS and the TLWRMI was moderately satisfactory. The main output of the project was achieved satisfactory, since facilities were rehabilitated and laboratory equipments and computers were provided and installed. The outcome is less satisfactory: at the TLWRMI, the equipments have not yet been put to use, and have not been incorporated in the research facilities and in applied research, mainly as a result of inadequate training and poor understanding among staff of the equipments and their potential use; at the TUAS, reportedly two new research streams were established in the field of management of I&D systems and in the field of WUA operations. As with the TLWRMI, integration of new methods in the on-going research and curriculum activities

appears absent, as research and teaching staff trained under RIRP and interviewed by the evaluation team did not have the skills to provide a demonstration of the increased capacity or training skills resulting from the project. The project eventually did not conduct the study on irrigation restructuring, but it was noted by the evaluation team from discussions with the TLWRMI and the MIWR that there was an increased awareness among management of the need for gradual irrigation sector reform and institutional restructuring.

76. Although not concretely covered by outcome indicators in the result framework, the outcome of the project support to oblast and raion water organizations is moderately satisfactory. Outputs were achieved satisfactory, but the evaluation team noted that the trainings provided under the project for increased institutional capability did not result in improved record keeping of water conveyance, ISFs and cost-recovery of O&M which could substantiate the project outcomes and could demonstrate any improvements in water management.

77. The objective to increase the capacity of WUAs to take responsibility for O&M was not met and the outcome was unsatisfactory. The majority of WUAs (26 out of 41) under RIRP and 1 out of 9 WUAs established under FPSP had stopped functioning or were foreseeing ceasing activities in 2008. Only 8 out of 41 RIRP WUAs and 4 out of 9 FPSP WUAs were functioning moderately satisfactory or better, as they were able to do some planning of O&M, and conduct minor O&M works. The main reason for the low performance of WUAs is the lack of support from raion authorities, low income levels of farmers, lack of a substantial discussion between the PMU and the raion authorities, insufficient guidance and follow-up from the PMU and the absence of adequate technical assistance. One significant outcome is the passing of the Law on Water Users Associations, although after many revisions. However, a law legalizing the relation between RVKs and WUAs and specifying the responsibilities of RVKs towards WUAs, is absent, thus allowing RVKs to by-pass WUAs in the planning and operations of on-farm irrigation water supply. Only after project completion did the PMU collect data on the status and functioning of the WUAs, a far step from the regular reporting on WUA functioning as agreed in the Development Grant Agreement.

78. It should be noted that whereas 33 out 41 WUAs were not functioning satisfactory, the majority of the 8 satisfactory functioning WUAs were in Zafarabad, where the RVK was supporting the farmers to establish WUAs, and the WUA model reportedly has been replicated within the district. In Zafarabad raion, farmers who were members of functioning WUAs mentioned that management by WUAs allowed more land to be irrigated at the tail-end of systems and facilitated more transparent billing of water. One WUA established under RIRP in Zafarabad was functioning highly satisfactory compared to most WUAs established under the RIRP, as they were able to do some O&M works, had some maintenance equipment and adequate number of staff on their balance sheet and were not indebted to the RVK or investors. In most of the other districts, farmers identified lack of support from the RVK and lack of corrective action by the PMU as the main reason for poor performance of the WUA. Farmers indicated that they saw the clear need and benefit of WUAs, but as one farmer reported, “the project was like a house without a foundation”, as district authorities had the mandate to enforce their water management planning on farmers, thus bypassing the WUAs. Throughout all the raions visited, both farmers and WUAs appreciated the training provided under the project.

3.3 Efficiency

79. At project appraisal it was envisaged that as a result of the timely and optimal delivery of water there would be a measurable increase in overall crop production in the project area and

a measurable increase in income levels of farm households benefiting from the project. The economic analysis at appraisal estimated an economic rate of return of 34 % over a 15 year period, as it was assumed that as a result of relieving crop moisture stress, wheat and cotton yields would increase by 2010 from 1.5 tons/ha to 1.8 tons/ha and from 1.8 tons/ha to 2.3 tons/ha respectively. Crop areas for wheat and cotton were projected to increase by 2010 from 35,941 ha to 45,175 ha and from 54,094 ha to 57,730 ha respectively. For the without project scenario the economic analysis assumed that the conveyance capacity of the system would decrease, resulting in a decline in crop areas for wheat and cotton by 2010 from 35,941 ha to 13,143 ha and from 54,094 ha to 18,158 ha respectively. Yields for cotton and wheat were project to decrease by 2010 from 1.5 tons/ha to 1.1 tons/ha and from 2.1 tons/ha to 1.2 tons/ha respectively.

80. Irrigation rehabilitation investments were mostly completed between 2003 and 2005 and data on yields and cropping area are available until 2006 only. Yet, assumptions at appraisal were based on projections for 2010. Hence, it is not possible to evaluate the assumptions made at appraisal. Available data for 1 – 3 years can only provide an indication of the trend of the project impact. As Figure 1 and Figure 2 indicate crop areas did not drop to the extent projected at appraisal under the without-project scenario and in general did not yet change significantly in 2005 and 2006. Increases in cropping area (as projected in the with-project scenario) are however not expected to occur as a result of improvements in irrigation infrastructure because of two reasons: (i) most of the infrastructure was rehabilitated by 2006 and its operation is limited by the lack of funds and electricity; and (ii) as reported in paragraph 72 it appears that other factors like the cotton production targets, are more dominant in determining crop areas.

81. As yields are depending on many factors, the impact of the project on crop yields is estimated by comparing yield data for the 4 main project districts with yield data for the adjacent project districts, thus minimizing the impact of different agro-climatic conditions on yield differences. The yearly weighted averages of cotton and wheat yields, for the 4 main project districts and adjacent non-project districts (SSA data) are shown in the figures below:

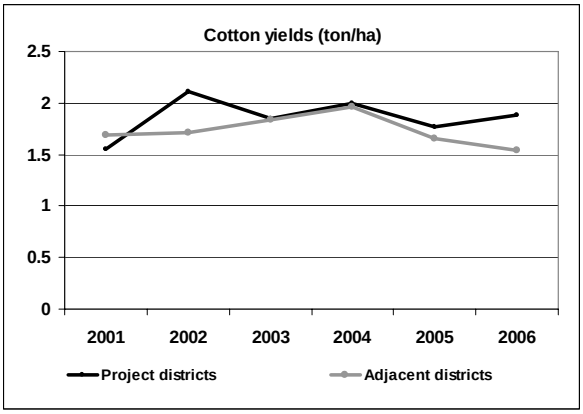


Figure 3 Cotton yields

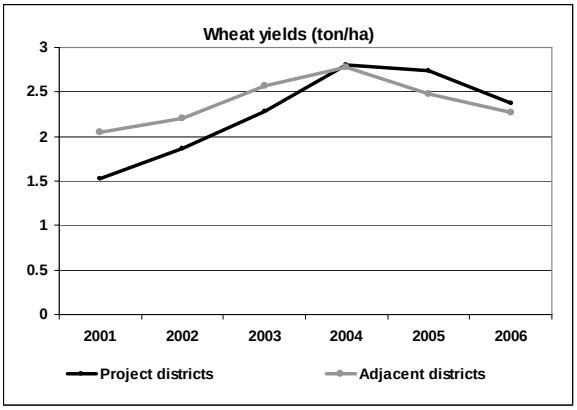


Figure 4 Wheat yields

82. As a result of the project, there was an increase in the area with reliable water supply of 11%, 18% and 88% in 2004, 2005 and 2006 respectively. From Figure 3 and Figure 4 it is observed that cotton yields in the same period were 2%, 7% and 22% higher in 2004, 2005 and 2006 respectively, which cannot necessarily be attributed to the irrigation investments made

under the project, as it is noted that in 2002, when project investments had not yet had an effect, the cotton yield was 23% higher in the project districts. Wheat yields are slightly higher in project districts by 1%, 11% and 5% in from 2004 to 2006. Also here the slightly higher yields in project districts cannot yet be attributed to the project investments, as the yields of 2004-2006 followed a yield increase in project districts from 2001 to 2004 which is steeper than the yield increase in non-project districts, and actually dropped in the years 2005 and 2006, when the area with reliable water supply increased.

83. It is difficult to discern the impact of the RIRP project on the yields independently from that of the FPSP which provided support to 18,000 ha of privatized farm land, or 42% of the incremental area receiving improved water management. A 2007 farm survey conducted as part of an independent research [8], elicited yield data for 2006 from two types of farms which benefited from the RIRP: (a) those that were also "pilot farms" under the FPSP and as such received a one-time grant towards inputs acquisition as well as training in farm management and (b) "non-pilot farms" which only benefited from irrigation rehabilitation under RIRP and no FPSP support. The data indicate that yields in FPSP pilot farms were higher than yields in non-pilot farms, respectively 8%, 6% and 11% for cotton, wheat and vegetables. However, in the absence of baseline data, it is not possible to discern the magnitude of improvements, if any, or to isolate the impact of irrigation rehabilitation.

84. Details of the ex-post economic analysis which focused mainly on irrigation rehabilitation are provided in Annex 3. Data constraints limited the quantitative aspects of the analysis significantly. Most notably, as the impact of the project on agricultural production could not be distinguished on the basis of the available data, no reliable projections for future project benefits could be made, and hence the economic rate of return could not be estimated. The key findings are the following:

- While energy use indicators improved at about 60% of the pumping stations rehabilitated by the project, and in 2% on average, and while water consumption per hectare of land decreased at 70% of the stations, the rates of decrease are highly variable. Furthermore, water consumption decreased by 7% on average but increased between 55-80% in some areas and absolute levels remain extremely high in some areas.
- No obvious improvement in cropping intensity and yields or shift to higher value crops in response to improved availability of irrigation water could be discerned in the four raions analyzed (Yavan, Matcho, Zafarabad and Kolkhozabad). This may be explained by a number of factors including farmers abandonment of allocated lands in reaction to the Government policy that 70% of land be allocated to cotton (the financial margins of which are dismal), labor shortage as a result of out-migration of young men to Russia, and the falling into disrepair of pumping stations that are not covered by the project. Exceptions are some increase in area allocated to vegetables and potatoes in Yavan, to cotton in Kolkhozabad, and an increasing trend in cotton yields in Matcho. As expected, average yields in farms that received support under the Farm Privatization Support Project were for the most part higher than average yields in farms that only benefited only from RIRP.

[8] Kudratov, 2007. PhD Dissertation, Moscow State University

- A total of 620 ha of land that was previously not cultivated was brought under cultivation following the completion of irrigation rehabilitation works in Yavan (200ha) and in Gissar (420 ha). In both raions, the additional lands are cultivated with vegetables. The net incremental economic value generated to the Tajik economy is estimated at US$ 257/ha in Yavan and US$ 667/ha in Gissar. Given the per hectare investment cost of US$ 241 in Yavan and US$1,142 in Gissar, and assuming that: (i) the rehabilitated infrastructure will be operated and maintained properly; and (ii) the per hectare returns remain on average at the above estimated levels, the net present values of vegetable production on these additional lands are estimated at US$ 1,082 per hectare in Yavan and US$ 2,348 per hectare in Gissar.
- The averted cost associated with morbidity and mortality from diarrhea in rural areas where potable water investments were carried out was estimated at nearly US$20,000 annually. The efficiency of the entire subcomponent of US$ 1.3 million could not be calculated however, due to lack of averted cost estimations for other water-borne diseases.

3.4 Justification of Overall Outcome Rating

Moderately Unsatisfactory

85. Although rated satisfactory throughout the duration of the project, the evaluation team, based on data that became available after project closing, rated the overall outcome of the project as moderately unsatisfactory. The project fully disbursed the allocated funds, and the main result of this is that the working life of critical irrigation and drainage infrastructure, mainly pumping stations, is prolonged and that the I&D systems maintain the capacity to provide the same amount irrigation water as before the project started. However, this achievement falls short of the original project development objective to increase irrigation water supply and efficiency. Within the context of Tajikistan and the resources allocated under the project, this is considered a satisfactory achievement for this Component 1, but, the unsatisfactory outcome of Component 2 and the moderately unsatisfactory rating of Component 3 resulted in the project being rated moderately unsatisfactory overall. An additional consideration for this rating is that the efficiency of the I&D investments seems limited: (i) a stark reduction in irrigated areas, as projected under the without-project scenario, did not occur both in project as well as in non-project districts; but (ii) it is not clear to what extent changes in yields and crop areas in project districts can be attributed to the RIRP. In addition, the efficiency of the investments in I&D rehabilitation is constrained by the poor performance of WUAs, since their performance is critical for an improved on-farm water management and an increase of cost-recovery of O&M to sustain the investments made under the project.

3.5 Overarching Themes, Other Outcomes and Impacts

(a) Poverty Impacts, Gender Aspects, and Social Development

86. Tajikistan remains the poorest country in ECA, with 57% of the total population and 64% of the rural population living below the poverty line of $2.15/day. This is especially true in the rural areas of Sugd oblast (Matcho and Zafarabad districts) and Khatlon oblast

(Kolkhozabad raion), where rural poverty remains persistent at 68% and 78% respectively[9]. The project contributed to not further increasing poverty in these districts, since yield levels in the districts stabilized compared to neighboring districts. However, the benefits from the I&D rehabilitation for increased farm incomes can not materialize to the fullest since farmers are not able to increase their profit margins in the production of cotton, due to the current policies and arrangements in the cotton sector. Therefore, the poverty impacts of the project seem limited. The poverty impact of the rural potable water supply component is very limited due to the low coverage, and in three locations reportedly negative; (i) in Yavan and Kolkhozabad, the community contributed to the system, but no functioning potable water supply system was handed-over to the VWO; (ii) in Matcho, an existing spring was demolished because of poor design and contract implementation. Overall, the benefits of this component are poor, and in the majority of the targeted project villages, women and children continue to haul water from distant and often polluted water points.

(b) Institutional Change/Strengthening

87. Capacity building of institutions was one of the supporting components of RIRP. Since WUAs and VWOs were largely unsuccessful and unsustainable, beneficiaries reported a decreased trust from farmers and villagers in the functioning and independence of these organizations. Project support to oblast and raion water organizations did not significantly alter current operational practices, and did not reduce institutional impediments to decentralization of water management. However, as a result of RIRP and efforts from USAID, there are signs of increasing awareness within the national government of the need for a gradual transition towards institutional restructuring and integrated water resources management, which eventually could create an institutional environment that is more supportive for the functioning of WUAs as an autonomous organization.

(c) Other Unintended Outcomes and Impacts (positive or negative)

88. Before the RIRP started, few contractors were capable of undertaking bidding and contract implementation according to improved procurement procedures and quality of works. With several large civil works contracts implemented, experience among contractors has increased, thus facilitating the implementation of similar projects[10].

3.6 Summary of Findings of Beneficiary Surveys

89. The beneficiary survey at MTR, based on results from the 2003 cropping season, states that the irrigation component in FPSP and RIRP has, to a large extent, met the water needs of farmers and that the performance of WUAs, measured in terms of irrigation water distribution efficiency and the ISF recovery rate (at close to 100%), was good. Furthermore the survey reported: (i) considerable crop diversification from cotton to other crops due to timely water supply leading to higher cash incomes; (ii) higher cropping intensities; and (iii) increased productivity levels by 25 to 40%. According to SSA data, increased productivity levels were indeed observed in 2003-2004, both in project and non-project districts, but higher cropping

[9] Data from the Tajikistan Living Standards Survey in World Bank and SECO, 2007. "Republic of Tajikistan – Priorities for sustainable growth: A Strategy for Agriculture Sector Development in Tajikistan". World Bank, Washington DC.

[10] as reported by international engineering consultants working in Tajikistan

intensities and crop diversification were not observed. Regarding potable water supply, the 2004 survey (conducted before the drinking water schemes were constructed) reported considerable awareness and enthusiasm for the upcoming establishment of VWOs.

90. No end-of-project survey was conducted, but interviews of the evaluation team with beneficiaries indicated that significant changes occurred since 2004. Farmers in 7 out 8 districts are not content with the functioning of the WUAs, and largely ceased to pay ISFs via or to the WUAs. Beneficiaries in 3 out 5 target areas are not aware of the existence of a functioning VWO. Evaluation of yield figures, cropping intensity, and crop areas at project closing, indicated that positive results reported at MTR where not sustained towards the completion of the project.

91. Regarding Component 1, oblast and raion water organizations spoke highly of the civil works conducted under the project, as it rehabilitated critical infrastructure on their balance sheet.

4. Assessment of Risk to Development Outcome

Substantial

92. The risk to the development outcome of the project is rated substantial. For Component 1, the technical risk associated with poor construction mainly in the first years of the project and a number of partially rehabilitated structures with declining performance, is moderate. Substantial risk based on financial and economic considerations is associated with the lack of O&M of rehabilitated systems, in particular the pumping stations. In light of a crisis in the energy sector and insufficient O&M resources both from government and from farmers indebted to cotton investors, the evaluation team observed structures that were already deteriorating and would likely be in need of further rehabilitation within the next 2-3 years. The capacity of raion water authorities to deliver irrigation water greatly depends on the expected working life and O&M of outdated equipment that is increasingly beyond repair. Therefore, this risk impacts the reliability of irrigation water supply and is compounded by a moderate risk of Government relocating pumps procured under RIRP to different irrigation systems and therefore not contributing to achievement of the project objectives in the target districts.

93. For Component 2, achievement of the development outcome was unsatisfactory, and therefore the risk to even further deterioration of the systems and the functioning of VWOs is low. The current level of low achievement is likely to be sustained after project closure, but with continuous lack of funds for O&M of the existing and functioning systems, there is a substantial risk of further deterioration of parts of the rehabilitated system that remain functional.

94. For Component 3, achievement of the development outcome was moderately unsatisfactory. Mainly as result of the persistent policies in the cotton sector and the lack of reform of the irrigation sector, the functioning of RIRP WUAs is likely to deteriorate further in the absence of the payment of irrigation fees and the lack of institutional support from the raion authorities. In the future this trend could be reversed, provided a law regulating RVK cooperation with WUAs is passed by the Cabinet, and the WUA unit at the MIWR becomes effective in reforming relations between RVKs and WUAs.

5. Assessment of Bank and Borrower Performance

5.1 Bank Performance

(a) Bank Performance in Ensuring Quality at Entry

Moderately Unsatisfactory

95. No Quality Review was conducted at entry, as this was not mandatory at that time. Bank performance in ensuring Quality at Entry for Component 1 was moderately satisfactory to moderately unsatisfactory. A positive factor was that the team chose a straightforward approach for the selection and design of the rehabilitation works, in light of the dire state of the irrigation system, the lessons learned from other projects and the low capacity of the national design agencies and contractors. However, a moderate shortcoming was the absence of a thorough review of the effectiveness of investments in the rehabilitation of irrigation systems that were mainly pumped and had high O&M costs, compared with gravity schemes with lower O&M costs and potentially higher rate of return. Significant shortcomings included (i) inadequate causal link between outputs and outcomes, as outcomes were not achieved in spite of completion of outputs; (ii) the selection of structures for partial (and therefore less effective) rehabilitation; and (iii) the absence of budget for adequate design and construction supervision by an engineering consultancy firm.

