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IMPLEMENTATION COMPLETION AND RESULTS REPORT

(IDA-H8230, TF-13997, IDA-D0810, IDA-56970)

ON AN

IDA GRANT IN THE AMOUNT OF SDR 11.70 MILLION (US\$18.00 MILLION)
NOVEMBER 29, 2012

GRANT FROM THE GLOBAL AGRICULTURE AND FOOD SECURITY MULTI-DONOR TRUST FUND
(GAFSP MDTF) IN THE AMOUNT OF US\$27.90 MILLION
NOVEMBER 29, 2012

ADDITIONAL FINANCE IDA CREDIT IN THE AMOUNT OF SDR 4.70 MILLION (US\$6.60 MILLION)
JUNE 22, 2015

ADDITIONAL FINANCE IDA GRANT IN THE AMOUNT OF SDR 3.90 MILLION (US\$5.40 MILLION)
JUNE 22, 2015

TO THE

REPUBLIC OF TAJIKISTAN

FOR THE

TAJIKISTAN SECOND PUBLIC EMPLOYMENT FOR SUSTAINABLE AGRICULTURE AND
WATER RESOURCES MANAGEMENT PROJECT

AUGUST 28, 2020

Water Global Practice
Europe And Central Asia Region

CURRENCY EQUIVALENTS
(Exchange Rate Effective February 28, 2020)

Currency Unit = Special Drawing Rights (SDR)
SDR 0.73 = US\$1
US\$1.37 = SDR 1

FISCAL YEAR
January 1 – December 31

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ABBREVIATIONS AND ACRONYMS

AF	Additional Financing
ALRI	Agency of Land Reclamation and Irrigation
COVID-19	Coronavirus Disease
CPF	Country Partnership Framework
CPS	Country Partnership Strategy
DRS	The Districts of Republican Subordination
EIRR	Economic Internal Rate of Return
ENPV	Economic Net Present Value
FAO	Food and Agriculture Organization
FAOSTAT	Food and Agriculture Organization Corporate Statistical Database
FM	Financial Management
FVWRMP	Ferghana Valley Water Resources Management Project
GAFSP	Global Agriculture and Food Security Program
GBAO	Gorno-Badakhshon Autonomous Oblast
GDP	Gross Domestic Product
GIS	Geographic Information System
GoT	Government of Tajikistan
I&D	Irrigation and Drainage
ICR	Implementation Completion and Results Report
IMIS	Irrigation Management Information System
ISR	Implementation Status and Results Report
IWRM	Integrated Water Resource Management
M&E	Monitoring and Evaluation
MAWRM	Ministry of Amelioration and Water Resources Management
MEWR	Ministry of Energy and Water Resources
MoF	Ministry of Finance
MoLM	Ministry of Labor and Migration
NDS	National Development Strategy
NDVI	Normalized Difference Vegetation Index
NGO	Nongovernmental Organization
NWIS	National Water Information System
O&M	Operations and Maintenance
PAD	Project Appraisal Document
PAMP	Public Employment for Sustainable Agriculture and Water Resources Management Project
PAMP II	Second Public Employment for Sustainable Agriculture and Water Resources Management Project
PCU	Project Coordination Unit
PDO	Project Development Objective
PIU	Project Implementation Unit
PMMIS	Project Management and Monitoring Information System
PMU	Project Management Unit
RBC	River Basin Council
RBMP	River Basin Management Plan
RBO	River Basin Organization
RF	Results Framework

TAJSTAT	Statistical Agency under the President of the Republic of Tajikistan
ToC	Theory of Change
TSB	TojikSodirotbank
WIS	Water Information System
WOP	Without Project
WUA	Water User Association