96. For Component 2, the Bank's performance was moderately unsatisfactory because of significant shortcomings. Project design was inadequate in: (i) the technical designs of the systems, which were mostly too complex and expensive; (ii) the lack of budget for adequate technical assistance for the implementation of the CDD approach and the supervision of the civil works; and (iii) poor design of the CDD approach, not taking into account best practice examples from other regions and lessons-learned from similar projects in Tajikistan. Most notably, the attempt to include a community contribution of 20% ignored the poverty in the country and was not based on a comprehensive analysis of willingness and capacity to pay.

97. The Bank's performance for the design of Component 3 was moderately unsatisfactory. Risks were identified satisfactorily, but significant shortcomings included the lack of incorporation of best-practice examples for water sector reform and WUA establishment, which indicated that (i) commitment to sector reform from Government should be reflected in the allocation of adequate resources to technical assistance for sector reform and a clear implementation plan; (ii) an adequate level of technical assistance is required to advise WUAs and Government during implementation and for follow-up after the trainings with both WUAs and raion water authorities to advance sustainable WUA operation; (iii) WUA staff salaries should be not paid by a project; and (iv) sufficient dedicated project WUA support staff should be responsible for component implementation. Moderate shortcomings vis-à-vis the design of project support to the TUAS, the TLWRMI and the oblast and raion water authorities included a lack of well-defined mechanisms for incorporation of training skills in the day-to-day operations and activities of these organizations.

98. At project design it was envisaged that structural changes to the institutional arrangements in the water management sector would generate alternative resources for water management through an increase in irrigation service fees. However, as a result of the design shortcomings, the PDOs were overly ambitious and realistically could not have been achieved given the limited timeframe of the project, and the resources allocated both by the World Bank and the Government.

(b) Quality of Supervision

Moderately Unsatisfactory

99. Since the team was not effective in proactively identifying threats to the achievement of the development objectives, and did not specify adequate resolutions, the quality of supervision is rated moderately unsatisfactory. This is in line with the QSA which rated the quality of supervision moderately satisfactory based on the assumption that PDOs were being achieved. The supervision task was constrained by a lack of accurate information, but as the team was aware off of the sensitivity of the project outcomes to achievements under the WUA component and the implementation of the CDD approach, it should have followed up more vigorously on the achievements of the project. Supervision inputs in terms of staff weeks were adequate, but reportedly as a result of limited supervision budgets, the supervision teams had to be engaged in multiple tasks, including the supervision of the FPSP and the preparation and supervision of the Community Agricultural Water Management Project. Candor and quality of AMs was adequate although repetitive at first, until the MTR in 2004. From end 2004 to end 2007 reporting was inadequate, with insufficient new information on the outcome of the project, demonstrating that the supervision team did not have adequate information to assess the status of the project. Information was presented mainly in the results framework, which was not regularly updated based on verified information. Throughout the project, little information was available regarding the institutional capacity building component, the progress on ISF and O&M cost-recovery and the study on irrigation sector restructuring proposed at design, even though specific reporting requirements on these aspects were included in the DCA. Supervision of safeguards and fiduciary aspects was satisfactory, although more thorough supervision of civil works contract management procedures and documentation could have contributed to more adequate implementation of civil works contracts.

100. With respect to Component 1, considerable efforts by the IDA supervision teams were made during project implementation to ensure acceptable quality of both design and civil works implemented. This positively affected the project implementation schedule and the quality of the works implemented from 2004 onwards. The supervision team performed less well with respect to the monitoring of achievement of Component 1 outcomes, as throughout the reporting, different indicators from the original indicators were used, and estimates provided by the PMU were not validated by the team.

101. Bank supervision was moderately unsatisfactory with respect to Component 2. After the MTR in 2004, insufficient field visits were conducted to monitor and validate the progress reported incorrectly by the PMU and to proactively assess the risk to achievement of development outcomes. The component was rated satisfactory throughout the project, while the extent of problems with the potable water schemes went unnoticed by the supervision team, in spite of timely reports from the international CDD consultant that the component was at risk. The supervision team did note that the capacity of VWOs was low, and from 2005 onwards, the supervision team requested the borrower to avail additional resources to train VWOs. However, given the poor implementation of civil works, the provision of training would not have been adequate to ensure that this component would have achieved its objective.

102. Bank supervision was moderately satisfactory for Component 3. Moderate shortcomings including a lack of reporting on progress and achievement of outcomes for the project support to oblast and raion water authorities, the TUAS and the TLWRMI and therefore the lack of integration of training in organizational practices went unnoted. Reporting on the support to WUAs was more consistent and informative, but not based on information verified

through field visits. As a result, the supervision team reported that the WUAs were established and functioning satisfactory throughout the project. From 2004 onwards, monitoring indicators were not adequately updated nor verified in spite of regular requests to the PMU by the supervision team. From 2005 onwards, the supervision team requested the borrower to avail additional resources to capacity building of WUAs, but when this did not materialize the project and implementation performance ratings were not modified accordingly. The supervision team did not ensure that mitigation measures identified in the risk framework were implemented, and as a result no constructive dialogue with raion organizations was conducted once they became an impediment to proper functioning of WUAs in most of the districts.

103. Most notably, the supervision team did not indicate to Government that the achievement of PDOs was at risk. Adequate steps should have included vigorous verification of outcomes in the field, downgrading of the project and the formulation of a clear plan to either restructure the project or to improve implementation in order to achieve the PDOs.

(c) Justification of Rating for Overall Bank Performance

Moderately Unsatisfactory

104. Overall Bank performance is rated moderately unsatisfactory.

5.2 Borrower Performance

(a) Government Performance

Moderately Unsatisfactory

105. Government performance was moderately unsatisfactory, as there were significant shortcomings. Most notably, Government did not fulfill key agreements reached during project negotiations. Government performance was not adequate in: (i) maintaining the necessary policies and procedures to monitor the achievement of the PDO according to the outcome indicators; (ii) maintain arrangements for the maintenance by WUAs of operational and financial records and submit a status report on the collection rate of the ISF, and (iii) review and adjust annually the ISF, based on a system of progressive cost recovery of O&M, satisfactory to IDA. The failure to meet these agreements, highlights that Government did not follow up on the intentions specified in the Letter of Development Policy to: (i) reform the irrigation sector to increase water use efficiency, by setting increased water usage fees and by establishing institutional mechanisms for transfer of responsibility for O&M to water users and WUAs; and (ii) develop a competitive market oriented agricultural sector.

106. Because of the shortcomings in Government performance, the project did not successfully achieve key outcomes and intermediate outcomes. Average water conveyance was not increased, most likely as a result of poor O&M and lack of funds for O&M, and water use efficiency and crop diversification outcomes were not realized most likely because of: (i) the lack of reform in the water sector; and (ii) strong Government control of the agricultural sector and the continuing practice to coerce farmers to meet cotton production targets, thus establishing unfavorable conditions to an increase in the income level of the rural population. Government control over the cotton sector also contributed significantly to the unsatisfactory outcome of the WUA subcomponent, as district authorities by-passed the WUAs in 7 out of 8 districts in order to allocate water according to the cotton production targets. This eventually resulted in a limited flow of funds from water users to WUAs and water operators to effectively operate and maintain the I&D systems. There are no adequate arrangements by Government for

regular operation of the project supported infrastructure, and as a result some rehabilitated pumping stations are likely to cease functioning within 2 to 3 years. Other significant shortcomings included a lack of oversight of Government on the performance of the PMU and the proper functioning of the M&E system, and lack of oversight on the adequacy of the consultations with beneficiaries and other project stakeholders, especially in case of the village drinking water component and the WUA subcomponent.

107. Satisfactory performance included Government commitment to implementing the project outputs under Component 1, the readiness for implementation and acceptable fiduciary management including regular audits over the life of the project. Under Component 1, issues pertaining to slow implementation of works were resolved eventually, including a delay in counterpart funding in 2003 which temporarily affected the rating of project implementation performance. One moderate success achieved was the passing of the Law on WUAs in the Cabinet.

108. As the supervision team did not inform the Government and the PMU consistently that achievement of the PDOs was at risk, they were not aware that urgent action was required to either restructure the project or to revise project implementation, and remained under the impression that the project was progressing satisfactory. However, as it is the responsibility of the Borrower to ensure that the supervision team has access to accurate information, Government is partially responsible for this shortcoming

(b) Implementing Agency or Agencies Performance

Moderately Unsatisfactory

109. The performance of the PMU had significant to major shortcomings. Most notably, project management was unsatisfactory. Fiduciary management and procurement was weak, but the key ingredient for satisfactory project management, namely a functioning M&E and reporting system to provide correct and representative data, was absent. During project implementation the PMU provided the World Bank supervision team with inaccurate and at times incorrect information regarding the achievement of project outputs and outcomes, and hence restricted the team in their possibility to identify threats to the achievement of the development outcome. As this was the main contributing factor to downgrading the project after project closing from a satisfactory to a moderately unsatisfactory rating, the overall implementing agency performance was moderately unsatisfactory.

110. The implementing agency performed unsatisfactory in the implementation of Component 2. Major shortcomings included: (i) a lower commitment to the achieving results under this component was noted, resulting possibly from a lack of accountability of the PIU to community-based organizations; (ii) incomplete delivery of project outputs, like partial construction of village water schemes; (iii) poor implementation of the CDD approach; (iv) unsuccessful resolution of implementation issues; (v) over-stating the achievements of this component; and (vi) the absence of transition arrangements for sustainable O&M. These shortcomings contributed significantly to the unsatisfactory outcome of this component.

111. The implementing agencies performed moderately unsatisfactory in the implementation of Component 3. Outputs were delivered, as the oblast and raion water organizations, the TUAS and the TLWRMI were supported with equipment and training and WUAs were established and trained according to the project implementation plan, but the target outcomes were not achieved, partially due to inadequate follow-up by the PMU. Significant

shortcomings included: (i) the absence of a constructive dialogue with RVKs to facilitate a more enabling environment for WUAs to operate; (ii) lack of follow-up assistance to WUAs after the trainings; and (iii) lack of follow-up with the TUAS and the TLWRMI to facilitate that new skills and new equipments were used in education and research.

112. The PMU and the PIU performed satisfactory in the management of component 1, as they were committed to realizing the component outputs, rehabilitation of I&D works, and eventually adequately resolved implementation issues under this component. Poor design and sub-standard quality of works characterized the project in the first years, but mainly as a result of contracting the IQCIE, a more diligent design and supervision of works resulted in increased quality of construction works. More effort should have been allocated to: (i) monitoring and realizing the outcomes of component 1; and (ii) maintaining accurate contract files and engineering documentation, as many standard engineering documents are unaccounted for.

(c) Justification of Rating for Overall Borrower Performance

Moderately unsatisfactory

113. There were significant to major shortcomings in both the performance of the Government as well as the implementing agency. Since these shortcomings resulted in downgrading of the project outcome from satisfactory to moderately unsatisfactory after project closing, overall borrower performance is rated moderately unsatisfactory.

6. Lessons Learned

114. The implementation of the RIRP M&E system provided incorrect data. As a result of verification of these data after project closing, the project was downgraded from satisfactory to moderately unsatisfactory. Inadequate M&E critically affects the ability of the World Bank to identify threats to project outcomes and propose adequate corrective action, and hence M&E results should be verified and properly documented through prompt supervision follow-up.

115. Given the persisting arrangements in the cotton sector in Tajikistan, where cotton investors with the compliance of Government increasingly indebt farmers in order to meet cotton production targets, World Bank support to community organizations in cotton areas, like WUAs, should be based on assurances by Government that these community organizations will not be coerced to operate according to targets and procedures set by district governments and which are designed to meet cotton production targets. Project design should include clear measures and procedures to avoid this from happening within World Bank-funded projects in Tajikistan.

116. The project development objective was to increase irrigation water supply, whereas the project design was mainly geared towards maintaining water supply and preventing further deterioration of the irrigation and drainage system. As a result, the targeted outcome was not realistic given the outputs of the project. For project outcomes to be achieved satisfactory, project design should clearly link project outputs to project outcomes. If during supervision it is evident that PDOs will not be achieved, the supervision team should inform the Borrower and take joint action for corrective measures through either restructuring of the project or through a revised project implementation plan.

117. Achievement of the project development objective hinged on a gradual increase in cost-recovery of O&M, through a decentralization of water management to Water Users Associations. Experience from other projects shows that this is a complicated process requiring

adequate technical assistance. Resources for technical assistance were inadequate, contributing to unsatisfactory achievement of project outcomes. Future projects on establishment of WUAs in Tajikistan should therefore allocated sufficient resources for technical assistance to Government in order to be successful.

118. Project investments in pumped irrigation schemes did not increase overall water supply, mainly because of a lack of funds for O&M. Poor O&M has a critical impact on project outcomes, and any future investments for irrigation and drainage rehabilitation projects in Tajikistan should be based on an analysis of the economic and financial viability of rehabilitated schemes and the resources available for O&M.

119. Financial resources for O&M of I&D systems are inadequate, mainly as a result of insufficient Government budget allocated to water authorities and low margins by farmers on cotton, resulting in a low capacity to pay for irrigation service fees. The low margins of farmers are a result of flawed agricultural policies in the cotton sector. Therefore, to improve the sustainability of investments in the water sector by means of adequate O&M, future projects should: (i) aim to increase the financial capacity of farmers to contribute to the O&M of on-farm systems, mainly through the adjustment of the current agricultural policies which result in low returns for farmers on cotton cultivation; and (ii) during project appraisal and negotiations, reach agreement that should there be a shortfall in collection of irrigation service fees due to Government agricultural policies, the Government through increased budget allocations will cover the shortfall in available funds for O&M of the system

120. Primarily because of non-cooperation by district authorities and decreasing Government commitment to the success of the WUA subcomponent, WUAs were not able to function effectively. This risk and corresponding mitigation measures were identified at project appraisal. Because the mitigation measures were not implemented according to project design, the negative impact of district authorities on the functioning of WUAs went unnoted by Bank supervision. In addition to close supervision, diligent implementation of risk mitigation measures, including the continued monitoring of the progress of sector reform and allocating adequate resources for awareness building, training, policy dialogue and consultations with the district authorities, should be done during project implementation, especially in a high-risk environment like Tajikistan.

121. Mainly because management style and the capacity and the commitment of the PMU were inadequate, the community-driven development approach for the village water supply component was implemented unsatisfactory and most water supply schemes did not reach their objective. Accordingly it is important that future investments in Tajikistan in CDD project components are implemented through capable and committed project partners with adequate understanding of the CDD approach.

7. Comments on Issues Raised by Borrower/Implementing Agencies/Partners

(a) Borrower/implementing agencies

122. A draft ICR was submitted for comments to the Government on June 25, 2008. This draft ICR of the RIRP proposed to downgrade the performance rating of project outcomes from satisfactory to moderately unsatisfactory, to rate Borrower performance unsatisfactory and to rate Bank performance moderately satisfactory. Government communicated to the Bank on July 25, 2008 (see Annex 5) that they did not agree with the proposed ICR findings and methodology, and they requested a further review of the ICR. On October 14, 2008, a meeting

was held between the World Bank and representatives of the Government to discuss the comments from Government on the draft ICR and to clarify the ICR process, methodology and results. At this meeting, representatives of the Government and the World Bank came to a mutual understanding that: (i) the World Bank team would revise the proposed ratings for Bank performance from moderately satisfactory to moderately unsatisfactory and for Government performance from unsatisfactory to moderately unsatisfactory; (ii) the PMU would provide further comments of a factual nature to the draft ICR; and (iii) the draft ICR would will be modified to incorporate the proposed ratings and to address applicable Government comments in a draft final ICR, to be sent to Government for a final review.

123. No further comments of a factual nature where received by the World Bank and the final draft ICR was submitted to Government for comments on December 1, 2008. Government communicated to the Bank on December 12, 2008 (see Annex 5) their strong disagreement with the proposed ratings and requested the World Bank to revise the ICR to reflect the comments from Government of July 2008. The final draft ICR was not significantly revised.

(b) Cofinanciers

124. There were no cofinanciers for RIRP, but the project had some benefit from simultaneous activities funded by USAID. For example, policy discussions under the USAID Central Asia Water Management Program leveraged the ratification by the Cabinet of the Law on WUAs, and one WUA in Yavan district was provided with further capacity building support under the same program.

(c) Other partners and stakeholders

125. The evaluation team discussed the RIRP outcomes on the establishment of WUAs during a meeting held with Winrock, an US NGO with extensive experience in similar programs in Tajikistan. This meeting highlighted mutual agreement regarding the constraints to WUA development in Tajikistan noted in Sections 2.1. and 2.2, the critical importance of the WUA project design considerations, including the importance of providing sufficient technical assistance to WUAs under the project, the detrimental impact of the project salary contributions to the sustainability of WUAs, and the shortcomings in the implementation and promulgation of the Law on WUAs.

Annex 1. Project Costs and Financing

(a) Project Cost by Component (in USD Million equivalent)

Components	Appraisal Estimate (USD millions)	Actual/Latest Estimate (USD millions)	Percentage of Appraisal
REHABILITATION OF MAIN IRRIGATION AND DRAINAGE WORKS	15.73	16.04	102%
VILLAGE DRINKING WATER SUPPLY	1.52	1.52	100%
INSTITUTION CAPACITY BUILDING	3.72	3.55	95%
PROJECT MANAGEMENT AND IMPLEMENTATION	3.03	2.89	95%
Total Project Costs	24.00	24.00	100%

(b) Financing

Source of Funds	Type of Cofinancing	Appraisal Estimate (USD millions)	Actual/Latest Estimate (USD millions)	Percentage of Appraisal
International Development Association (IDA)		20.00	21.86	109.3
GOVERNMENT		1.50	1.65	110.0
BENEFICIARIES		2.50	0.49	19.6

Annex 2. Outputs by Component

1. This annex contains more details on the evaluation of the three components to support Section 3.2, Achievement of Project Development Objectives. For the evaluation, the team: (i) reviewed the project infrastructure on-site; (ii) through review of engineering and financial documents, including design and completion documentation, verified project inputs and outputs for each site; (iii) reviewed data on irrigation water management from RVKs and the PMU; (iv) observed the operational status of project infrastructure; (v) conducted site interviews with WUAs, VWOs, TUAS, TLWRMI and project beneficiaries; (vi) reviewed data provided by the PMU and discussed evaluation findings with the PMU and PIU; and (vii) repeatedly invited the PMU to provide clarification on findings and analysis presented by the evaluation team.

Component One: Rehabilitation of Main I&D Works

2. In total, 36 contracts in 7 districts were implemented, of which 25 were reviewed in detail by the project evaluation team. The contract status is shown in Table 2.

Table 2
Physical and financial progress of I&D rehabilitation contracts

##	Raion/ Contract	Start	Completion	Physical status	Contract Cost (US$)	Final Cost (US$)	Financial status
I	**Sharinav**						
1	ICB.CW - 1	14.11.2001	13.02.2003	100%	277 661.00	277 617.17	Completed
2	NCB.CW -1	10.04.2002	10.05.2003	100%	159 571.37	156 584.52	Completed
II	**Gissor**						
3	NCB.CW -10	10.01.2007	07.08.2007	100%	155 657.49	155 657.49	Completed
4	NCB.CW -11	07.09.2006	28.08.2007	100%	188 791.41	197 110.29	Completed
5*	PWC.CW-21	25.05.2005	25.08.2005	100%	74 000	74 000	Completed
6*	PWC.CW-29	17.10.2007	17.01.2008	100%	30 000	30 000	Completed
III	**Rudaki**						
7	ICB.CW -2	12.10.2001	30.06.2002	100%	394 144.47	390 774.89	Completed
8	ICB,CW -3	11.10.2001	10.01.2003	100%	287 543.00	287 543.00	Completed
IV	**Yavan**						
9	ICB.CW -8	03.07.2003	08.12.2004	100%	247 595.48	263 640.41	Completed
10	ICB.CW -14	06.05.2003	06.08.2004	100%	232 753.92	242 248.26	Completed
11	ICB.CW -19	31.07.2003	30.10.2006	100%	1 453 329.50	1 527 496.10	Completed
12	ICB.G -17	31.07.2003	17.12.2004	100%	1 143 792.08	1 143 792.08	Completed
13	ICB.G -18	29.07.2003	01.10.2004	100%	301 000.03	301 000.03	Completed
14	NCB.CW -3	30.06.2003	31.05.2004	100%	55 986.36	64 203.63	Completed
15	NCB.CW -4	29.11.2003	31.05.2005	100%	205 632.00	218 546.69	Completed
V	**Kolkhozabad**						
16	ICB.CW -12	21.04.2003	21.02.2005	!00%	520 953.71	586 640.70	Completed
17	ICB.CW -13	17.07.2003	01.04.2005	100%	120 560.42	130 366.81	Completed
18	ICB.CW -22	21.01.2004	31.03.2005	100%	283 299.92	289 672.78	Completed
19	ICB.G -16	11.12.2003	08.06.2005	100%	640 308.76	636 694.69	Completed
20	NCB.CW -2	31.07.2003	31.10.2004	100%	146 516.62	153 391.83	Completed
21*	NCB.CW - 9	07.09.2006	07.09.2007	100%	184 000	184 000	Completed
22*	IS.G - 9	04.07.2005	04.09.2005	100%	61 000	61 000	Completed
23*	IS.G - 16	23.07.2007	23.09.2007	100%	50 000	50 000	Completed
VI	**Zafarabad**						
24	ICB.G -29	22.07.2004	26.04.2006	100%	3 982 608.19	3 784 547.40	Completed
25	ICB.G -31	24.04.2004	20.11.2005	100%	195 328.17	195 328.17	Completed
26	NCB.CW -7	12.12.2003	12.06.2005	100%	159 896.44	172 924.17	Completed
27	NCB.CW -8	01.03.2006	18.12.2006	100%	155 637.10	161 492.10	Completed
28*	ICB.G - 30	05.03.2004	05.03.2006	100%	424 000	424 000	Completed
29*	NCB.CW - 6	18.11.2003	18.11.2004	100%	74 000	76 000	Completed
30*	PWC.CW - 28	20.03.2007	20.07.2007	100%	50 000	50 000	Completed
31*	IS.G - 8	18.01.2005	48.04.2005	100%	69 000	69 000	Completed
32*	ICB.G - 35	19.07.2007	19.10.2007	100%	941 000	941 000	Completed

##	Raion/ Contract	Start	Completion	Physical status	Contract Cost (US$)	Final Cost (US$)	Financial status
VII	**Matcho**						
33	ICB.G -26	26.01.2004	12.10.2006	100%	680 617.40	680 617.40	Completed
34	ICB.G -27	18.03.2004	15.06.2006	100%	250 721.46	248 535.07	Completed
35	NCB.CW -5	17.12.2003	23.02.2005	100%	162 680.6	167 655.22	Completed
36*	ICB.G - 23	19.07.2005	19.10.2005	100%	1 632 000	1 387 000	Completed
TOTAL - VISITED					**12 402 5867**	**12 434 081**	
***TOTAL**					**15 991 587**	**15 780 081**	

* Contracts not reviewed by evaluation team. Data obtained from the Borrowers Completion Report

3. All the works under the 36 contracts were completed and contractors paid. Total cost of the original civil works and supply and installation of equipment contracts is US$ 15.99 million. The total cost of actual completion of these contracts is US$ 15.78 million. Total savings is US$ 201,506.00 or 1.3% of the original total cost of contracts. For the 25 contracts reviewed in detail, cost of the original contracts is US$ 12.40 million compared to total cost of actual completion of works which is US$ 12.43 million. Thus, the total cost overrun is US$ 31,494.00 or 0.25% of the original total cost of 25 contracts. The maximum increase of the original contract cost was 14.68 %, and the maximum saving is 1.87 %.

4. Out of the 25 contracts visited works implemented under six of them were delayed. Relevant variation orders were available only for three out of these six contracts. The total command area of all contracts is about 127,095 ha as per the engineering design reports, compared with 137,747 ha as reported in the Borrowers Completion Report, including 128,069 ha in the project districts area). The average investment cost was US$ 124 per ha, ranging from US$ 17.85 per ha in Rudaki raion to US$ 1141.92 per ha in Gissor raion.

5. Despite the rehabilitative and relatively simple nature of the works, review of Detailed Engineering Designs implemented in the initial stage of project implementation revealed an overall poor quality with respect to the book of drawings and to the annexes. As most design capacity is with government institutes and hence could not be procured under World Bank guidelines, the PMU faced serious difficulties in finding suitable design companies at the start of project implementation. Eventually, three relatively inexperienced companies were selected. With the support of the International Quality Control Irrigation Engineer (IQCIE), design works were improved and became adequate for the purpose of rehabilitation. A notable exception is the design of the BGK headworks, which did not include innovative design features that could have contributed to the sustainable rehabilitation of the works. For all the designs, engineering design firms had not been contracted.

6. The civil works contract documentation made available by the PMU to the evaluation team did not allow for a comprehensive review and analysis of the quality of supervision of civil works. In particular, essential documents required under the SNiP were not available in most of the contract files, including daily activity reports of site supervisors approved by PMU Engineers, monthly bills of completed quantities and bills of cumulative quantities, certificates of used materials and equipments, certificates of invisible works, certificates of welding tests, tests of concrete and soil compaction works, and “as-built” drawings. Available certificates of invisible works are general and do not specify the sections or dimensions of the works. The main documents missing or not available for review (with a few exceptions) are:

(i) Certificates of handing–over construction site to contractors with permanent and temporary reference pegs allocation;
(ii) Daily activity reports of site supervisors approved by supervising Engineer;
(iii) Certificates of all construction materials and equipments used;

(iv) PMU Engineers field visits reports including written instructions to contractors;
(v) Monthly bill of completed quantities and bill of cumulative quantities approved by the supervising engineer;
(vi) Approved requests for payments for interim completed works
(vii) Laboratory tests of concrete, welding, soil compaction etc. works quality;
(viii) Approved certificates of testing of all equipments installed, pipeline and the like, as per the relevant technical specifications;
(ix) "As-build" drawings for completed works including for all invisible works, verified by site supervisor and approved by the engineer.
(x) Evidence of registration of assets in the balance sheet of relevant institution.

7. The IQCIE spent considerable time during his assignment supervising implementation of works. The participation of representatives of raion water authorities and institutions responsible for pumping stations O&M was highly encouraged. This was evidenced by the high awareness of representatives of raion institutions about the works implemented, contractors, supervisors, PMU engineers and the activities of the IQCIE. The IQCIE was not delegated by the PMU to sign completed Bill of Quantities, whereas this could have provided an opportunity and incentives for the PMU maintain a better quality of subprojects contract and engineering documentation files. Poor quality of concrete works, road profiling and equipment mounting has been observed by the evaluation team under some of the contracts.

8. Major works implemented under the component included: canal cleaning (54.08 km), canal concrete lining (8.43 km), cleaning of collectors (72.25 km), profiling of maintenance road (82.64 km), rehabilitation of 28 pumping stations, rehabilitation of 57 boreholes and 299 other structures. The PMU data for the type and total amount of works implemented under the component are summarized in Table 3. A significant portion of available funds, about US$ 12.04 out of US$ 16 million was allocated to investments in civil works and supply and installation of equipment for rehabilitation of pumping stations. The overall quality of works implemented at the sites visited appears satisfactory compared to the quality of similar works in Tajikistan, though in some cases poor quality of canal concrete lining and poor equipment installation, especially the mounting of electric cables, were observed. Some of the works implemented are in poor condition, particularly:

- In the "New Karatag" pumping station in Sharinav raion (command area 750 ha) all the equipment installed under the project have been moved to other districts and the pumping station (including the pump house) is currently in a very poor state;
- Pumping station No. 4 (Guliston cascade) in Kolkhozabad raion (command area 840 ha) is flooded while all the equipment has been installed;
- Due to the poor quality of downstream apron works in the BGK headwork concrete works have been washed away for the most part and need diligent re-design and rehabilitation
- In all the schemes visited by the evaluation team most of the water measurement devices (hydro-posts) had been destroyed.

Table 3 Works implemented under 36 RIRP I&D rehabilitation contracts

##	Raion/ Contract	Command area (ha)	Canals			Maintenance road (km)	Collectors (km)	Pumping stations (Nos.)	Boreholes (Nos.)	Other structures								
			Total length (km)	Cleaned (km)	Lined (km)					Headworks (nos)	Bridge (nos.)	Siphon (nos)	Aqueducts (nos.)	Cross regulators (nos.)	Escape structure (nos.)	Outlets (nos.)	Water measur. devices (nos)	Other (culvert, manholes, etc.)
I	**Sharinav**																	
1	ICB.CW – 1	1021	22.3	0	3.08	13.00	0.00	0	0	1	11	0	0	0	0	0	2	0
2	NCB.CW -1	3140 (incl. 750 ha N. Karatag PS)	19.8	0	0	9.00	0.00	1	0	0	12	1	0	0	1	0	2	0
II	**Gissor**																	
3	NCB.CW -10	400	19.8	19.8	0	0.00	0.00	0	0	0	0	0	0	0	0	7	0	5
4	NCB.CW -11		0	0	0	0.00	0.00	0	0	0	0	2	0	0	0	0	0	0
5	PWC.CW-21		0	0	0	0.00	0.00	0	0	0	0	1	0	0	0	0	0	0
6	PWC.CW-29		0	0	0	0.00	0.00	0	0	0	0	n/a	0	0	0	0	0	0
III	**Rudaki**																	
7	ICB.CW -2	38000 (incl. 3976 ha Dushanbinskaya Vetka)	49.3	0	0	0.00	0.00	0	0	1	0	0	0	0	0	0	0	0
8	ICB.CW -3		19.6	12.6	1.3	2.30	2.10	0	0	1	6	1	0	11	0	16	6	22
IV	**Yavan**																	
9	ICB.CW -8	15600 (PVMK)	102	0	0.31	0.00	7.60	0	0	0	1	0	2	0	1	8	0	0
10	ICB.CW -14		19.37	11	1.49	22.21	0.00	0	0	0	1	1	2	0	2	8	0	11
11	ICB.CW -19		0	0	0	0.00	0.00	3	0	0	0	0	0	0	0	0	0	0
12	ICB.G -17		0	0	0	0.00	0.00	2	0	0	0	0	0	0	0	0	0	0
13	ICB.G -18		0	0	0	0.00	0.00	n/a	0	0	0	0	0	0	0	0	0	0
14	NCB.CW -3		0	0	0	0.00	0.00	n/a	0	0	0	0	0	0	0	0	0	0
15	NCB.CW -4		0	0	0	0.00	0.00	0	0	1	0	0	0	0	0	0	0	0
V	**Kolkhozabad**																	
16	ICB.CW -12	9520	97.5	1.88	1.17	16.90	39.00	0	0	0	33	0	0	5	0	10	6	5

##	Raion/ Contract	Command area (ha)	Canals			Maintenance road (km)	Collectors (km)	Pumping stations (Nos.)	Boreholes (Nos.)	Other structures								
			Total length (km)	Cleaned (km)	Lined (km)					Headworks (nos)	Bridge (nos.)	Siphon (nos)	Aqueducts (nos.)	Cross regulators (nos.)	Escape structure (nos.)	Outlets (nos.)	Water measur. devices (nos)	Other (culvert, manholes, etc.)
17	ICB.CW -13		22.4	7.3	1.1	7.23	2.05	0	0	0	0	0	0	6	0	23	3	2
18	ICB.CW -22		0	0	0	0.00	0.00	8	0	0	0	0	0	0	0	0	0	0
19	ICB.G -16		0	0	0	0.00	0.00	**10**	0	0	0	0	0	0	0	0	0	0
20	NCB.CW -2		0	0	0	0.00	0.00	8	0	0	0	0	0	0	0	0	0	0
21	NCB.CW – 9		0	0	0	0.00	0.00	2	0	0	0	0	0	0	0	0	0	0
22	IS.G – 9		0	0	0	0.00	0.00	8	0	0	0	0	0	0	0	0	0	0
23	IS.G-16		0	0	0	0.00	0.00	2	0	0	0	0	0	0	0	0	0	0
VI	**Zafarabad**																	
24	ICB.G -29	36250 (incl. 250 ha drainage improvement under the boreholes)	0	0	0	0.00	0.00	2	0	0	0	0	0	0	0	0	0	0
25	ICB.G -31		0	0	0	0.00	0.00	0	31	0	0	0	0	0	0	0	0	0
26	NCB.CW -7		65	1.5	0	12.00	21.50	0	0	0	0	2	3	6	3	40	7	0
27	NCB.CW -8		0	0	0	0.00	0.00	0	0	0	0	0	0	0	1	0	0	0
28	ICB.G – 30		0	0	0	0.00	0.00	2	0	0	0	0	0	0	0	0	0	0
29	NCB.CW – 6		0	0	0	0.00	0.00	**7**	0	0	0	0	0	0	0	0	0	0
30	PWC.CW – 28		0	0	0	0.00	0.00	**n/a**	0	0	0	0	0	0	0	0	0	0
31	IS.G – 8		0	0	0	0.00	0.00	**n/a**	0	0	0	0	0	0	0	0	0	0
32	ICB.G – 35		0	0	0	0.00	0.00	**n/a**	0	0	0	0	0	0	0	0	0	0
VII	**Matcho**																	
33	ICB.G -26	23564 (incl. 150 ha drainage improvement under boreholes)	0	0	0	0.00	0.00	2	0	0	0	0	0	0	0	0	0	0
34	ICB.G -27		0	0	0	0.00	0.00	0	26	0	0	0	0	0	0	0	0	0
35	NCB.CW -5		0	0	0	0.00	0.00	**5**	0	0	0	0	0	0	0	0	0	0
36	ICB.G – 23		0	0	0	0.00	0.00	3	0	0	0	0	0	0	0	0	0	0
Total		**127495**	**437**	**54**	**8.4**	**82.6**	**72.3**	**28**	**57**	**4**	**64**	**7**	**7**	**28**	**8**	**112**	**26**	**45**

Rating of outputs

9. The rating of works implemented in each contract site visited by the evaluation team was done based on two criteria: (i) design solutions and quality of works implemented based on observations and review of available technical documentations (CI-Contract Implementation); and (ii) current operational status of rehabilitated schemes (OE-Outcome Effectiveness). Ratings vary from moderately unsatisfactory to highly satisfactory. The only contract which was rated as moderately unsatisfactory is ICB.CW–2 (BGK headworks) both in terms of implementation and current stage. This is the result of significant shortcomings in the design solutions and poor quality of works implemented. Currently the rehabilitated aprons are washed out (almost completely) and require significant re-investment.

10. The majority of works implemented under the other contracts are rated as satisfactory as compared to similar works in Tajikistan, as only minor shortcomings have been observed, mainly because of the lack of experience in PMU staff at early stage of project implementation. Works under 5 contracts have been rated as moderately satisfactory as obvious shortcomings in the quality of works such as poor quality of concrete works, electric mounting, metal works and the like, have been observed. However, good standard of works and adequate current operational condition have been observed by the evaluation team in Yavan raion (PVMK canal and PVMK Tunnel Outlet). Consequently the works implemented under these two contracts are rated as highly satisfactory. Summary ratings of the works are presented in Table 4.

Table 4
Rating of works implemented and current state

##	Raion/Contract	Rating	##	Raion/Contract	Rating
I	**Sharinav**		**V**	**Kolkhozabad**	
1	ICB.CW - 1	CI – moderately satisfactory OE- moderately satisfactory	14	ICB.CW -12	CI – satisfactory OE- satisfactory
2	NCB.CW -1	**Chuzi canal** CI – satisfactory OE-satisfactory **"New Karatag" PS** CI – satisfactory OE – unsatisfactory	15	ICB.CW -13	CI – satisfactory OE- satisfactory
II	**Gissor**		16	ICB.CW -22	CI – satisfactory OE- satisfactory
3	NCB.CW -10	CI – satisfactory OE- satisfactory	17	ICB.G -16	CI – satisfactory OE- moderately satisfactory
4	NCB.CW -11	CI – satisfactory OE- satisfactory	18	NCB.CW -2	CI – satisfactory OE- satisfactory
III	**Rudaki**		**VI**	**Zafarabad**	
5	ICB.CW -2	CI – moderately unsatisfactory OE- moderately unsatisfactory	19	ICB.G -29	CI – satisfactory OE- satisfactory
6	ICB,CW -3	CI – satisfactory OE- moderately satisfactory	20	ICB.G -31	CI – moderately satisfactory OE- satisfactory
IV	**Yavan**		21	NCB.CW -7	CI – satisfactory OE- satisfactory
7	ICB.CW -8	CI – highly satisfactory OE- satisfactory	22	NCB.CW -8	CI – satisfactory OE- satisfactory
8	ICB.CW -14	CI – moderately satisfactory	**VII**	**Matcho**	

##	Raion/Contract	Rating	##	Raion/Contract	Rating
		OE- moderately satisfactory			
9	ICB.CW -19	CI – moderately satisfactory OE- satisfactory	23	ICB.G -26	CI – satisfactory OE- satisfactory
10	ICB.G -17	CI – satisfactory OE- satisfactory	24	ICB.G -27	CI – satisfactory OE- satisfactory
11	ICB.G -18	CI – satisfactory OE- satisfactory	25	NCB.CW -5	CI – satisfactory OE- satisfactory
12	NCB.CW -3	CI – moderately satisfactory OE- satisfactory			
13	NCB.CW -4	CI – highly satisfactory OE- highly satisfactory			

CI- Contract Implementation; OE-Outcome Effectiveness

Component Two: Provision of Community-Based Village Water Supply in Selected Villages

11. The potable water component was supported by an international consultant on three short-term assignments for a total of two months who provided an implementation manual for the CDD approach and training to PMU staff and VWOs. The last assignment was in May 2003, two years before completion of most of the potable water supply subprojects. Main recommendations from the consultant to the Bank supervision team included:

- As important as knowing, understanding, and working with VWOs is, equally important is knowing, understanding, and pushing RIRP/PMU to implement a CDD approach in RIRP. The greatest challenge in implementing CDD in RIRP is not with the villagers and the VWOs. The greatest challenge is to work with RIRP/PMU and get them to accept, understand, and fully implement a CDD approach in the project's drinking water supply component.
- It may be wise to seek other, outside sources to implement capacity-building of VWOs, rather than to rely exclusively on RIRP/PMU staff.
- RIRP/PMU needs to commit the resources required to implement a CDD approach in RIRP, whether they come from PMU or elsewhere. At an absolute minimum, there should be at least one PMU staff person who knows, understands, accepts, and is willing to implement the CDD approach in RIRP. There should be one person in one office with full responsibility and authority for implementing the CDD program in RIRP/PMU.
- RIRP/PMU should place much more emphasis on the long term financial, O&M, and management implications of rehabilitation designs. RIRP/PMU engineers need to consciously ask themselves whether local villagers are technically, financially, and organizationally capable of long-term management of the design.
- In the bidding documents supplied to potential contractors, there should be clear information regarding the 20 percent contribution from the villagers, to avoid any future misunderstanding during rehabilitation.
- Though there will be considerable sums of money deposited into VWO bank accounts during rehabilitation, it may not be necessary for the VWO to employ a

full-time accountant during this time. A part-time, professionally trained accountant may be sufficient.