TABLE OF CONTENTS

DATA SHEET	1
I. PROJECT CONTEXT AND DEVELOPMENT OBJECTIVES.....	6
A. CONTEXT AT APPRAISAL.....	6
B. SIGNIFICANT CHANGES DURING IMPLEMENTATION	10
II. OUTCOME	12
A. RELEVANCE OF PDOs	12
B. ACHIEVEMENT OF PDOs (EFFICACY)	13
C. EFFICIENCY.....	21
D. JUSTIFICATION OF OVERALL OUTCOME RATING	22
E. OTHER OUTCOMES AND IMPACTS	22
III. KEY FACTORS THAT AFFECTED IMPLEMENTATION AND OUTCOME.....	23
A. KEY FACTORS DURING PREPARATION	23
B. KEY FACTORS DURING IMPLEMENTATION.....	24
IV. BANK PERFORMANCE, COMPLIANCE ISSUES, AND RISK TO DEVELOPMENT OUTCOME ..	25
A. QUALITY OF MONITORING AND EVALUATION (M&E)	25
B. ENVIRONMENTAL, SOCIAL, AND FIDUCIARY COMPLIANCE.....	26
C. BANK PERFORMANCE.....	28
D. RISK TO DEVELOPMENT OUTCOME.....	28
V. LESSONS AND RECOMMENDATIONS	29
ANNEX 1. RESULTS FRAMEWORK AND KEY OUTPUTS.....	31
ANNEX 2. BANK LENDING AND IMPLEMENTATION SUPPORT/SUPERVISION.....	44
ANNEX 3. PROJECT COST BY COMPONENT	47
ANNEX 4. EFFICIENCY ANALYSIS.....	49
ANNEX 5. PUBLIC WORKS PROGRAM - COSTS AND BENEFITS	53
ANNEX 6. REVISED INDICATORS AND OUTCOME TARGETS	54
ANNEX 7. IRRIGATION REHABILITATION SCHEDULE.....	57
ANNEX 8. REMOTE SENSING ASSESSMENT OF AREA UNDER IRRIGATION	58
ANNEX 9. BORROWER, CO-FINANCIER AND OTHER PARTNER/STAKEHOLDER COMMENTS ...	60
ANNEX 10. SUPPORTING DOCUMENTS	64
ANNEX 11. PROJECT MAP	65



DATA SHEET

BASIC INFORMATION

Product Information

Project ID	Project Name
P133327	TAJIKISTAN SECOND PUBLIC EMPLOYMENT FOR SUSTAINABLE AGRICULTURE AND WATER RESOURCES MANAGEMENT PROJECT
Country	Financing Instrument
Tajikistan	Investment Project Financing
Original EA Category	Revised EA Category
Partial Assessment (B)	Partial Assessment (B)

Organizations

Borrower	Implementing Agency
Republic of Tajikistan	Ferghana Valley Water Resources Management Project (FVWRMP) Project Management Unit (PMU), Agency for Land Reclamation and Irrigation (ALRI)

Project Development Objective (PDO)

Original PDO

The project development objectives are to (i) provide employment to food insecure people through the rehabilitation of irrigation and drainage infrastructure, (ii) increase crop production in response to improved irrigation and drainage infrastructure, and (iii) support the development of improved policies and institutions for water resource management, as a means to improve food availability and food access for low-income people in poor rural areas supported by the project.

Revised PDO

The project development objectives for PAMP II are to: (i) provide access to temporary employment to food-insecure people through the rehabilitation of irrigation and drainage infrastructure, (ii) increase yields of selected crops in response to improved irrigation and infrastructure, and (iii) strengthen the capacity of Tajikistan to introduce integrated water resource management. By improving food access and food availability these measures improve the food security of low-income people in the poor rural areas supported by the project.

PDO as stated in the legal agreement

The objectives of the Project are to: (i) provide access to temporary employment to food-insecure people through the rehabilitation of irrigation and drainage infrastructure; (ii) increase yields of selected crops in response to improved irrigation and infrastructure; and (iii) strengthen the capacity of Tajikistan to introduce integrated water resource management.

(Source: Financing Agreement (Additional Financing) between the Republic of Tajikistan and the International Development Association. Dated August 7, 2015. Credit No.: 5697-TJ, Grant No.: D081-TJ)

FINANCING

	Original Amount (US\$)	Revised Amount (US\$)	Actual Disbursed (US\$)
World Bank Financing			
IDA-H8230	18,000,000	18,000,000	16,535,423
TF-13997	27,900,000	27,900,000	27,900,000
IDA-D0810	5,400,000	5,400,000	5,454,901
IDA-56970	6,600,000	6,599,547	6,571,714
Total	57,900,000	57,899,547	56,462,038
Non-World Bank Financing			
Borrower/Recipient	0	0	0
Total	0	0	0
Total Project Cost	57,900,000	57,899,547	56,462,038