- If the VWO cannot afford to hire a Quality Control Engineer during rehabilitation (and it is likely they cannot), RIRP/PMU should consider allowing the VWO to hire the engineer, but a large proportion of the engineer's salary could be transferred from RIRP/PMU to the VWO, and then the VWO could pay the engineer's salary.
- A more concentrated, systematic effort is needed to include women in VWO decision-making.

12. The PMU recruited one engineer to coordinate this component, but other recommendations were not implemented. Most notably, the PMU continued to be the main implementer of the CDD component, to the extent that funds were not transferred to the VWO accounts but paid directly by the PMU to contractors, the quality control engineer was not paid by the VWO but by the PMU, and eventually no effective effort was undertaken to establish sustainable VWOs.

13. The infrastructure output of component 2 consisted of civil works contracts. The output of civil works as reported by the PMU are listed in the Table 5 and Table 6:

Table 5
Civil works contracts implemented under Component 2

Raion	Name of VWO	# of villages	Target # of beneficiaries	Date of VWO registration	Date of signing civil works contract	Date of completion of civil works	Contract value, 1,000 US$	Community contribution, 1,000 US$	% of community contribution
Rudaki	10 solagii Tojikiston	5	13,000	27/8/'02	25/9/'03	25/12/'04	196.93	28.3 (cash 22,0, materials 0.05, labor 6.3)	14.36
Yavon	Kulobod	5	28,000	14/9/'02	21/11/'03	21/3/'05	192.53	Not clear	Not clear
Kolchozabad	Sujunobod	4	4,564	3/1/'03	16/1/'04	20/12/'07	193.81	9.4 (cash 0.7, materials 8.8)	4.86
Zafarabad	Zulol	7	8,000	16/2/'02.	18/3/'04	18/7/'05	172.28	7.8 (cash 4.7, labor 3.1)	4.53
Matcho	Abdekaum Sariev	9	6,158	12/10/'02	17/3/'04 23/4/'04	17/7/'05 23/8/'05	358.99	68.4 (35 cash, 9.4 materials, 24.1 labor)	19.06
Total		**30**	**59,722**				**1114.54**	**113.9**	**10,2**

Table 6
Main works conducted under potable water supply contracts

Type of work	Unit	Kolkhozabad VWO Sujunobod	Rudaki VWO 10 solagii Tojikiston	Yavon VWO Kulobod	Matcho VWO Zulol	Zafarabad VWO A. Sarieva	Total volume of work
Tubewell boring	P	0	2	0	1	2	5
Main pipelines of different diameters	M	2550	5673	8538	10014	19622	46397

Type of work	Unit	Kolkhozabad VWO Sujunobod	Rudaki VWO 10 solagii Tojikiston	Yavon VWO Kulobod	Matcho VWO Zulol	Zafarabad VWO A. Sarieva	Total volume of work
Village network pipelines of different diameters	M	25919	6242	8123	5610	2218	48112
Bolts and valves	P	87	95	56	82	144	464
Stand pipes	P	86	68	36	82	85	357
Earth works	CM	31810	19127	43921	37292	67213	199363
Power lines	M	7080	1931	0	11500	3750	24261
Cables and and on-site power lines	M	674	1156	0	2350	1413	5593
Building of pump stations and other additional accommodation	P	4	5	0	0	3	12
Pump aggregates	P	5	5	2	2	2	16
Transformer sub stations	P	2	1	0	1	3	7
Chlorinators	P	2	3	0	1	1	7
Storage tanks	P	1	1	0	2	3	7
Fencing	M	568	250	0	60	14164	15042
Concrete and reinforced concrete	CM	186	218	51	99	569	1123
Station management «Cascade»	P	0	5	0	0	2	7

14. Incorrect information was provided by the PMU regarding the outcome of each of village drinking water schemes, overstating the number of beneficiaries. The evaluation team visited each of the potable water supply schemes and found the following:

Matcho. For five out of 9 villages targeted under RIRP, the system had not been functioning because of a number of the following reasons (as reported by representatives of the VWO and inhabitants and observed by the evaluation team). In one village, during rehabilitation of the spring, backpressure during mechanical excavation practically halted the flow of the spring, rendering it not suitable as a source for the village. In a second village, the pressure provided by the pump was too low to reach the village, which is located at a slightly higher elevation. In a third village, the polyethylene (PE) pipe was reportedly of inferior quality and leaked, and resulting low pressure was insufficient to supply the village with water. In the fourth and fifth village, the community's contribution was not sufficient, leaving the system only partially completed. The VWO had been left with a debt to the contractor of TJS 30,000 (approximately US$ 8,000), and is trying to repay this. However, because of this debt the Defect Liability Period had been waived.

Zafarabad. The system is operating properly and was operating properly at contract completion. The project constructed infrastructure was in good condition and well maintained. Members of the VWO reported that the VWO has been incorporated into the village (jamoat) administration, and employs 14 staff members, including the head of jamaot, with a fee collection rate around 55% (TJS 18,160 collected in 2007 out of TJS 32,600 planned). There is limited electricity supply from October to April, so there is no reliable potable water supply during these months. During this period the village inhabitants use the old water system, consisting of one existing tap stand supplied by the spring.

Kolkhozabad. According to the progress reports of the PMU, the contract had been completed and handed-over, but the system was not functioning at project closing. The evaluation team observed after project closing that works were not completed. Specifically, the electric hoist mounted inside the pumping station, the connection to the main supply of electricity, the connection to the chlorination system and one pump were missing at the water intake station. Also, the team observed that quality of works was not according to contract specifications. In particular, concrete blocks for manholes were used instead of reinforced concrete, a secondhand transformer was installed, the installed pumps of 7.5 kW were not according to contract specifications of 10 kW, and PE to steel pipe connections were done by heating PE and dressing it over steel. Quantities of works were not according to the Bill of Quantities in the contract. Specifically, the number of buildings, the number of electricity poles and the connection of the toilet blocks to a sewerage or septic system were lower than the quantities specified in the contract. The contractor informed the evaluation team that he had handed over the project, but he was not able to provide information as to why the project had not been completed. No contract documentation was made available by the PMU to the evaluation team to clarify the observed differences.

Statements by the VWO and the villagers indicated that the VWO had little participation from the communities targeted under the project. Five out of six village households interviewed by the evaluation team reported they were not aware of the existence of a VWO, and six out six households interviewed had not been asked for a contribution, both in cash or in kind. All households stated they would be willing to contribute to an improved water supply. One interviewed female household member who was interviewed stated to the evaluation team that they do not feed their children or send them to school, in order to save money to buy water, since the price per CM of tankered water is roughly TJS 17 (approximately US$ 5). One villager informed the evaluation team that the chairman of the VWO is a supplier of construction materials to the project, whereas the former chairman of the VWO was a contractor on the project. The current VWO chairman confirmed he had worked for the contractor before becoming the head of the VWO. He did not provide information to the evaluation team to explain why the contractor had handed over the system while it was not completed.

Rudaki. The system is providing only an estimated 50% of the design target area, with pumps mostly not provided by the RIRP, since only one of out four pumps provided by RIRP was available on-site when the evaluation team visited:

- At the Ak-Kurgan site there is a defunct borehole with no submersible pump, a transformer station and pump house that is not connected to the transformer station, all constructed under RIRP. The VWO informed the evaluation team that the pump was in the pump house and that it was working. Neighborhood residents informed the team that: (i) there is severe water shortage due to a lack of pressure in the pipeline; (ii) shortly after construction of the pump house the pump worked and the water supply improved, but the transformer burned.; (iii) people from the community

collected money twice to repair the transformer, with no success; (iii) they do not know the VWO; (iv) water is provided by the Dushanbe water company; and (v) the pump station was build on land that was privately owned, without the consent of the owner.

- At the Komunism site, the transformer station was likely over 5 years old, not connected to the pump house and with the actual transformer missing, the chlorination system was not installed and the borehole with a submersible pump was, as reported by the operator, in existence before the onset of the project.
- At the Chemtepa site the borehole constructed by the project (as reported by the PMU), had no pump, the chlorination system was not installed and the transformer at site was missing.
- At the Galezor site the project tubewell is working when there is no limit on energy supply (from May to September) but provides 9 out of 67 households only due to low capacity of the pump. The NGOs CARE and CESVI rehabilitated existing springs in the village from 2005-2007 and connected the school and the health clinic to the potable water supply. The VWO is not known by beneficiaries.
- The VWO appeared to have little understanding of the system: (i) the VWO representative stated that chlorination of the water was done directly in the borehole (effectively chlorinating the aquifer); (ii) there were significant gaps between the rates and income from fee collection quoted by the accountant and the rates and income mentioned in the financial files; and (iii) the financial statement showed a significant yearly deficit, of which the VWO accountant was not aware.

Yavan. The potable water system constructed by the project to serve 28,000 people in the village of Kulobod and downstream villages, was not functioning at project closing. The evaluation team observed that the village of Kulobod does not receive water from the pumping station and pipeline rehabilitated by the project, and only a small part of the village receives water from a connection to the industrial water supply of a chemical factory which was constructed before the RIRP. The chief engineer of the pumping station (who reported not being involved in the project), and the villagers stated that this was the situation at project completion. The pump motors were missing, as were a section of the pipeline connecting the pump station to the village. The PMU and the head of the VWO reported that representatives of the district authority (hukumat) in Yavan district removed the section of the pipeline shortly after completion of the project in June 2005 for use, according to the PMU, in a different water supply system.

The chief engineer reported that the pump motors installed under the RIRP were faulty and not functioning properly, and as a result were not able to power the pumps providing water to the villages targeted under the project. According to the PMU and to the construction progress reports of the IQCIE old pumps and motors were indeed installed in August 2004 and not replaced with new ones until the beginning of June 2005. The PMU reported to the evaluation team that new pumps

had been installed just before handing over of the project. These pumps were not observed at the site by the evaluation team.

The evaluation team interviewed approximately 15 households in the village of Kulobod and the head of the VWO from a village 25 km from Kulobod. None of the households provided positive feedback on the project. Seven project beneficiaries in Kulobod stated to the evaluation team that the people working on the project deceived the World Bank supervision team by manipulating the operation of the potable water scheme existing from before the project and presenting this as results achieved because of the RIRP. .Beneficiaries stated that they contributed money and labor to the project. The VWO stated that the financial contributions were used for staff salaries. Some eight villagers stated that the water supply of the village, existing before project onset, had deteriorated because of leakages in the project pipelines that were attached to the existing village network. Beneficiaries reported that at the start of the project, the project representatives had disconnected existing connections to the water supply of the chemical factory and informed the villagers that households which cultivated cotton would receive a new connection to the new potable water supply scheme.

15. From the achievement of the outcomes, it is clear that there were major shortcomings in the area of contract management of the potable water works; however, these shortcomings cannot be identified properly as there is limited documentation regarding the contract management process. The list of documents made available to the evaluation team is listed below:

Table 7
Contract documentation

Document	Matcho	Zafarabad	Yavan	Kolkhozabad	Rudaki
Design report	Yes	Yes	Design brief	Design brief	Partially
Cost estimate	Yes	Yes	Rough estimate	Rough estimate	Rough estimate
Bids	Yes	Yes	Yes	Yes	Yes
Drawings	Incomplete	Incomplete	Incomplete	Incomplete	Incomplete
Agreement w/ VWO	Yes	No	Yes	No	Yes
Contract	1 out of 2	Yes	Yes	Yes	Yes
Amendments	No	No	Yes	Partial	Yes
Variation orders	No	No	Incomplete	No	Yes
Equipment certificates	No	No	Incomplete	No	Yes
Community contribution			No	No	Yes
Final payment	No	No	Yes	Yes	Yes
Hand-over	Yes, copy	No	Yes	No	Yes
VWO registration	Yes, partial	Yes, partial	Yes	No	Yes
As built drawings	No	No	No	No	Yes

16. A summary of the outcomes and an estimate of the actual benefiting population versus the targeted population as per design reports and PMU project progress reports are provided in the table below.

Table 8 Outcomes of potable water supply schemes established under RIRP.

	Potable Water Civil Works				VWO	
Raion	**Estimated status as per contract completion and defect liability period**	**Status as per December 31, 2007**	**Target Popu-lation**	**Est. system population coverage at RIRP completion**	**VWO status as of RIRP completion**	**Target achie-ved (%)**
Yavan	Not functioning	Not functioning: - Non-functioning pumps installed - Village networks not connected to pumping station	28,000	0	Not functioning	0%
Kolcho-zabad	Not functioning	Not functioning: - Contract not completed according to specifications - Pumping station not connected to electricity supply	4,564	0	Not functioning. VWO not known by beneficiaries.	0%
Rudaki	Not clear, est. 75%	- Chimtepa site; 50% operational, but no from RIRP supported infrastructure, as submersible pump is missing - Komunism site; 75% operation, RIRP booster pump and transformer missing - Ak-Kurgan site; 0%, RIRP submersible pump missing, area supplied by Vodokanal - Chulizor site; 9 out of 67 (13.4%) h/holds supplied by RIRP submersible pump	13,000	6,500	VWO not know by 12 beneficiaries around 2 sites. VWO Head known as the "land privatizer from jamoat"	50%
Zafarabad	Functioning	System built as per contract and well maintained. Chlorination system out of order Not functioning at evaluation because of electricity shortage	8,000	8,000	VWO taken over by jamoat and operating	80%
Matcho	Four out of 9 villages supplied	5 villages with non-functioning system: Village 1. Rehabilitation of spring caused backpressure, stopping water flow Village 2. Pump capacity (head) too low to supply it to the village Village 3. Large pressure drop over main (PE) pipe due to leakages in newly installed pipe Village 4. Partially constructed since not enough community contribution Village 5. Partially constructed since not enough community contribution	6,158	2,737	VWO known and existing. Salaries not paid, no budget for O&M and for 30,000 TJS indebted to contractor	65%
Total			**59,722**	**17,237**		**39%**

Component Three: Institutional capacity building for improved land and water resources management

17. The TUAS and the TLWRMI were supported with rehabilitation of facilities and laboratory equipments. In the table below is a list of equipments provided, as reported by the PMU.

Table 9
Equipments provided to TUAS and TLWRMI

No	Equipment	Quantity
Meteorological devices		
1	Anemometer	4
2	Altimeter	6
3	Portable temperature and humidity meter	15
4:	Barometer	6
5:	Radiation meter	5
6:	Psychrometer	3
Surveying equipment		
1:	Leveling instrument	3
2:	Supports	4
3:	Sunshade	4
4:	Board	4
5:	Measuring tape	4
6:	Clinometers	1
7:	Compass	3
8:	Distance meter	3
9:	Electronic planar	5
Water measurements and analysis		
1:	Measuring flume	6
2:	Flow recorder	3
3:	Multisampler Set	2
4:	pH meter	6
5:	Set for field analysis of water	5
6:	Flow meter	3
Soil analysis		
1:	Sampling rings	5 set
2:	Electronic tensiometer	7
3:	Infiltrometer	5
4:	Humidity sensor	10
5:	Indicator for identification of soil humidity	7
6:	Soil particle analysis	5
7:	Electric shakers	7
8:	pF calibration sand box	5
Plant analysis		
1:	Leaf area meters	4
2:	Plant water potential	4
3:	Sun-scans	4

18. The procurement of equipment was supported with technical assistance by an international irrigation researcher from Colorado State University. This researcher recommended establishing some new courses within the current curriculum of the TUAS and provided a detailed description of the course content. Furthermore, he provided training in the use of the equipment. At the TUAS, it was reported to the evaluation team that all research equipments were used in new research and training curricula. This report, however, is doubtful as research equipment appeared brand-new and not used, and staff reportedly trained under the project and teaching students on the use of the equipment were not able to operate the equipment when requested by the team. At the TLWMRI, the director acknowledged that the research equipment was not being used, as a result of limited training and the fact that the equipment manuals had not been properly translated.

19. As reported by the PMU, oblast and raion organizations and WUAs were supported with equipment shown in the table below:

Table 10
Equipments provided to WUAs and water management organizations

Name of equipments and goods	Unit of measurement	Quantity
1. Motorcycle	P	75
2. Bicycle	P	213
3. Computers, Printer, Scanner	P	70
4. Copy machine	P	70
5. One side tables	P	132
6. Two-side tables	P	52
7. Chair	P	380
8. Leveling instrument	P	30
9. Measuring tape	P	43
10. Distance meter	P	43
11. Water measuring device	P	36
12. Water measuring tape	P	214
13. Eletroconductivometer	P	16
14. Portable radiostation	P	80
15. One channel stationery radiostation for 20 users	set	4
16. Two channel stationery radiostation for 60 users	set	3
17. Portable radiostations	P	80
18. Portable radiostation	P	2
19. Stationery radiostation	P	18
20. Service equipment	set	1
21. Equipment for telemetrical information transmission	set	1
22. Electrical tachometer	set	1
23. GPS	set	1
24. Computer	P	3
25 Optical level	P	2
26. Electrical theodolite	P	2

20. The water management organizations and WUAs were also supported through a training program, first under the FPSP and subsequently under RIRP. Most of the

trainings were initially provided under the FPSP; trainings conducted under RIRP are listed in the table below. Trainings were provided at the training center in Dushanbe, part of the TLWRMI, mainly by staff of the TUAS, the TLWRMI and MIWR.

Table 11
Trainings provided under RIRP

Target group	Topic	Duration (days)	Attendees
Dehkan farmers	WUAs, irrigation, legal issues, marketing	5	3,000
WUA field agents	Irrigation scheduling and management	6	160 (both FPSP and RIRP)
WUA engineers	WUA organization and irrigation	6	60
WUA management	WUA management	6	40
Water inspectors and technicians	Construction supervision, irrigation management	6	240
Oblast and raion water authority managers	WUA, irrigation planning and management	6	120
Oblast and raion water authority directors	WUA, irrigation planning and management, organization and decentralization	6	25
Pump department specialist	Pump operation	6	60
MIWR specialist	Extension, training and communication	12	80
Design engineers	Irrigation design	24	20
Environmental specialist	Environmental considerations in water management	6	20
Safety engineers	Engineering safety	6	20
Headwork operators	Headwork operation	6	20
Not defined	Monitoring of I&D	12	20
Not defined	Field trips	6	60

21. Under the RIRP and the FPSP, 50 WUAs were established, 41 under RIRP and 9 under FPSP, and received training and equipment. The evaluation team obtained information on 22 out of 50 WUAs through field visits and site interviews and was provided by the PMU with information on all 50 WUAs established under RIRP and FPSP, as reported by the WUAs to the PMU. WUAs were ranked according to the criteria listed in Table 12, where satisfactory performance corresponds with the target level for WUA functioning described in the monitoring indicators. All WUAs that reported they were able to do some O&M works were ranked moderately satisfactory or higher.

Table 12
WUA ranking criteria

Ranking	Ranking criteria
1 Highly unsatisfactory	Mainly existing on paper and not able to operate anymore
2 Unsatisfactory	Collecting some fees in kind from farmers
3 Moderately unsatisfactory	Able to pay some staff salaries
4 Moderately satisfactory	Able to do some O&M planning and able to carry out some O&M work
5 Satisfactory	Contracts with farmers are being met, able to pay salaries and able to carry out some O&M
6 Highly satisfactory	Not in increasing debt, paying salaries and doing O&M

22. Overall, results were unsatisfactory, based on findings by the evaluation team and information provided by the PMU, as shown in the table below. Most of the WUAs had ceased functioning and WUAs established under RIRP were on average unsatisfactory, whereas WUA established under FPSP were on average moderately unsatisfactory. WUAs established under FPSP received a more sustained and rigorous training program than those established under the RIRP.

Table 13
Main characteristics and ranking of RIRP and FPSP WUAs

Raion	WUAs interviewed/ WUAs established	Main characteristics	WUA ranking
Rudaki	4 out 5	Reported by PMU Chiltan (FPSP) is functioning (rank 4) Visited "Obi Ravon": stopped functioning (rank 1) Visited "Obodoni": stopped functioning (rank 1) Visited "Kuttosh": reducing the number of staff (rank 3) Visited "Zainab": able to do some O&M works (rank 4)	RIRP: 2.25 FPSP: 4
Kolkho-zabad	3 out of 6 –	Visit "Ittifaq" (FPSP): no office and not able to pays staff partially (rank 2) Visited "Rahimov"(FPSP): Have office, and pay 1 staff, not able to conduct O&M (rank 3) Visited "Pochoev": partially functioning, receiving some fees from the farmers, only one employee unpaid, and the O&M is done by the RVK (rank 2) Reported by PMU "Tashrabot": fees collected satisfactory, but no O&M work carried out (rank 3) Reported by PMU "M.Gadoev": fees collected unsatisfactory, no other information (rank 2) Reported by PMU "Vaksh" – No information (rank 1)	RIRP: 2.3 FPSP: 2.5
Khuroson	1 out of 4	Visited "Mehnat": reported that none of the 4 WUAs are functioning, as they did not receive authorization from the RVK to collect fees from the farmers (rank 1)	RIRP: 1
Gissor	0 out of 1	Reported by PMU: "Guliston" has no office and unsatisfactory fee collection (rank 1) [11]	RIRP: 1

[11] On September 25, 2008, a local newspaper in Gissor reported that the WUA "Guliston" would dissolve officially on October 15, 2008.

Raion	WUAs interviewed/ WUAs established	Main characteristics	WUA ranking
Sharinav	2 out of 4	Reported by PMU: "Mirob" (FPSP) has office, some equipments available, some fees are collected, some O&M is carried out (rank 4) Visited "Navruz": Seized activities (rank 1) Reported by PMU: "Obi toza" has office, some equipments available, some fees are collected, no O& M is carried out (rank 3) Visited "Bogiston": Seized activities (rank 1)	RIRP: 1.7 FPSP: 4
Yavan	3 out of 8	Reported by PMU: "10 solagii Tojikiston (FPSP)" received additional training from CARE, some staff with paid salary, 30% of O&M is conducted, contracts with most farmers (rank 4) Visited "Norin", seizes functioning this year (rank 1) Reported by PMU "Chorgul" activity stopped (rank 1) Visited "Navkoram", misrepresentation to World Bank (rank 3) Reported by PMU "Dahana" has no more staff, is indebted (rank 1) Visited "G. Jusufov", does not function (rank 1) Reported by "G. Jusufov", "Haoti Nav" does not function (rank 1) Reported by PMU: "Obi Muki" has no more staff (rank 1)	RIRP: 1.3 FPSP: 4
Matcho	3 out of 6	Visited "J.Odinaev": have order to give water from the local government to the farmers growing cotton even if they don't pay fees (rank 2), indebted and restricted by RVK in operations. Visited "Azizov" and "Ashrapov" (FPSP) reported that trying to function but in whole raion ISFs are paid directly to RVKs and WUAs are bypassed (rank 2) No information provided by PMU on 3 other WUAs (rank 1)	RIRP: 1.3 FPSP: 1.7
Zafarabad	3 out of 16	Visited "M.Abdulloev": conduct minor O&M, increased staff and is not in debt (rank 6) Visited "Oshor": pay some staff salaries, but farmers pay directly to RVK (rank 4) Visited Kanz (FPSP): Staff and functioning contracts with farmers, but no funds for O&M (rank 5) Reported by PMU "Sarob": no information (rank 1) Reported by PMU "Obi Haiet": no information (rank 1) Reported by PMU "Sugd": Staff paid partially, contracts with most farmers, hardly funds for O&M, indebted, debt increasing (rank 4) Reported by PMU "Obron": 3 staff remaining and paid partially, contract with RVK, hardly funds for O&M (rank 3) Reported by PMU "S.Kenjaev": no information (rank 1) Reported by PMU "Mehrgon": - Staff paid partially, contracts with most farmers and RVK, hardly funds for O&M (rank 4) Reported by PMU "60-solagii leninobod": no information (rank 1) Reported by PMU "Pahtakor": Staff paid partially, contracts with most farmers, hardly funds for O&M (rank 5) Reported by PMU "Login": - Staff paid partially, contracts with most farmers, hardly funds for O&M, debt increasing (rank 4) Reported by PMU "Navobod": Staff paid partially, contracts with most farmers, hardly funds for O&M, debt increasing (rank 4) Reported by PMU "S.Aini": Seized activities (rank 1) Reported by PMU "Yagnob": No information (rank 1) Reported by PMU "Zafar": Staff paid partially, contracts with most farmers and RVK, hardly funds for O&M, debt increasing (rank 4)	RIRP: 2.9 FPSP: 5
Overall ranking		RIRP: 2.1 - FPSP: 2.9	

Annex 3. Economic and Financial Analysis

23. The cost benefit analysis focuses mainly on irrigation and rehabilitation activities of the project because rehabilitation works accompanied by institutional strengthening activities cost the largest share of project expenditures (approximately 90%). Specifically, the following phenomena which are typically associated with investments in irrigation are explored: (i) increases in crop yields due to more reliable provision of irrigation water; (ii) shift in the cropping pattern to higher value crops that cannot be grown profitably under rain-fed conditions; (iii) higher cropping intensity and cultivation of previously uncultivated land; and (iv) savings in water and energy due to reduced losses and higher efficiency in operations. All these phenomena are associated with higher incremental economic benefits to the farmers and/or the society as a whole. The objective of the cost benefit analysis is to measure the efficiency with which these benefits are achieved by comparing them with project costs.

Table 14
Current project costs (thousand US$)

Component	2001	2002	2003	2004	2005	2006	2007	Total	%age
A. Rehabilitation of main irrigation nets	**148**	**697**	**1,074**	**5,474**	**5,495**	**1,448**	**1,938**	**16,190**	**69.9%**
B. Drinking water supply	**29.7**	**23**	**54**	**525**	**507**	**83**	**125**	**1,347**	**5.8%**
C. Institutional strengthening	**46.9**	**342**	**283**	**893**	**584**	**438**	**71**	**2,661**	**11.5%**
C I. Institutional strengthening	46.9	177	164	333	282	219	67	1,289	5.6%
C II .Water user associations	0.00	164	119	560	302	219	4.4	1,372	5.9%
D. PMU and PCU	**94**	**512**	**909**	**727**	**431**	**181**	**71**	**2,965**	**12.8%**
D I. PMU	56.9	266	288	312	191	78	22	1,213	5.2%
D II. PCU	34.7	139	221	308	145	25	23	929	4.0%
D III. Nature protection	2.5	107	400	108	96	77	27	823	3.6%
Total	**319**	**1,574**	**2,320**	**7,619**	**7,018**	**2,149**	**2,205**	**23,162**	**100.0%**

24. Unavailability of key data and the questionable nature of data that were available severely limited the analysis of project benefits. Most notably, as the impact of the project on agricultural production could not be distinguished on the basis of the available data, no reliable projections for future project benefits could be made, and hence the economic rate of return could not be estimated. The key sets of missing data are annual crop budgets, including yields and market prices for outputs, total area irrigated and cultivated, and cropping patterns in the command area of rehabilitated irrigation infrastructure before and after effectives of these investments. In the absence of such data, the analysis used raion-wide data collected by the State Statistical Agency. Unfortunately these data sets are characterized by a number of deficiencies, including significant inconsistencies (such as huge fluctuations in area data for perennial crops from one year to the next) and missing data points. Experts consulted also indicated that over-reporting of production figures by 20 to 30% is not uncommon. The analysis was mindful of these deficiencies in reaching conclusions using these data.

Cost and Timing of I&D Rehabilitation Investments

25. The total cost of I&D rehabilitation investments was US$ 15.8 million, affecting some 127,000 ha of arable land. Per hectare investment ranged from a high of US$ 1,142 in Gissar to US$ 17.9 in Rudaki, with an average US$ 124 across the project area.

Table 15
RIRP rehabilitation investments per districts and hectare

Raion	Irrigated area	Total investment (US$)	Per Hectare Investment (US$/ha)
Sharinav	4,161	434,202	104.33
Gissar	400	456,768	1,141.92
Rudaki	38,000	678,318	17.85
Yavan	15,600	3,760,927	241.09
Kolkhozabad	9,520	2,081,767	218.67
Zafarabad	36,250	5,874,292	163.17
Matcho	23,414	2,483,808	106.08
TOTAL	**127,346**	**15,780,081**	**125.00**

26. As indicated in Table 16, in Yavan and Sharinav, rehabilitation works were completed in 2004, making reliable water supply available on 750 ha and 6,100 ha, respectively. However, in Sharinav the area serviced was reduced in 2007 because the new equipment was moved to another raion by Government decision. In Matcho, investments were completed gradually increasing the serviced area from 10,515 ha in 2002 to 23,564 ha in 2007. In Kolkhozabad, as of 2005, 3,270ha more were serviced; there was nevertheless a decline in 2008 due to some pumps going out of operation. In Zafarabad, reliably irrigated land from 15,000ha in 2005 to 36,250ha in 2006, while in Gissar, 400 ha could be irrigated in the 2008 cropping season due to the project. In Rudaki, limited project investments did not aim at increasing serviced area, but at maintaining the structural soundness of the BGK headworks and one conveyance canal.

Table 16
Irrigated areas serviced with rehabilitated works

Raion	Area (ha)							
	2001 (pre-project)	2002	2003	2004	2005	2006	2007	2008
Sharinav	3,411	3,411	3,411	4,161	4,161	4,161	3,411	3,411
Yavan	10,376	9,500	9,500	15,600	15,600	15,600	15,600	15,600
Matcho	10,515	10,500	10,800	11,500	11,500	20,521	23,564	23,564
Kolkhozabad	7,400	6,500	6,500	6,250	9,520	9,520	9,520	8,670
Zafarabad	15,298	15,298	15,000	15,000	15,000	36,250	36,250	36,250
Gissor	0	0	0	0	0	0	0	400
Rudaki	38,000	38,000	38,000	38,000	38,000	38,000	38,000	38,000
Total	**85,000**	**83,209**	**83,211**	**90,511**	**93,781**	**124,052**	**126,345**	**125,895**

Project Impact on Energy and Water Use Efficiency

27. Three efficiency indicators are discussed in this section: (i) pump efficiency (power consumed per cubic meter of irrigation water supplied, measured in kWh/million CM); (ii) power consumed per hectare irrigated (in kWh/ha); and (iii) water supplied per hectare of land irrigated (in CM/ha). Pumping station level data are provided for 2001 (pre-project), 2005 and 2006 in Table 17. Analysis of these data leads to the following conclusions:

(i) Pump efficiency in terms of energy consumed per cubic meter of water increased in 12 out of 23 pumping stations between 2001 and 2005/2006. Improvements are particularly noticeable in 2006. However, the analysis considered averages of the final two years in order to take into account possible special conditions in 2006, except in the case of Zafarabad where rehabilitated pumping stations became effective only in 2006. Power consumed per hectare of land decreased in 13 out of 23 pumping stations. It is not possible to compare the pump efficiencies to similar pumping schemes in different countries, as the analysis could not draw on data on the pumping elevation.

(ii) Per hectare water consumption decreased in the command areas of 16 out of the 23 rehabilitated pumping stations. However, the overall average decrease of 7% is low. Furthermore, there is significant variation in the rate of decrease at the level of pumping station which ranged from 1% to 58%. It is also noteworthy that at three pumping stations water consumption increased by 54-78%.

(iii) At nearly 15,000 CM/ha on average, water consumption remains very high. Raion averages range from about 12,000m3/ha in Zafarabad in 2006 to nearly 24,000 CM/ha in Kolkhozabad in the same year. In some areas, water consumption levels reach nearly 38,000 CM/ha which compares highly unfavorably with technically feasible levels of 7,000 CM/ha achieved in the US, Australia and Israel.

Project Impact on Crop Yields, Cropping Patterns and Cropping Intensity

28. This section examines the impact of irrigation rehabilitation investments on key crop yields (cotton, grains, and vegetables), total land under cultivation and relative allocations of land to different crops. Total cropping area may have increased both due to the beginning of cultivation of previously uncropped area and increased cropping intensity whereby farmers are able to harvest crops more times during the year than without improved irrigation water supply. The analysis focuses on four raions, namely Yavan, Kolkhozabad, Matcho and Zafarabad, where project investments per ha were sizeable and/or completed before 2006 so data were available for analysis.

Table 17– Pumping Station efficiency Indicators

Pumping station	**Power consumed per million cubic meter** (kWh/MCM)				**Power consumed per hectare** (kWh/ha)				**Water per hectare** (CM/ha) [b]			
	2001	2005	2006	Average of 2005 and 2006	2001	2005	2006	Average of 2005 and 2006	Before rehabili-tation	2005	2006	Average of 2005 and 2006
Sharinav												
New Karatag	**722**	**789**	**350**	**570**	**10.48**	**10.40**	**9.68**	**10.04**	**14,520**	**13,173**	**27,640**	**20,407**
Yavan												
HC № 1	172	163	149	156	6.50	6.05	5.57	5.81	37,760	37,228	37,240	37,234
HC № 2	174	173	142	158	2.21	2.15	1.76	1.96	12,663	12,412	12,421	12,416
HC № 3	159	159	151	155	0.57	0.54	0.51	0.52	3,550	3,381	3,374	3,378
HC № 4	111	121	101	111	1.31	1.29	1.07	1.18	11,792	10,660	10,613	10,637
HC № 7	89	103	86	95	0.22	0.20	0.17	0.19	2,516	1,971	1,971	1,971
Average	**169**	**164**	**145**	**155**	**2.66**	**2.52**	**2.23**	**2.23**	**15,709**	**15,363**	**15,366**	**15,365**
Kolkhozabad												
Gulistan No.1	81	80	95	88	1.85	1.82	1.92	1.87	22,820	22,764	20,186	21,475
Gulistan No.2	100	103	70	86	1.66	1.66	2.62	2.14	16,495	16,048	37,664	25,484
Gulistan No.3	83	80	68	74	1.84	1.71	1.87	1.79	22,131	21,516	27,631	24,574
Gulistan No.4	94	98	88	93	2.02	2.15	2.39	2.27	21,439	21,914	27,162	24,538
Gulistan No.5	40	45	17	31	0.59	0.58	0.65	0.61	14,500	12,900	39,000	25,950
Kolkhozabad	82	82	217	150	1.99	2.10	1.58	1.84	24,300	25,578	7,285	16,431
Kumsangir No2	92	93	105	99	3.58	3.72	3.76	3.74	38,955	39,827	35,781	37,804
Yubilei No 1	116	126	216	171	2.74	2.71	4.47	3.59	23,533	21,533	20,733	21,133
Yubilei No 2b	56	97	139	118	1.48	1.43	1.04	1.23	26,680	14,680	7,480	11,080
Yubilei No 2g	47	45	74	60	0.65	0.63	1.65	1.14	13,857	13,857	22,190	18,024
Average	**85**	**87**	**93**	**90**	**2.05**	**2.10**	**2.19**	**2.15**	**24,148**	**24,010**	**23,583**	**23,796**
Matcho												
Delvarzin 1a	209	214	290	252	6.25	7.36	7.67	7.51	29,886	34,397	26,444	30,421
Delvarzin 2a	269	351	300	325	2.86	3.00	2.21	2.61	10,606	8,564	7,375	7,969
Delvarzin station	169	184	280	232	1.26	0.87	0.68	0.78	7,471	4,699	2,447	3,573
Yantak No. 1	116	128	280	204	2.25	3.09	2.20	2.65	19,378	24,214	7,876	16,045
Average	**200**	**214**	**290**	**252**	**3.28**	**3.70**	**3.38**	**3.54**	**16,428**	**17,270**	**11,656**	**14,463**
Zafarabad												
GNS-1	386	362	348	348	5.70	5.05	4.27	4.27	14,781	13,948	12,273	12,273
GNS-2	359	325	336	336	5.76	4.80	3.97	3.97	16,049	14,756	11,808	11,808
Leninabadskaia	196	140	239	239	2.25	2.21	2.40	2.40	11,452	15,797	10,039	10,039
40 let Tajikistanskaya	247	302	225	225	1.71	3.31	2.75	2.75	6,929	10,975	12,209	12,209
Average	**366**	**338**	**332**	**332**	**5.33**	**4.75**	**3.99**	**3.99**	**14,564**	**14,075**	**12,036**	**12,036**
Overall												
Overall Average	**266**	**255**	**261**	**261**	**4.25**	**4.04**	**3.52**	**3.78**	**15,959**	**15,840**	**13,483**	**14,870**

[a] *Data provided by PMU based on oblast and district organization reports*

[b] *Water per hectare values are not absolute, as command areas of pumping stations overlap. Therefore, values are provided to show the trend in consumption.*

29. The economic analysis at appraisal predicted that in the without-project scenario pumping stations would cease functioning within five years, leading to a gradual decline in cultivated area and yields. In the with-project scenario, it was assumed that yields would improve from their 1999 levels and a significant diversification in crops would occur along with significant increases in area planted to grains and cotton.

30. This analysis faces three important difficulties, all related to data availability: Firstly, data on area cropped and cropping patterns in the project area are not available, hence the statistics from 1999 and assumptions made for the with- and without-project scenarios may not be compared with actual data. Secondly, the period during which infrastructure rehabilitated under RIRP was functional and provided irrigation to an increased area of land and for which data area available is limited to 1-3 years. This is a very short period given the large number of other factors that can affect area and cropping mix decisions, and yields. Thirdly, the available data on baseline are limited to one year, thus not allowing the analyst to take into account fluctuations that may occur due to a variety of reasons.