KEY DATES

Approval	Effectiveness	MTR Review	Original Closing	Actual Closing
29-Nov-2012	05-Feb-2013	15-Dec-2016	28-Feb-2018	28-Feb-2020

RESTRUCTURING AND/OR ADDITIONAL FINANCING

Date(s)	Amount Disbursed (US\$M)	Key Revisions
22-Jun-2015	15.09	Additional Financing Change in Project Development Objectives Change in Results Framework Change in Components and Cost Change in Loan Closing Date(s) Change in Disbursements Arrangements Change in Institutional Arrangements
06-Nov-2015	18.42	Change in Results Framework Change in Components and Cost Reallocation between Disbursement Categories Change in Procurement Change in Implementation Schedule
23-Jul-2018	49.22	Reallocation between Disbursement Categories

KEY RATINGS

Outcome	Bank Performance	M&E Quality
Satisfactory	Satisfactory	Modest

RATINGS OF PROJECT PERFORMANCE IN ISRs

No.	Date ISR Archived	DO Rating	IP Rating	Actual Disbursements (US\$M)
01	04-Jul-2013	Satisfactory	Satisfactory	0
02	30-Jan-2014	Moderately Satisfactory	Moderately Satisfactory	3.50
03	20-Oct-2014	Moderately Satisfactory	Moderately Satisfactory	8.06
04	27-Feb-2015	Moderately Satisfactory	Moderately Satisfactory	10.76
05	09-Sep-2015	Satisfactory	Satisfactory	17.30
06	06-Apr-2016	Moderately Satisfactory	Moderately Satisfactory	23.15
07	27-Sep-2016	Satisfactory	Satisfactory	31.10
08	25-Feb-2017	Satisfactory	Satisfactory	37.57

09	27-Sep-2017	Satisfactory	Satisfactory	42.75
10	22-Jun-2018	Satisfactory	Satisfactory	48.77
11	27-Dec-2018	Satisfactory	Satisfactory	52.00
12	27-Jun-2019	Satisfactory	Satisfactory	55.04
13	30-Dec-2019	Moderately Satisfactory	Moderately Satisfactory	56.46

SECTORS AND THEMES

Sectors

Major Sector/Sector (%)

Agriculture, Fishing and Forestry 90

Irrigation and Drainage 90

Water, Sanitation and Waste Management 10

Public Administration - Water, Sanitation and Waste Management 10

Themes

Major Theme/ Theme (Level 2)/ Theme (Level 3) (%)

Private Sector Development 100

Jobs 100

Finance 4

Finance for Development 4

Agriculture Finance 4

Social Development and Protection 19

Social Protection 19

Social Safety Nets 19

Urban and Rural Development	56
Rural Development	56
Rural Markets	4
Rural Infrastructure and service delivery	46
Land Administration and Management	6
Environment and Natural Resource Management	20
Renewable Natural Resources Asset Management	12
Biodiversity	6
Landscape Management	6
Water Resource Management	8
Water Institutions, Policies and Reform	8

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I. PROJECT CONTEXT AND DEVELOPMENT OBJECTIVES

A. CONTEXT AT APPRAISAL

Context

1. **Country background.** Tajikistan is the smallest and poorest of the Central Asia economies. The 2008–2009 global economic crisis adversely affected Tajikistan’s economy, but growth recovered quickly due to remittance inflows and strong growth in the services and agricultural sector. The real gross domestic product (GDP) grew by 6.5 percent in 2010 and 7.4 percent in 2011. As a result, per capita income increased from US\$771 in 2008 to US\$820 in 2010.¹ Nevertheless, at the time of the project’s approval in 2012, the country had a population of 7.6 million, out of which 46 percent lived below the poverty line. Severe limitations in employment opportunities led many workers (up to 40 percent of the working population) to seek better job prospects overseas, largely in the Russian Federation. The economy remained highly vulnerable to exogenous shocks, including regional trade and border disputes, the volatility in world prices for cotton and aluminum, and the continued depreciation of its currency. Tajikistan’s high dependence on fuel and cereal imports and the rising prices for these commodities exacerbated the country’s vulnerability. In 2012, the agricultural sector accounted for 21 percent of GDP and 64 percent of employment. But with 77 percent of Tajikistan’s poor engaged in agricultural activities, and a high exposure to risks such as droughts, floods, and landslides, agriculture was also one of the most vulnerable sectors.