31. As a general comment on yields, 2005 should be noted as a year with unusually unfavorable weather conditions which led to a significant drop in output levels almost across the country and crops.

32. In the absence of data specific to the command areas of the irrigation infrastructure, raion-wide data were reviewed and compared with those of with adjacent non-project comparator raions with similar geographical and climatic conditions, thus minimizing the impact of different agro-climatic conditions on yield differences. No significant irrigation rehabilitation investments were carried out in these adjacent districts, whether funded by the World Bank or any other donor. The pairings are as in Table 18:

Table 18 Comparator raions

Project raion	**Adjacent comparator raion**
Yavan	Abdurahman Jomi (Hojamaston)
Matcho	Bobojon Gafurov
Kolkhozabad	Jilikul
Zafarabad	Nau

33. From Figure 3 and Figure 4 it is observed that in 2005 and 2006 average yield trends in project districts remain stable, whereas in non-project districts yields declined. In 2006, cotton and wheat yields were approximately 18% to 5% higher in project districts compared to non-project districts. The stable yields in project districts are more likely a result of more reliable water availability than in the neighboring districts. Therefore, the main achievement of this component were its prolonging the working life of critical infrastructure (mainly pumping stations), its halting the decline in the provision of irrigation water and its prevention of a decline in the total crop area.

34. One of the difficulties in the analysis was to discern the impact of the RIRP on the above variables independently from that of the FPSP. This was partially achieved

through the analysis of data collected in a 2007 farm survey. The survey elicited yield data for 2006 from two types of farms which benefited from the RIRP: (a) those that were also "pilot farms" under the FPSP and as such received a one-time grant towards inputs acquisition as well as training in farm management and (b) "non-pilot farms" which only benefited from irrigation rehabilitation and no FPSP support. The data indicate that, as expected, average yields in pilot farms were higher than average yields in non-pilot farms. However, in the absence of baseline data, it is not possible to discern the magnitude of improvements, if any, or to isolate the impact of irrigation rehabilitation.

Table 19
2006 yields in farms benefiting from RIRP with and without FPSP

	Yavan		Matcho		Zafarabad		Kolhozabad	
	RIRP & FPSP	RIRP only	RIRP and FPSP	RIRP only	RIRP & FPSP	RIRP only	RIRP and FPSP	RIRP only
Cotton	1.78	1.56	1.45	1.37	1.59	1.48	1.71	1.63
Grains	1.64	1.61	1.72	1.65	1.62	1.53	1.96	1.77
Vegetables	11.52	10.81	2.96	3.00	11.05	8.84	12.63	11.72

Source: Kudratov, 2007, PhD Dissertation, Moscow State University

Yavan

35. Raion-wide statistics indicate that overall cropping area decreased in 2005 and 2006 despite an increase as of 2004 of area with reliable irrigation of more than 6,000 ha (Table 20). Rather, the decreasing trend in overall cropping area from 2004 is similar to that observed in the adjacent Abdurahman Jomi (Hojamaston) raion which was not included in the RIRP (or the FPSP) (Table 21). The seeming lack of impact of project investments in Yavan may be explained by the deterioration of other irrigation infrastructure. In Yavan irrigation is mainly based on pumping and the project's intervention was limited to partial rehabilitation of five deteriorated pumping stations out of a total of 12 stations in the conveyance system. Based on observations of the O&M performance in project areas, it is likely that some of the remaining stations seized functioning properly while others were being rehabilitated. Conversations with farmers in Yavan also point to farmers abandoning land allocated to them in reaction to the Government policy that 70% of all land in cotton areas be cultivated to cotton despite extremely low financial returns on cotton. Anecdotes conveyed to the ICR team suggest that for some farmers belonging to dekhkan farms work only for the sticks of cotton which serves as fuel for heating; hence such farmers cultivate only as much of their allocated land as will cover their needs for heating materials for the following winter. Finally, labor shortage brought about by migration of young men to Russia for work may be another factor explaining the decline in the cropped area.

36. With regards to cropping patterns, the area under cotton increased slightly in 2004 but then decreased again in 2006. The area under grains decreased also, and by almost half in 2006. The factors listed above may at least partially explain these

decreases. Vegetable cultivation increased slightly during the period 2004-2006, the percentage of land under vegetables also increased a little, which could be an indication that farmers retained land for high value crops as irrigation became more reliable. The increase in area allocated to potatoes is also of note.

Table 20
Yavan raion – Cropping area (ha)

	2000	2001	2002	2003	**2004**	**2005**	**2006**
Area benefiting from RIRP		10,376	9,500	9,500	**15,600**	**15,600**	**15,600**
Total cropping area	31,317	39,167	32,110	34,589	**34,764**	**33,952**	**27,884**
Grains	9,970	9,446	11,394	13,535	**12,614**	**11,485**	**6,670**
Cotton	14,530	23,936	15,423	16,210	**16,410**	**16,410**	**15,500**
Vegetables	1,062	445	448	549	**488**	**857**	**994**
Potatoes	54	22	55	67	**68**	**232**	**230**
Melons	310	283	308	222	**228**	**353**	**237**
Fruits	555	554	554	565	**565**	**565**	**538**
Grapes	1,029	980	929	973	**973**	**974**	**735**
Fodder crops	3,807	3,500*	3,000*	2,468	**3,418**	**3,076**	**2,980***

Columns with bolded data indicate years when rehabilitation works were complete.
*Data points inserted/corrected by the evaluation team.

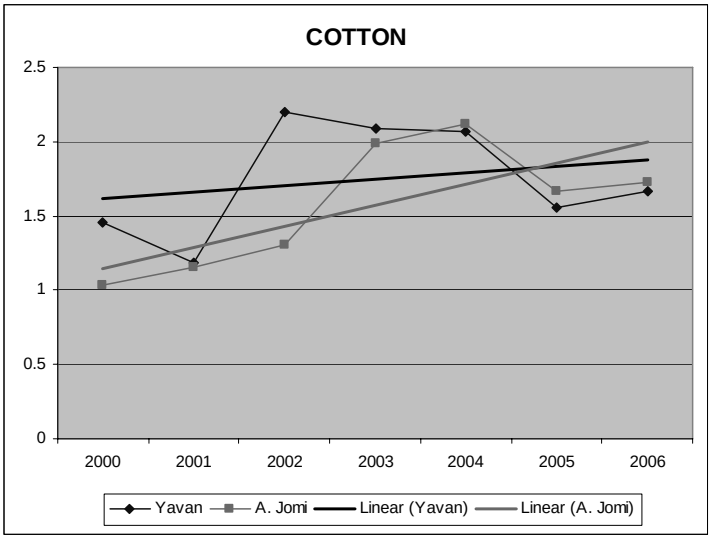
Table 21
Abdurahman Jomi raion – Cropping area (ha)

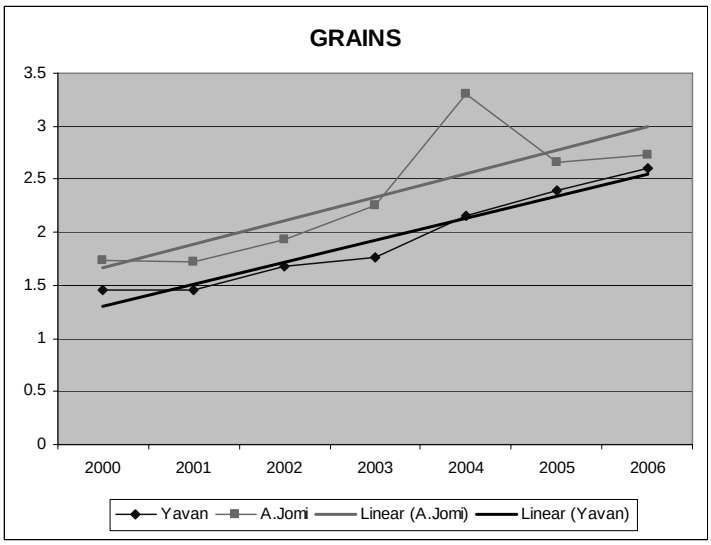
	2000	2001	2002	2003	2004	2005	2006
Total cropped area	20,633	17,878	19,852	20,612	18,786	17,971	18,762
Grains	8,583	6,523	8,343	7,668	4,846	4,790	6,346
Cotton	9,173	9,442	9,220	10,415	11,109	10,800	9,770
Vegetables	380	590	607	714	779	874	926
Potatoes	874	541	568	638	847	573	589
Melons	270	145	94	187	191	389	112
Fruits	1,329	394	455	467	466	27	470
Grapes	239	243	565	522	549	518	549

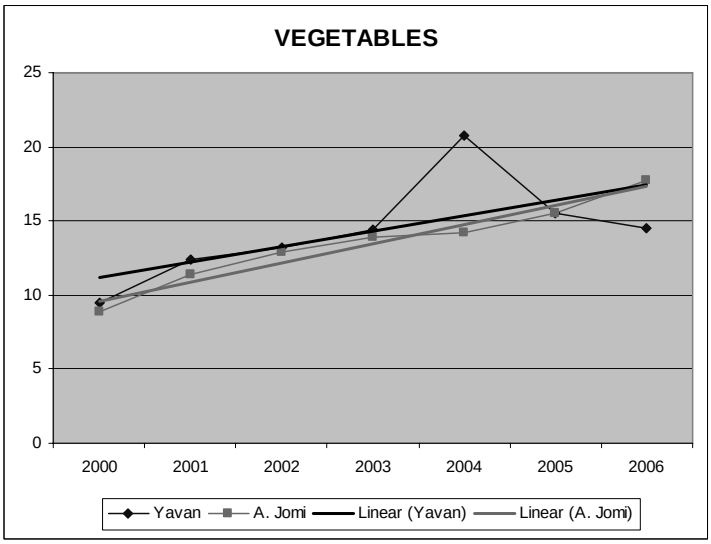
37. As shown in Figure 5 cotton yields in Yavan spiked in 2002 but then steadily decreased until 2005 despite the rehabilitated irrigation pumps coming on line in 2004. On the other hand, grain yields display a steady increase through 2006. Vegetable yields spiked in 2004 suggesting initial positive impact of irrigation rehabilitation.

Figure 5

Comparison of yields (ton/ha) in Yavan and Abdurahman Jomi







Kolkhozabad

38. The increase in area with reliable water supply did not have a significant impact on the area cultivated. In fact the changes in total cropping area closely mirror those in the comparator Jilikul raion in 2005 and 2006 (Table 22 and Table 23). However improved irrigation may have led to the increases observed in area devoted to cotton in 2005 and 2006 since in the same years Jilikul experienced declining area devoted to cotton production. This may have occurred at the expense of grains, since area allocated to grains, including corn, decreased in 2005 and 2006, while in Jilikul the reverse was observed. No clear impact on other crops can be discerned due to data limitations.

Table 22
Kolkhozabad raion – Cropping area (ha)

	2000	2001	2002	2003	2004	**2005**	**2006**
Area benefiting from RIRP		7,400	6,500	6,500	6,250	**9,520**	**9,520**
Total cropping area	21,907	15,370	30,228	22,959	23,004	**23,267**	**22,916**
Grains	9,731	9,141	13,782	12,716	13,763	**13,193**	**12,134**
Cotton	7,953	1,891	11,768	5,891	4,368	**5,111**	**6,280**
Vegetables	710	740	1,119	679	1,084	**901**	**1,058**
Potatoes	270	281	265	320	401	**380**	**309**
Melons	889	786	800	630	670	**469**	**647**
Fruits	555	573	483	751	472	**936**	**217**
Grapes	257*	257	310	284	156	**264**	**266**

Columns with bolded data indicate years when rehabilitation works were complete.
*Data points inserted/corrected by the evaluation team.

Table 23
Jilikul raion – Cropping area (ha)

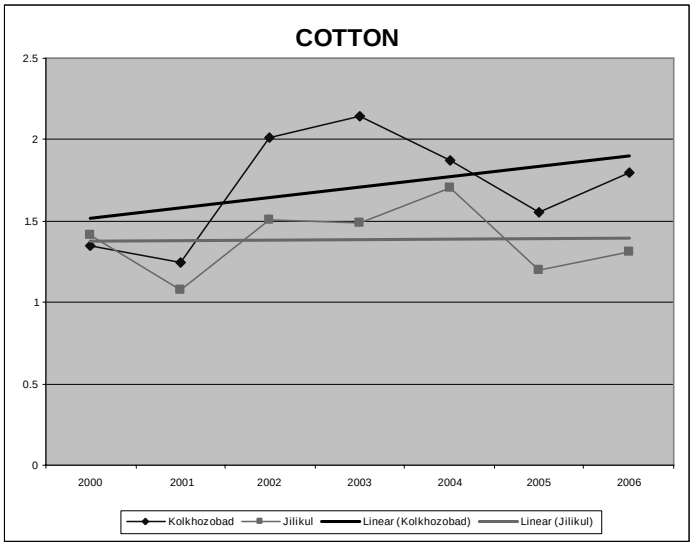
	2000	2001	2002	2003	2004	2005	2006
Total cropping area	19,859	20,379	17,283	16,823	16,713	16,949	16,514
Grains	8,001	6,786	3,969	3,898	3,864	4,382	5,226
Cotton	9,971	11,219	11,399	11,113	11,450	11,263	9,760
Vegetables	479	584	309	353	311	348	417
Potatoes	44	83	90	92	120	119	202
Melons	577	914	756	526	520	389	461
Fruits	467*	467	465	520	245	245	245
Grapes	320*	326	295	320	203*	203*	203

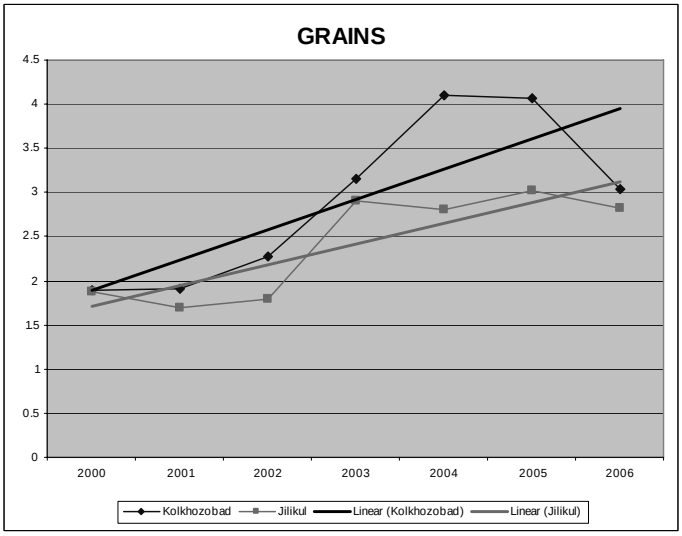
*Data points inserted/corrected by the evaluation team.

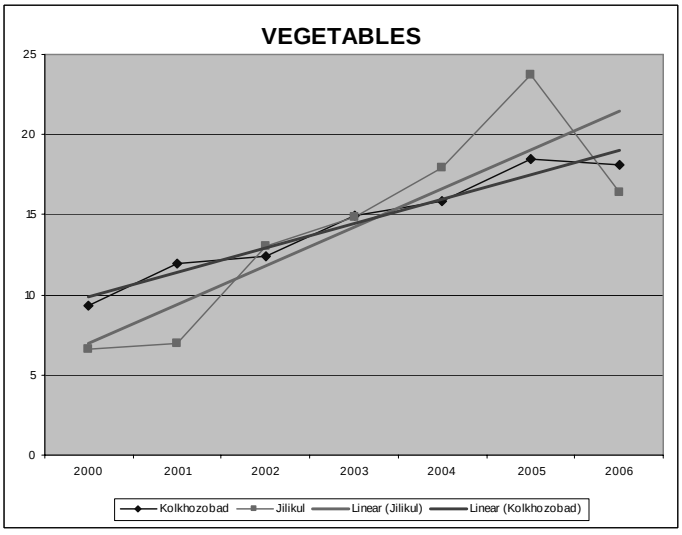
39. As shown in Figure 6 grain, cotton and vegetable yields behaved similarly in Kolkhozabad and Jilikul for the most part, suggesting that increased reliability of irrigation did not lead to large yield improvements.

Figure 6

Comparison of yields (ton/ha) in Kolchozabad and Jillikul







Zafarabad

40. Available data on total cropping area in Zafarabad indicate that it remained below the total irrigated area and that it actually declined in 2006. A similar decline was observed in the adjacent comparator Nau raion where irrigation rehabilitation did not take place. Here the area devoted to cotton decreased significantly, while there was a slight increase in area allocated to vegetables. This phenomenon is observed in Nau too. Nevertheless, it would be misleading to conclude that the project did not have any impact-based data pertaining to a single year.

Table 24
Zafarabad raion – Cropping area (ha)

	2000	2001	2002	2003	2004	2005	**2006**
Area benefiting from RIRP		15,298	15,298	15,000	15,000	15,000	**36,250**
Total cropping area	25,386	24,644	25,832	26,304	26,666	26,482	**25,218**
Grains	10,267	9,456	8,189	7,470	7,251	6,665	**6,448**
Cotton	11,366	12,339	14,470	16,037	16,677	16,503	**14,609**
Vegetables	410	230	416	408	523	744	**760**
Potatoes	57	30	97	132	116	146	**139**
Melons	190	92	125	97	72	72	**184**
Fruits	172	157	488	543	319		**258**
Grapes	71	41	147	68	144		**156**

Columns with bolded data indicate years when rehabilitation works were complete.

Table 25
Nau raion – Cropping area (ha)

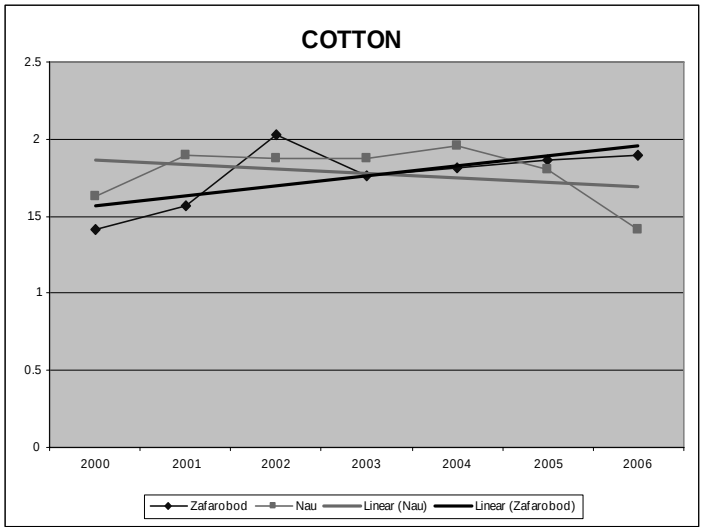
	2000	2001	2002	2003	2004	2005	2006
Total cropping area	14,900	15,682	15,254	17,477	17,405	16,793	16,971
Grains	5,953	6,012	5,183	7,168	6,728	6,704	7,124
Cotton	7,507	7,916	8,453	8,618	8,932	8,576	7,980
Vegetables	1,004	979	797	644	766	757	808
Potatoes	92	64	31	30	74	64	88
Melons	75	46	59	73	35	51	77
Fruits	246	521	580	802	740	512*	765
Grapes	23	144	151	142	130	129*	129

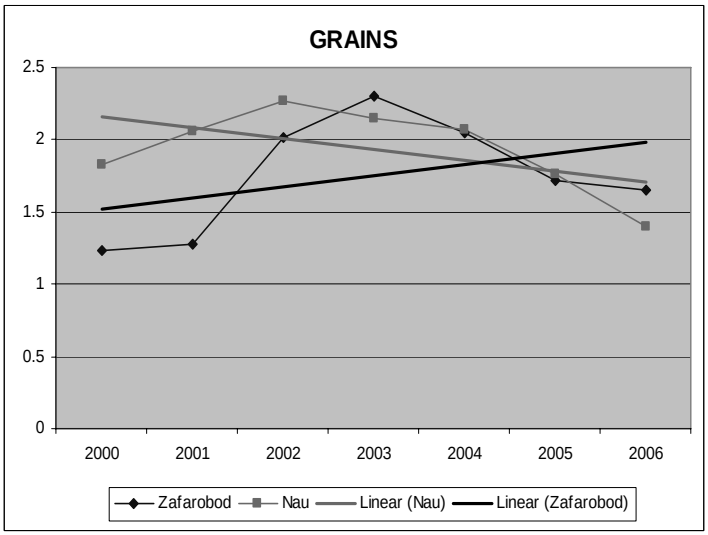
*Data points inserted/corrected by the evaluation team.

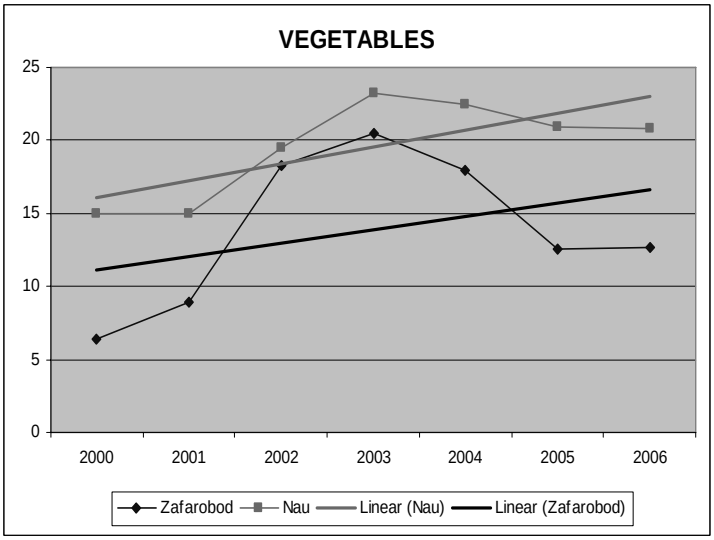
41. As shown in Figure 7, in 2006, the cotton yields continued the positive trend seen in Zafarabad while the negative trend in grain yields continued. The fact that in Nau the cotton yield fell sharply in 2006 while in Zafarabad it increased slightly may be attributed to better irrigation availability in the latter, although caution is called for as the positive trend existed already. Similarly, the fact that the falling trend in vegetable yields was halted in 2006 in Zafarabad cannot necessarily be explained by irrigation rehabilitation since a similar phenomenon albeit at a lesser scale was observed in Nau.

Figure 7

Comparison of yields (ton/ha) in Zararabad and Nau







Matcho

42. A slight decrease in the total area cropped is observed in the one year for which data area available. This contrasts with the significant increase in the adjacent comparator, Bobojon Gafurov raion. There appears to be a shift from cotton and grains to fodder crops and to a lesser extent to melons in that one year. A similar decrease in cotton area and increase in melon area are observed in Bobojon Gafurov in 2005.

Table 26
Matcho raion – Cropping area (ha)

	2000	2001	2002	2003	2004	2005	**2006**
RIRP target with adequate irrigation		10,515	10,500	10,800	11,500	11,500	**20,521**
Total cropping area	21,288	20,653	23,684	24,299	23,669	23,664	**23,430**
Grains	2,934	3,202	5,005	5,005	3,742	3,422	**2,723**
Cotton	12,240	12,066	15,164	15,164	16,139	16,000	**15,010**
Vegetables	585	658	494	494	295	430	**347**
Potatoes	51	61	69	31	23	85	**81**
Melons	664	505	623	690	688	782	**903**
Fruits	247	142	155	138	132		**66**
Grapes	496	519	40	20	13		**24**
Fodder crops	3,500*	3,500	3,000	2,757	2,637	2,945	**4,276**

Columns with bolded data indicate years when rehabilitation works were complete.
*Data points inserted/corrected by the evaluation team.

Table 27
Bobojon Gafurov raion – Cropping area (ha)

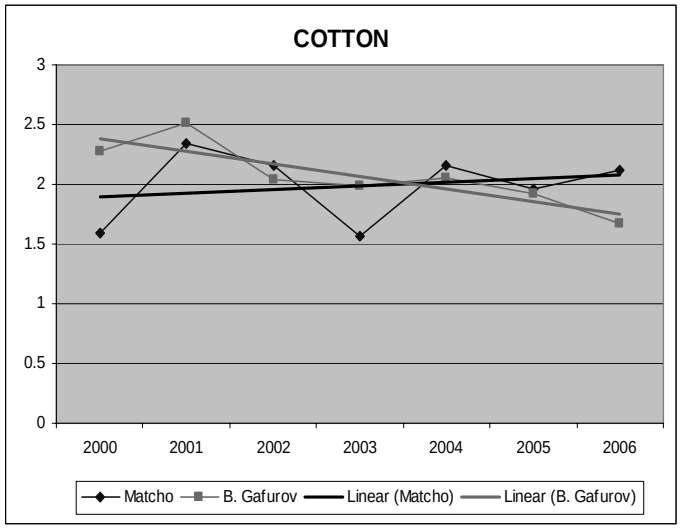
	2000	2001	2002	2003	2004	2005	2006
Total cropping area	29,184	29,833	31,374	33,382	28,058	29,781	31,712
Grains	7,618	7,637	6,658	7,085	6,520	5,700	6,010
Cotton	11,604	12,799	13,868	13,956	14,207	13,893	12,771
Vegetables	1,822	1,575	1,806	1,943	1,704	1,809	1,929
Potatoes	249	32	904	165	336	325	253
Melons	91	164	78	95	87	56	104
Fruits	4,100*	3,934	4,311	6,205	1,239	4,487	7,127
Grapes	3,700*	3,691	3,749	3,933	3,965	3,511*	3,518

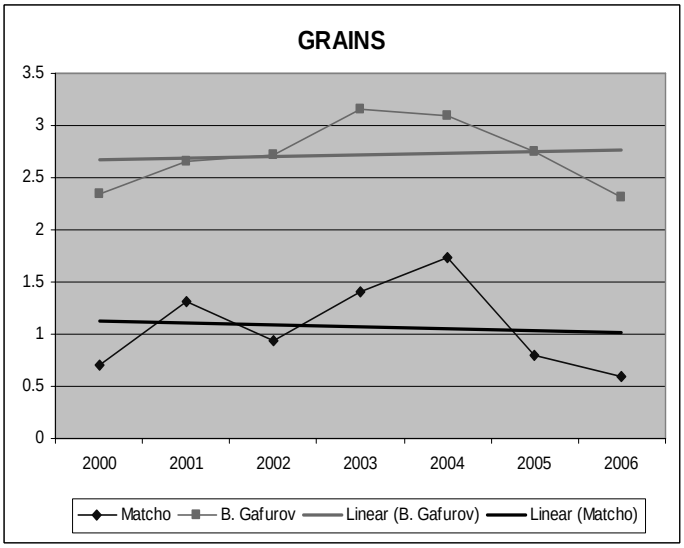
*Data points inserted/corrected by the evaluation team.

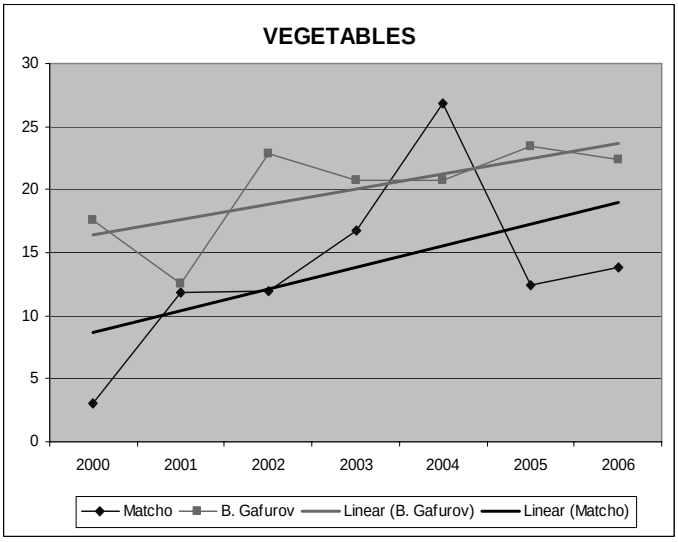
43. As shown in Figure 8 yield data indicate that the increasing trend in the cotton yields continued in 2006. This contrasts favorably with the decreasing trend in Bobojon Gafurov. On the other hand, like in Bobojon Gafurav the grain yield continued to decline, albeit at a slower rate. Vegetable yields rebounded from the drastic fall in the previous year, but this is likely more due to limitation of cultivation to favorable areas (area cultivated to vegetables) decreased.

Figure 8

Comparison of yields (ton/ha) in Matcho and Bobojon Gafurov







New Land Brought under Cultivation

44. A total of 620 ha of land that was previously not cultivated was brought under cultivation following the completion of irrigation rehabilitation works in Yavan (200 ha) and in Gissar (420 ha). In both raions, the additional lands are cultivated with vegetables. The per-hectare financial gross margins in Yavan and Gissar are estimated at US$275 and US$ 667, respectively. The corresponding economic values are US$ 257 and US$ 667 (see below for assumptions). These values are considered incremental benefits due to the project since no returns were reportedly obtained from this land prior to the rehabilitation works. Hence, the total annual values generated to the economy are roughly US$ 56,564 and US$ 266,985 respectively.

Table 28
Economic crop budgets for vegetables in Yavan and Gissar (2006)

		YAVAN			GISSAR		
Item	**Unit**	**Quantity**	**Market price (US$/unit)**	**Total (US$/ha)**	**Quantity**	**Market price (US$/unit)**	**Total (US$/ha)**
Output							
Yield	KT / ha	10.81	99.69	1,077.62	20.56	72.50	1,490.60
Inputs							
Fuel	liter/ha	54	0.73	39.62	56	0.65	36.52
Seeds	thousand pieces/ha	45,000	0.0027	122.28	42,000	0.0027	114.13
Fertilizers	kg/ha	800	0.22	173.91	850	0.23	194.02
Salaries	US$/ha			84.33			73.16
Machinery	US$/ha			43.48			77.45
Water*	CM/ha	7,682	0.0294	225.64	6,587	0.0294	193.48
Transportation	US$/ha			131.25			134.38
Total input cost	US$/ha			820.51			823.14
Net return (US$/ha)				**257.11**			**667.46**

*Half of annual average per ha water consumption in Yavan and Sharinav in 2005 as reported by the PMU. Two vegetable crops per year are assumed.

45. Given the per hectare investment cost of US$ 241 in Yavan and US$1,142 in Gissar, and assuming that (i) the rehabilitated infrastructure will be operated and maintained properly, and (ii) the per hectare returns remain on average at the above estimated levels, the net present values of vegetable production on these additional lands are estimated at US$ 1,082 per hectare in Yavan and US$ 2,348 per hectare in Gissar (10 year period, r=.12.). These correspond to high internal rates of return.

46. The crop budgets used in this estimation were obtained in a field survey of farms in 2006.[1] Since the survey area did not include Gissar, the crop budget observed in the adjacent Sharinav raion was used in this analysis. Financial input prices were adjusted as follows: VAT of 15% was deducted from the prices paid by farmers for fuel, seeds and fertilizers. A pension fund tax of 25% and a social fund transfer of 1% were deducted from salaries paid to hired labor. Additionally it was assumed that the shadow price of

[1] Kudratov, 2007, PhD Dissertation, Moscow State University

labor is 50% given the high rate of unemployment in rural areas of Tajikistan. Market price data, obtained from the State Statistical Committee, were not further adjusted because no taxes are levied on crops sold by farmers on the market place or to intermediaries. Per hectare water consumption had not been included in the crop budget established in the 2007 survey. Considering that these areas benefit from pump irrigation and assuming double cropping, the evaluation team inserted half the average annual per hectare water use levels. The economic cost of water provision is estimated at US¢ 2.9 per hectare (9.4 Dirham/ha). At 10 times the rate charged to farms for irrigation water supply in Yavan, Sharinav, Gissar, Kolkhozabad and Rudaki, the analysis assumes this amount reflects the true coss of water delivery to the field. The exchange rate for mid-2006 was taken as TJS 3.2 per US$.

Impact of Drinking Water Supply Investments

47. The key benefit of improved potable water supply are: (i) reduced incidence of water-borne diseases; (ii) reduced expenditures households incur to avert such diseases; and (iii) reduced cost, in terms of time and effort, to collect drinking water from distant locations. The recently completed Country Environmental Analysis (CEA) for Tajikistan (World Bank, 2008) estimated the annual cost to the economy of poor water supply, sanitation and hygiene to equal 1.4% of Tajikistan's GDP – in particular, diarrheal illnesses in rural areas at TJS 72 million and Hepatitis A and Typhoid/Paratyphoid across the country at TJS 4.2 million. The annual household averting expenditures were estimated between TJS 3 million and TJS 7 million. These costs rank third in significance among all environmental hazards in Tajikistan.

48. This section evaluates the benefits of RIRP's small potable water supply component by building on the above-referenced study. The estimated number of rural residents in Rudaki, Matcho and Zafarabad who as a result of the project now have improved potable water supply is estimated at 17,000 (Table 29).

Table 29
Planned vs. actual beneficiaries

Raion	Planned	Actual (estimate)
Rudaki	13,000	6,500
Kolkhozabad	4,564	0
Yavon	28,000	0
Matcho	6,158	2,737
Zafarobad	8,000	8,000
Total	59,722	17,237

49. Based on this number the averted loss in disability adjusted life years (DALY) terms and monetary terms was calculated to be 45 and US$20,000 per year respectively (Table 29). The key assumption was that improved drinking water supply would reduce

the incidence of diarrhea by 25%[1]. It was also assumed that the share of <5 population and incidence of diarrhea is the same among project beneficiaries as in the overall rural population.

Table 30
Averted losses as a result of Component 2

	Project Beneficiaries		DALYs saved	Monetary costs avoided (US$/yr)
Children under 5	2,253	mortality	40	11,128
		morbidity	1	1,534
Persons over 5	15,074	morbidity	5	6,954
Total	17,327		45*	19,616

* rounding

50. If the project had achieved the originally envisaged number of beneficiaries, the averted loses would have been 155 DALYs and US$67,000 per year.

1 As per Fewtrell, L. and J. Colford Jr. (2004). Water, Sanitation and Hygiene: Interventions and Diarrhea – A systematic review and meta-analysis. HNP Discussion Paper. World Bank.

Annex 4. Bank Lending and Implementation Support/Supervision Processes

(a) Task Team members

Names	Title	Unit	Responsibility/ Specialty
Lending			
T.V. Sampath	Task Team Leader	ECSSD	
Michael Nightingale	Task Team Leader (until Sept. 1999)	ECSSD	
Janakiram Subramaniam	Economist and Institutional Specialist	ECSSD	
Joseph R. Goldberg	Sector Leader (Quality Assurance)	ECSSD	
Ton Lennaerts	Irrigation Engineer		
Hermine De Soto	Senior Social Scientist	ECSSD	
Taies Nezam	Social Scientist	ECSSD	
Nirmala Saraswat	Environmental Specialist	ECSSD	
Naushad Khan	Procurement Specialist	ECSPS	
Gurdev Singh	Procurement Specialist	ECSPS	
Ranjan Ganguli	Financial Management Specialist	ECSPS	
Hannah Koilpillai	Disbursement Officer		
Ahmed Jehani	Senior Counsel		
Junko Funahashi	Legal Counsel		
Irina Iacovlenko	Translator/Interpreter		
Valencia M. Copeland	Team Assistant		
Supervision			
T.V. Sampath	Task Team Leader (until June 2006)	ECSSD	
Usaid El-Hanbali	Task Team Leader(until June 2008)	ECSSD	
Julia Bucknall	Senior Environmental Specialist	ECSSD	
Shahridan Faiez	Social Scientist	ECSSD	
Daniel P. Gerber	Operations Analyst	ECSSD	
Jessica Mott	Senior Natural Resources Econ.	ECSSD	
Bekzod Shamsiev	Senior Agriculture Economist	ECSSD	
Hermine de Soto	Senior Social Scientist	ECSSD	
Bobojon Yatimov	Senior Rural Development Specialist	ECSSD	
Peter Zara	Junior Professional Associate	ECSSD	
Norpulat Daniyarov	Financial Management Specialist	ECSPS	
Fasliddin Rakhimov	Procurement Specialist	ECSPS	
Johannes Bardill	Consultant (Civil Engineer)		
Christian Goenner	Consultant (Sociologist)		
Richard James	Consultant (Financial Management)		
Malik Khokhar	Consultant (Agriculture/Horticulture)		
Svetlana Kutkova	Consultant (Logistics)		
Evelin Lehis	Consultant (Social Development/ CDD)		
Marc Sadler	Consultant (Cotton Specialist)		
Michael Sandoz	Consultant (Irrigation engineering)		

Ernst Schulze	Consultant (Irrigation and WUAs)		
Andreas Zysset	Consultant (Hydrologist)		
ICR			
David Meerbach	Water Resources Specialist	ECSSD	
Tijen Arin	Sr. Environmental Specialist	ECSSD	
Samval Ghazaryan	FAO Irrigation Specialist	FAO	
Ghazi al-Kelani	Consultant Civil Engineer (Water supply)		
Nadia Benani	Consultant Community Specialist (WUAs)		
Anna O'Donnell	Consultant (Editing)		

(b) Staff Time and Cost

Stage of Project Cycle	Staff Time and Cost (Bank Budget Only)	
	No. of staff weeks	USD Thousands (including travel and consultant costs)
Lending		
FY99		159.07
FY00	41	143.26
FY01		-0.73
FY02		3.23
Total:	41	304.83
Supervision/ICR		
FY99		0.00
FY00		0.00
FY01	13	58.44
FY02	15	110.49
FY03	17	83.36
FY04	25	82.05
FY05	21	72.83
FY06	26	87.83
FY07	18	61.27
FY08	13	56.00
Total:	148	612.27

Annex 5. Summary of Borrower's ICR and Government comments on ICR

Summary of BCR:

The Rural Infrastructure Rehabilitation Project aimed to (i) increase the total efficiency of water use in main and field canals; (ii) reduces expenses of pumping irrigation and increase the efficiency of rehabilitated pumping stations and other infrastructure; (iii) establish Water User Associations and introduce measures to sustain project investments; (iv) to improve drinking water quality involving communities; and (v) to strengthen institutional capacity for the development of land management and water resources. To do this, the project was comprised of four components. Each of these components are listed below with an assessment of their outcomes:

Component 1: Rehabilitation of main irrigation net and drainage collectors:

This component was designed to rehabilitate critical irrigation infrastructure for more reliable and efficient water delivery. At the closing of the project, all the works under this component were completed. As a result of the rehabilitation of infrastructure, efficiency gains were noted in the main canals from between 0.5% and 11.4%, due, primarily to a reduction in leakage from the canals (68.3 million cu annually) and a total land water supply in the project areas of 56,900 ha. In addition, 3,530 ha of land was improved, and 620 ha of land that was previously unusable because of water shortages and high water tables, was introduced into agricultural rotation. This resulted in employment for 1,100 farmers, most of whom are located in the relatively impoverished RRS. Table 31 shows a breakdown of the areas where water supply was improved as a result of investments in rehabilitation of irrigation infrastructure.