2. **Sector context.** Tajikistan’s annual agricultural sector growth averaged 5 percent from 2005 to 2010 and was driven by land reform and the liberalization of the domestic market for cotton, the write-off of farmer cotton debts, and ‘freedom to farm’. More than 60,000 small-scale private farms replaced the collective farms that dominated agriculture at independence. The cotton sector reform reduced the ability of local governments to coerce farmers into growing cotton, and a more profitable and sustainable balance between cotton and other crops emerged. Nevertheless, about 50 percent of the rural population (2.7 million) remained in poverty and 30 percent² were considered as food-insecure. In 2010, rural unemployment in the Khatlon region, Tajikistan’s most populated region, was estimated at 50 percent.

3. The country’s agricultural resource base was characterized by limited arable land and relied heavily on irrigation for crop production. Out of the 830,000 ha of arable agricultural land, around 85 percent (720,000 ha) was irrigated, but only 515,000 ha were in use due to the low performance in the irrigation sector. The problems were manifold and included: (i) severe deterioration of irrigation and drainage (I&D) infrastructure due to lack of public funds; (ii) irregular maintenance of secondary and tertiary irrigation canals due to the lack of responsibility and ownership following the farm reorganization; (iii) low access to rural finance due to high interest rates and low levels of lending by commercial banks; and (iv) slow progress with the reform of land and water resources management policy in the country.

4. In response to the abovementioned challenges, the Government of Tajikistan (GoT) developed the ‘Agrarian Reform Program’ for 2012–2020³ which recognized farm productivity as Tajikistan’s major domestic food security challenge. The objectives of the strategy were to: (i) provide farmers with equitable, long-term access to land; (ii) ensure regular access to adequate irrigation; (iii) allow farmers to develop their own organizations and farm freely; and (iv) provide sustainable and affordable rural finance. It also recognized water as a critical input for agricultural production and

¹ World Bank. 2012. *Project Appraisal Document (P133327)*.

² Food and Agriculture Organization (FAO)/World Food Program. 2011. *Crop and Food Security Assessment Mission Report*.

³ The Government of the Republic of Tajikistan. 2012. *Agriculture Reform Program of the Republic of Tajikistan for 2012-2020*. Dushanbe, Tajikistan.



addressed the need for water sector reform and the transition to an integrated water resource management (IWRM) approach.

5. **Rationale for World Bank involvement.** The Second Public Employment for Sustainable Agriculture and Water Resources Management Project (PAMP II) was designed to align with these objectives, building on the GoT's willingness to sector improvement and policy reform. This repeater project, jointly financed by the World Bank and the Global Agriculture and Food Security Program (GAFSP), built on the achievements and lessons learned under the emergency food security project 'Public Employment for Sustainable Agriculture and Water Management Project' (PAMP), which was implemented in five food-insecure districts of Khatlon from 2010 to 2011.⁴ The objectives of the PAMP were to "generate temporal employment and rehabilitate irrigation and drainage infrastructure in selected districts in the Khatlon Oblast as a means to increase household food security."⁵ PAMP II used the same underlying structure and design and covered a further 12 districts, both among the Districts of Republican Subordination (DRS) and in Khatlon (annex 11: Project map). It placed less emphasis on temporary employment and more on the rehabilitation of I&D infrastructure as the basis for increased food production, farm income, and improved food security. The longer time frame and larger financing envelope also facilitated a more substantial contribution to policy reform and support for the introduction to IWRM.

6. **Contribution to higher-level objectives.** The project contributed to the main objectives of the Country Partnership Strategy (CPS) for Tajikistan for FY10–FY13 (Report No. 50769) which were to "reduce the negative impact of the global financial and economic crisis on poverty and vulnerability" and to "pave the way for post-crisis recovery and sustained development." Under Objective 2 (Results 5), it identified improving conditions for a sustainable increase in agricultural productivity as one of the key initiatives to achieve its objectives. PAMP II was fully aligned with the strategic objectives of the National Development Strategy (NDS) of Tajikistan for 2006–2015.⁶ The key challenges identified for agriculture included high food insecurity and inadequate nutrition, particularly in rural areas, as well as the deterioration of irrigation infrastructure. These priorities were also reflected in Tajikistan's Poverty Reduction Strategy for 2010–2012.⁷

Theory of Change (Results Chain)

7. The project sought to implement a public works program for manual cleaning of on-farm irrigation canals, which would provide employment to food-insecure people in the short term. The rehabilitation of I&D infrastructure and flood emergency works would improve the area equipped with I&D services, which would result in increased crop production in the medium term. The provision of technical assistance to the GoT and the Ministry of Amelioration and Water Resources Management (MAWRM) in the formulation of a legal basis for water sector reform and IWRM and capacity building of the MAWRM and I&D institutions would result in improved policies and institutions for water resources management in the long term. The project also sought to improve food availability and food access for low-income people in poor rural areas. The underlying assumption was that improved access to irrigation would raise cereal production, and therefore improve food availability at the household level. The parallel increase in production of irrigated cash crops (food and non-food) would raise household incomes and so the capacity to access food. These short-, medium-, and long-term objectives would contribute to the project's higher-level objectives to improve food security and enhance rural development and livelihoods. The Implementation Completion and Results Report (ICR) developed the Theory of Change (ToC) under figure 1, as a ToC was not required at the project preparation stage.

⁴ The PAMP (P119690) became effective on November 24, 2010 and closed on December 31, 2011.

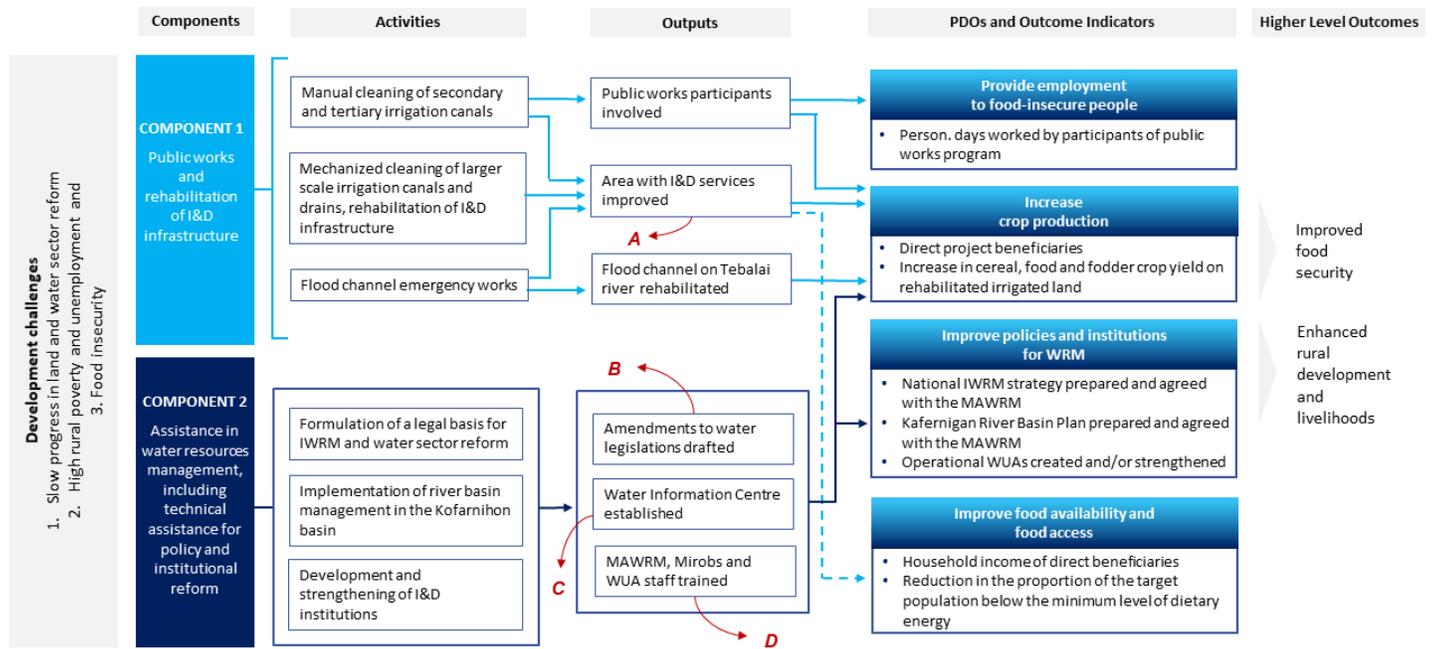
⁵ Grant Agreement (Public Employment for Sustainable Agriculture and Water Management Project) between Republic of Tajikistan and International Development Association acting as Trustee of the Food Price Crisis Response Trust Fund. Dated September 3, 2010. FPCR TF Grant No.: TF097691.