Table 31: Irrigation area where as a result of rehabilitation of irrigation structures the water supply of lands was improved.

№№	Name of raion in zone of project efficiency	Irrigation area in zone project efficiency, ha	Gravitational irrigation, ha	Pump station with water rise				
				to 50 m	51-100 m	101-150 m	151-200m	above 200 m
1	Rudaki	5625	5625	0	0	0	0	0
2	Gissar	11516	11020	0	0	0	0	0
3	Shahrinav	7207	5859	0	68	1000	0	280
4	Kolkhozabad	8647	4835	3479	333	0	0	0
5	Yavan	21637	8976	0	532	10516	45	1568
6	Khuroson	9685	6956	0	0	2729	0	0
7	Matcha	20562	8590	8140	2550	4377	5015	1538
8	Zafarabad	43190	0	2816	40374	0	0	0
9	Other area(Jomi raion)	9678	9678	0	0	0	0	0
9	TOTAL:	137747	61539	14435	43857	18622	5060	3386
	Total in pilot raions	128069	51861	14435	43857	18622	5060	3386

Investments under this component also replaced pumps that served to reduce the power expenses for water supply by 5%, and increased water supply to 81,760 ha of land. The total area that benefited from improved water supply was 137,747 ha.

Assessment of achievement: Overall the objectives of this Component were achieved. Rehabilitation works have been completed in all five districts, although the scope of rehabilitated works was modified slightly in two districts (Zafarabad and Matcho) because of increased equipment costs. The quality of the work is rated as satisfactory, although the continued O&M of the infrastructure remains questionable. Secondary impacts of the investments included increased capacity to execute Bank projects, and in procurement procedures for local firms.

Lessons Learned: While the investments in rehabilitating infrastructure was considered crucial at project design, more training and capacity building is needed to ensure the sustainability of investments.

Component 2: Rehabilitation of drinking water supply system in rural areas:

Investments made under this component were designed to rehabilitate drinking water supply systems in rural areas. At the project's closing, five water supply systems were rehabilitated. These included:

Raion	**Village**	**Population**
Rudaki	Okkurgan	13,000
	Kommunizm	
	Krupskaya	
	Kahramon	
	Chipteppa	
	Gulzor	
Rumi (Kolkhozabad)	Rohi Lenin	4,564
	Ittifaq	
	Suyunabad	
	Yangiabad	
Yavan	Kulobod	4,500
Matcha	9 villages of Ch. Ergashev farms	6,158
Zafarabad	Kh. Aliev	8,000

In addition, existing water supply systems were rehabilitated to improve the quality of drinking water, in line with requirements of the law GOST 2874-82 "Drinking Water". This resulted in improvements to water supply systems affecting an additional 52,500 inhabitants. This served to reduce the disease level by 25 to 50%. Table 32 shows the reductions in diseases as a result of improved drinking water.

Table 32: Reductions in levels of diseases

Jamoat Kh Alieva Zafarabad rayon					
№	*Types of diseases*	*Before rehabilitation (2000.)*	*After rehabilitation (2004)*	*Reduction in number of patients , per*	*Reduction in level of diseases in, %*
1.	Dysentery	17	13	4,0	23,5
2.	Malaria	13	8	5,0	38,5
3.	Typhus	10	5	5,0	50,0
4.	Other	34	23	11,0	32,4
Jamoat Chorgul Yavan rayon					
1.	Dysentery	13	6	7,0	53,8
2.	Malaria	21	15	6,0	28,6
3.	Typhus	17	10	7,0	41,2
4.	Other	67	38	29,0	43,3
Jamoat Okkurgan Rudaki rayon					
1.	Dysentery	12	9	3,0	25,0
2.	Malaria	17	12	5,0	29,4
3.	Typhus	7	3	4,0	57,1
4.	Other	34	27	7,0	20,6

Assessment of achievement: The rehabilitation of works to the drinking water supply system was fully implemented as designed, and the quality of the works is rated satisfactory. However, in light of the extreme poverty of the targeted populations, the participation of local communities remains low, at only ten percent. The lack of participation is expected to negatively impact the sustainable O&M of these systems.

Lessons Learned: Given the crucial link between community participation and the sustainability in investments, the local context for participatory action is important to understand. The participatory process must account for the ability and willingness to pay on the part of villagers, and necessitates intensive training and capacity building exercises to introduce the approach. Capacity building and training programs for local staff is also key to understanding the process.

Component 3: Increase of institutional capacity of organizations and department of Republic of Tajikistan

This component aimed to complement investments in the rehabilitation of infrastructure by supporting institutional capacity building in relevant organizations and departments. This was done mostly by providing trainings and improving facilities at the Tajik Agrarian University, as well as by providing training programs, assisting in WUA establishment, and preparation of technical specifications for works to be completed under the project.

By November 2006, legislation on WUAs was accepted by Parliament and signed by the President, and revisions to the Water Code of the Republic of Tajiksitan were revised to be line with provisions for user groups at the local level.

A number of WUAs were established under the project and were provided with trainings and mobilization campaigns. These WUAs are organized with a manager, a water management engineer, an accountant and field agents (mirobs) to cover 450-500 ha or irrigated land per worker.

Assessment of achievement: The Water User Associations (WUAs) established under this component failed to achieve sustainable O&M of canal systems. The main reasons for this are: (i) poverty rates and farmer indebtedness to futures companies; (ii) lack of micro- or bank-credit schemes to farmers; (iii) limited support from the local authorities; (iv) poor knowledge of legal rights amongst farmers; (v) lack of machinery that could be rented to implement works; and (vi) the absence of specialists that could provide operational support to on-farm irrigation systems.

Lessons Learned: Water User Associations established for irrigation purposes should take into account the patterns of crop production in the area. In this project, much of the achievement of WUAs was undermined by the focus on cotton production and related indebtedness to futures companies that provide key inputs. In addition, sustained capacity building exercises are needed to ensure the mobilization of members and the training of WUA staff.

Comments on the Bank's performance:

Overall, the borrower rates the performance of the Bank as *satisfactory*, given the close supervision and institutional support provided. The Bank was responsive to challenges that emerged during implementation and assisted the PMU in overcoming them. The close supervision of the Bank's team ensured that initial problems, such as developing terms of reference, procurement and contracting, was dealt with in a timely manner and improved over the course of the project.

Comments on the PMU performance:

The PMU's performance is rated *satisfactory*. This rating is based on the responsiveness of the PMU to the Bank's requirements and suggestions during supervisions, which improved the final achievement of the project.

Comments (translated) from Government on draft ICR

Received on July 25, 2008 from Mr. Safarali Najmiddinov, Minister of Finance, Ministry of Finance.

Chiara Bronchi
Country Manager World Bank

Ministry of Finance Republic of Tajikistan thoroughly reviewed an Implementation Completion and Results Report on a Tajikistan Rural Infrastructure Rehabilitation Project and has the following comments.

The report assesses the results by comparing outcomes with targets indicated in Development Project Objectives (DPOs). Using this approach is good in case of developed countries, but not in case of a post conflict and transition country like Tajikistan. Moreover, many indicative targets set up at approval of the project were overoptimistic or less realistic and we believe that after several projects we would have achieved these targets. Furthermore, existence of the measurement problem makes it difficult to compare outcomes with the targets.

It is disappointing that the report only relies on interviews conducted with farmers or beneficiaries and has not expanded analysis with a scientific approach. The interviewing approach is not immune of problems like a conflict of interests, farmers' disappointments with the Government policies and others. For example, in para 66 it is reported that "Targeted beneficiaries in Kolkhozobod … reported to the evaluation team paying TJS 17 (USD 5) per CM [cubic meter] of potable water". Given the fact that beneficiaries have a very low income it is hard to believe that this information is even close to the reality. In para 79 the report quotes one farmer as "the project was like a house without a foundation" and many similar examples can be found throughout the text. Such statements are fully contradictory with the satisfactory assessment by the Bank's supervision during the 7 years of the project's implementation.

Key results achieved are not reflected in the report properly. The objective was to maintain the existing level of rural infrastructure and keep it running, but not improving it. In this regard, the project to large extent achieved its objective. Specifically, about 78.9% of the allocated budget went to rural infrastructure rehabilitation and despite the existing issues it has been successfully implemented. It is therefore, disappointing and unacceptable to see that with 78.9% level of achievement, the report rates the borrower's performance as unsatisfactory.

We admit that placing a good mechanism for sustaining the system in the long run is a key factor, which requires more money, more effort and more time. However, in this particular case, the objective was maintaining, but not improving the system. That is why a $100 per hectare was allocated, which clearly was not sufficient since in some countries it was about $2000 per hectare. Accordingly, it is not appropriate to claim improvement of rural infrastructure at this stage. The low investment of $100 per hectare could have served as another factor for not achieving the best results in some individual areas.

Problems also were in design of the project and the report acknowledges it. The project was overloaded with too many assumptions, conditions and reforms. Nevertheless the Bank team, the Project Management Unit (PMU) and the Government put much effort to implement the project. As indicated before, we appreciate the Bank team's effort and assessed its performance as satisfactory. However, we observed that the report criticizes the project's design and the Bank's team throughout the text, but at the end gives a satisfactory performance to the Bank, which seems to be inconsistent by itself.

We acknowledge that there were some deficiencies and lack of capacity. However, deficiencies and lack of capacity were due to the condition of the country in its both post conflict and transitional period. For example, in the beginning it was very difficult to find reliable private contractors since the private sector was just emerging in the country and had lack of capacity in procurement, fiduciary and others. In addition, Water User Associations (WUAs), Community Driven Development (CDD) approach and others introduced were very new in Tajikistan. Therefore, it is also not appropriate to claim the efficient WUAs and CDD approach at this stage, since it is not possible to complete restructure, irrigation, water supply

and water management in 6-7 years. In other countries a set of 4-6 multi projects have been continuously implemented in irrigation and water management and despite this the results are not promising. We oppose the view of the Implementation Completion and Results' (ICR) team that water management and CDD approach did not substantially benefit from the project in Tajikistan.

Economic analysis in the report is not strong. In some cases the text is contradictory, even within the team. Some tables and annexes are also contradictory. For instance, in the table of "Revised Project Development Objectives" at page viii it is written that "9 water laws drafted, 1 water law on WUAs passed. Eight water laws were not passed or ratified". However, this was not the case. In fact, 9 proposals for the same law drafted, but not 9 laws. Lessons learned are not strong too. This is a post conflict and transition country, it attempted WUAs, CDD approach and many others and these should have been taken into account. Successful experience in individual districts should have been noted as lessons learned. In this regard, Zafarabad district is a great example where people pay for drinking water 50% of invoiced water, which does not exist in other parts of the country. The comparative study of similar projects with other countries is missing in the lessons learned's section. The comparative study is useful for the Bank and the Government both to avoid repetition of common problems and to learn from experiences of the other countries.

We admit that there were some deficiencies in PMU. We note however that the PMU staff and international experts were committed to implementing the project and did their best to achieve as better results as possible. However, given the country's situation and difficult and unpredictable circumstances some of these deficiencies were unavoidable. For example, due to the droughts the PMU staff faced much more challenges and had to divert to other tasks. In addition energy crisis in early 2008 winter delayed data supply and processing. With regard to lack of capacity, training for contractors and training for PMU staff should have been provided adequately. Overall PMU staff was dedicated to rehabilitate rural infrastructure.

The ICR team in some cases reported unfinished construction sites as finished, because the PMU could not explain the team that these sites are not fixed yet. Or in some cases sites, which were not a part of this project, were

mistakenly shown to the ICR team and they were reported as a part of the project. Hence, reporting poor results for these kinds of sites is not correct.

Overall, the report is not balanced and does not properly take into account the evolving context and condition of the country. We acknowledge that there were some deficiencies, which did not happen intentionally and learned lessons for next time. There are a lot of achievements, especially in irrigation, which is a bulk of the project and the report in its assessment should not ignore it. The report's rating on the borrower's performance is not acceptable. We believe that rehabilitation and improvement of irrigation infrastructure and better water management system need more support in future. The government is committed to implement further reform in this area. There is a vast amount of demand for infrastructure rehabilitation that needs more money and work. Next step would be a good assessment of water and irrigation in Tajikistan.

Taking into account all the above mentioned points we strongly disagree with the borrower's performance rating and the PMU's performance rating of the report as well as its content including text and tables, annexes, which we found inadequate and some time contradictory.

We request the Bank to review the report in order to better reflect the positive achievements while highlighting remaining challenges. We expect the report to be also more consistent with the project's supervision and evaluation reports over time. We would appreciate the revised version to be sent for our final review before it is submitted to the Board members.

Best regards,

Safarali Najmiddinov
Minister of Finance
Republic of Tajikistan

Comments (translated) from Government on final draft ICR

Received on December 12, 2008 from Mr. Matlubkhon Davlatov, State Advisor to the President, Executive Office of the President.

Unofficial translation

December 12, 2008

Ms. Chiara Bronchi
Country Manager
World Bank Tajikistan Country Office
Republic of Tajikistan

Dear Ms. Bronchi,

We have reviewed thoroughly a revised (final) draft of the Implementation Completion and Results Report on the Tajikistan Rural Infrastructure Rehabilitation Project and have the following comments.

We were very disappointed to see that in the revised draft the World Bank team did not take into account our comments on the earlier version of the report, submitted to the World Bank Country Office on July 25, 2008 (№2-3-19/15).

There is not much difference between the original and the revised drafts of the report. The major difference between the revised version and the earlier version of the report is that the Bank has downgraded the project performance to unsatisfactory in the revised version. This is even more disappointing in view of the fact that (as mentioned in our previous letter as of July 25, 2008, №2-3-19/15) despite the insufficient budget allocated per hectare and difficult situation in the country, the majority of targets as per outcome indicators have been successfully achieved.

Therefore, we strongly disagree with the performance rating, indicated in the report, and believe that the performance of the borrower, the PMU and the Bank should be upgraded to a satisfactory rating. We request the World Bank team to fully incorporate our comments, provided in our earlier letter (№2-3-19/15) as of July 25, 2008, and to revise the report accordingly so that it reflects better positive achievements of the project while highlighting remaining challenges.

Sincerely,

M. Davlatov

1 5 DEC 2008

Annex 6. List of Supporting Documents

Project preparation:

Project Appraisal Document
Decision meeting documentation
Development Credit Agreement

Project implementation:

Mission Aide Memoires
Mission PSRs and ISRs
Quality of Supervision Assessment
Progress reports and end-of-assignment report of International Quality Control Civil Engineer
End-of-assignment report of Community Development Specialist
Civil works contract documentation
Reports of Water Users Associations specialist
Report of applied research specialist
Report of Ernst-Basler consultants on the BGK headworks

Project completion:

ICR Back to Office Reports
ICR Consultancy Reports
Draft and Final Borrowers Completion Report
Minutes of meeting with Government

General:

Bucknall, Klytchnikova, Lampietti, Lundell, Scatasta and Thurman, 2003. "Irrigation in Central Asia: Social, Economic and Environmental Considerations." World Bank, Washington, DC

Fewtrell, L. and J. Colford Jr., 2004. "Water, Sanitation and Hygiene: Interventions and Diarrhea – A systematic review and meta-analysis." HNP Discussion Paper. World Bank, Washington DC

Kudratov, 2007. PhD Thesis. Moscow State University.

World Bank and SECO, 2007. "Republic of Tajikistan – Priorities for sustainable growth: A Strategy for Agriculture Sector Development in Tajikistan". World Bank, Washington DC.

World Bank, 2004. "Poverty and Social Impact Analysis of Cotton Farmland Privatization." World Bank, Washington DC.

IBRD 30745

TAJIKISTAN

RURAL INFRASTRUCTURE REHABILITATION PROJECT

PROJECT IRRIGATION WORKS

- PROJECT RAIONS
- PROJECT HEADQUARTERS
- OFF-FARM PUMPING STATION LOCATIONS
- SELECTED CITIES
- AUTONOMOUS OBLAST CENTERS*
- OBLAST CENTERS
- NATIONAL CAPITAL
- ROADS
- RAILROADS
- RURAL DISTRICTS
- AUTONOMOUS OBLAST BOUNDARIES
- OBLAST BOUNDARIES**
- INTERNATIONAL BOUNDARIES

* Area with no oblast-level administrative divisions, where rayons are under direct republic jurisdiction.

** An oblast is named only when its name differs from that of its administrative center.

KAZAKHSTAN
UZBEKISTAN
KYRGYZ REP.
CHINA
AFGHANISTAN
PAKISTAN
69°
72°
75°
39°
To Tashkent
To Gulistan
To Dzhizak
To Quqon
To Osh
To Shufu
To Samarqand
To Termiz
To Konduz
To Denau
Syrdar'ya
Zeravshan
Surkhob
Kafirnigan
Bartang
Murghab
Oksu
Ozero Karakul'
Pendzhikent
Ayni
Khodjand
Konibodom
Chkolovsk
Ura-Tyube
Tursunzade
Dushanbe
Nurek
Kalinipabad
Kurgan-Tyube
Kulyab
Shugnan
Murgab
ZAFAROBOD
MATCHO
SHAHRINAV
GISSAR
LENIN
GHOZIMALIK
YAVAN
KOLKHOZABAD
ASHT
KHUJAND
NAU
PROLETAR
URA-TYUBE
SHAHRISTON
GONCHIHI
PENJIKENT
AINI
MATCHO
GHARM
JIRGITAL
TOJIKOBOD
VARZOB
KOFARNIHON
DARBAND
TAVILDARA
ROGUN
FAIZOBOD
HOVALING
KALAYHUMB
VANCH
TURSUNZADE
DANGARA
SOVET
MUMINOBOD
BOKHTAR
KULYAB
VOSE
SHURABAD
MOSKOW
KURGAN-TYUBE
SHAHRTUZ
KABODIEN
JILIKUL
VAKHSH
FARKHOR
RYANJ
KUMSANGIR
ISFARA
KONIBODOM
MURGAB
RUSHAN
GORNO-BADAKHSHAN A.O.
SHUGNAN
ROSHTKALA
ISHKOSHIM

0 50 100 Kilometers
0 50 100 Miles

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