⁶ The Government of the Republic of Tajikistan. 2014. *National Development Strategy for the Period up to 2015*. Dushanbe, Tajikistan.

⁷ The Government of the Republic of Tajikistan. 2009. *Poverty Reduction Strategy of the Republic of Tajikistan for 2010–2012*. Dushanbe, Tajikistan.



Figure 1. Theory of Change



Critical assumptions

- A: Improved irrigated land and irrigation water supply would lead to an increase in agricultural production and thus to a higher income for farmers (as indirect beneficiaries of the project)
- B: Revised water legislations would strengthen the introduction of IWRM and set clear roles and responsibilities between institutions across the water sector
- C: The Water Information Center would serve as a platform for data exchange between water sector stakeholders and as a tool for improved water resources management and planning
- D: Increased technical and financial capacity of national and local water institutions would result in improved and sustainable WRM at national, basin and local level

Project Development Objectives (PDOs)

8. The PDOs were to: (i) provide employment to food-insecure people through the rehabilitation of irrigation and drainage infrastructure; (ii) increase crop production in response to improved irrigation and drainage infrastructure; and (iii) support the development of improved policies and institutions for water resource management, as a means to improve food availability and food access for low-income people in poor rural areas supported by the project.⁸

Key Expected Outcomes and Outcome Indicators

9. The key indicators selected to measure progress toward the objectives were:
- Person.days worked by participants of public works program, disaggregated by gender and vulnerable group;
 - Direct project beneficiaries, disaggregated by gender;
 - Increase in cereal, food and fodder crop yield on rehabilitated irrigated land;
 - National IWRM strategy prepared and agreed with the MAWRM;
 - Kafernigan⁹ River Basin Plan prepared and agreed with the MAWRM;
 - Operational WUAs established and/or strengthened.

⁸ Financing Agreement between the Republic of Tajikistan and International Development Association. Dated February 5, 2013. Grant No.: H823-TJ.

⁹ Kafernigan in Russian language is the same as Kofarnihon in Tajik language.



10. The GAFSP core indicators to measure progress toward household food security were:¹⁰
- Household income of direct beneficiaries; and
 - Reduction in the proportion of the target population below the minimum level of dietary energy, disaggregated by gender and vulnerable.

Components

11. **Component 1: Public Works and Rehabilitation of Irrigation and Drainage Infrastructure (estimated US\$35.82 million; actual US\$44.35 million¹¹).** This component financed a public works program to manually clean secondary and tertiary canals and provide employment to food-insecure people (Subcomponent 1a: Employment Generation for Food Insecure Households through Public Works). It also supported mechanized cleaning works of larger I&D canals, as well as the rehabilitation and provision of hydraulic infrastructure to ensure an adequate supply of irrigation water (Subcomponent 1b: Mechanized and Other Works). In addition, the component financed emergency works to restore a flood channel in the city of Kulob (Kulob district) (Subcomponent 1c: Flood Channel Emergency Works).

12. **Component 2: Assistance in Water Resources Management, including Technical Assistance for Policy and Institutional Reform (estimated US\$8.07 million; actual US\$9.14 million).** This component provided technical assistance to the MAWRM and other relevant institutions to support the reform of water resource management. At the national level, it provided support for the legislative reforms needed to introduce and implement IWRM. It also supported the preparation of a national strategy for IWRM and the establishment of a Water Resources Information Center (Subcomponent 2a: National-level Policy, Legislative, and Institutional Formulation). As a further step toward the introduction of IWRM, the project supported the GoT in piloting river basin management in the Kofarnihon river basin (Subcomponent 2b: River Basin Planning). To ensure sustainable, water resource management at the local level, it assisted in establishing and strengthening WUAs (Subcomponent 2c: Develop and Strengthen Irrigation and Drainage Institutions).

13. **Component 3: Project Management (estimated US\$2.01 million; actual US\$2.90 million).** This component provided support for the PMU in project implementation and coordination, financial management (FM) and procurement, communication and awareness programs, environmental management and safeguards, and monitoring and evaluation (M&E).

Main Stakeholders and Beneficiaries

14. The main stakeholder and beneficiaries, as stated in the Project Appraisal Document (PAD), were:
- Vulnerable households with high food insecurity, including female-headed households;
 - Community-level institutions including *mahalla* committees¹² and WUAs; and
 - Public institutions including the MAWRM, RBOs, *mirobs*,¹³ regional and district government authorities, *jamoats*, working groups leading water sector reform, and the donor community.

¹⁰ The GAFSP core indicators were not part of the Results Framework (RF) but introduced to measure the project's impact toward the outcome 'food availability and food access' (household food security).

¹¹ Source: PAMP II Project Management Unit (PMU), Final disbursements, as of August 2020. It should be noted that the actual costs increased because of the additional financing (AF) in 2015.

¹² The territory of Tajikistan is divided into four administrative divisions: regions (Tajik: *viloyat*, Russian: oblast); districts (Tajik: *nohiya*, Russian: rayon); *jamoats* (as the lowest level of local public administration); and communities (Tajik: *mahalla*) (as the lowest level of administration of self-governance in a local community).

¹³ Under the water sector reform, '*Mirobs*' were planned to be established to serve as a semipublic agency responsible for water delivery and maintenance of off-farm I&D infrastructure.

B. SIGNIFICANT CHANGES DURING IMPLEMENTATION

15. **An AF was approved on June 22, 2015, to scale up the project by the inclusion of six additional project districts.** The AF in the amount of US\$12.0 million (IDA Grant and Credit) was approved with a restructuring which reformulated the PDO, revisited the RF, project components and costs, implementation arrangements, and extended the closing date from February 28, 2018, to February 28, 2020.

16. **A second restructuring was approved on November 6, 2015, to finance additional flood emergency works.** The restructuring revisited the RF, project components and costs, and included a reallocation of US\$4.2 million between project components.

17. **A third restructuring was approved on July 23, 2018, to adjust the project's financing framework.** This included a reallocation of IDA and GAFSP grant funding between disbursement categories.

Revised PDOs

18. The PDOs were revised during the AF and restructuring in 2015.¹⁴ One substantive change included the withdrawal of the outcome 'as a means to improve food availability and food access for low-income people in poor rural areas supported by the project'. Other outcomes were rephrased to be better aligned with project activities.

19. The revised PDOs were to: (i) provide access to temporary employment to food-insecure people through the rehabilitation of irrigation and drainage infrastructure; (ii) increase yields of selected crops in response to improved irrigation and infrastructure; and (iii) strengthen the capacity of Tajikistan to introduce integrated water resource management.¹⁵

Revised PDO Indicators and Outcome Targets

20. During the first restructuring, the outcome targets for three PDO indicators were increased due to the AF. A new indicator 'registered WUA members' was added, and other outcome indicators were rephrased to be better aligned with project activities. During the second restructuring in 2015, the outcome targets for three PDO indicators were slightly reduced because of the removal of one project district. The outcome target for 'registered WUA members' was increased to reflect continuous progress of the WUA development activities under the project. A new PDO indicator 'beneficiaries of Flood Protection Works' was included due to the additional emergency works. The abovementioned changes are summarized in table 1 and presented in detail in annex 6.

¹⁴ Financing Agreement (Additional Financing for Second Public Employment for Sustainable Agriculture and Water Resources Management Project) between the Republic of Tajikistan and the International Development Association. Dated August 7, 2015. Credit No.: 5697-TJ.

¹⁵ The PDO in the Financing Agreement (dated August 7, 2015) differs from the PDO in the AF Project Paper (dated June 3, 2015). The PDO in the AF Project Paper, subsequent Restructuring Paper (November 2015), and Implementation Status and Results Report (ISR) documents is to: (i) provide access to temporary employment to food-insecure people through the rehabilitation of irrigation and drainage infrastructure; (ii) increase yields of selected crops in response to improved irrigation and infrastructure; and (iii) strengthen the capacity of Tajikistan to introduce integrated water resource management. By improving food access and food availability these measures improve the food security of low-income households in the poor rural areas supported by the project.

Table 1. Original and Revised PDO Indicators and Targets

PDO Indicator	Original Financing (November 2012)	AF and Restructuring (June 2015)	Second Restructuring (November 2015)
Person.days worked (number)	880,000	1,255,000	1,146,000
Direct project beneficiaries (number)	772,000	1,385,000	1,343,450
Operational WUAs created and/or strengthened (number)	95	135	125
Registered WUA members (number)	Not included	22,000	45,000
Beneficiaries of Flood Protection Works (number)	Not included	Not included	62,400

Revised Components

21. The first restructuring made no changes to the project components, but the component costs changed due to the AF (see annex 3: Project Cost by Component). The second restructuring included a reallocation of US\$4.2 million within Components 1 and 2 to finance additional flood emergency works outside of Kulob district. The restructuring was achieved within the existing project structure by dropping one of the original project districts (Bokhtar) and reallocating the funds assigned for this district to the emergency response. The project activities under Subcomponent 1c: Flood Channel Emergency Works were rephrased to reflect the flood emergency restoration works outside the original project area and the original reference to Kulob city was dropped.¹⁶

Other Changes

22. **Institutional arrangements.** Under the original project design, the MAWRM was the project's main counterpart in the government. A different ministerial structure was adopted by the GoT in 2014, which split the ministry into two separate government bodies. The Ministry of Energy and Water Resources (MEWR) maintained the responsibility for strategic policy development and coordination of the water sector reform, and the Agency of Land Reclamation and Irrigation (ALRI) for irrigation policy and service delivery. ALRI was also given responsibility for the implementation of IWRM, previously planned for *mirobs*, under the new ministerial structure. All project references to the former MAWRM and to *mirobs* were thus replaced with MEWR and ALRI. The latter became the project's main counterpart and MEWR continued to be supported in developing the legal basis for water sector reform.

Rationale for Changes and Their Implication on the Original Theory of Change

23. **Economic downturn.** The rationale for the AF and restructuring was to respond to the GoT's request in January 2015 to counteract the impact of the Russian economic downturn on Tajikistan and meet the demand for employment, heightened by the return of migrant workers to the country. The AF scaled up the public works program to create temporary jobs in six additional project districts. To ensure sustainability of the AF-funded activities, parallel investments were provided for the rehabilitation of I&D infrastructure and WUA development in the additional districts. The project was extended to allow adequate time to build the capacity of the additional WUAs supported by the AF. These changes were made without changing the overall structure or underlying objectives of PAMP II.

24. **Change in counterpart.** The restructuring of the project also allowed to reflect the structural changes in the government that had been made. At the request of the GoT, the project outcome 'to improve food availability and food access' was dropped to emphasize the institutional elements of the project. While this change did not significantly alter

¹⁶ The budget allocated for Bokhtar district (US\$4.2 million) was reallocated from Subcomponents 1a and 1b to Subcomponent 1c to finance additional flood emergency works in Khatlon and Gorno-Badakhshon Autonomous Oblast (GBO), a minor rehabilitation of the existing irrigation schemes in GBO, and the replenishment of fuel used by government agencies in carrying out the emergency response activities.. The origin budget allocated for Bokhtar under Component 2 for WUA support was used for the same activity in other districts.



the ToC, it did shift the focus of the project from its basic food security concept at local level toward the more ambitious long-term objective of introducing IWRM in the country.

25. **Flood emergency.** The rationale for the second restructuring was the request from the GoT for support to respond to disastrous floods in Tajikistan that began in July 2015. The restructuring was achieved within the existing project structure by dropping one of the original districts (Bokhtar) and reallocating the funds assigned for this district to the emergency response. The underlying project design remained the same and did not have an impact on the ToC.

26. **Financing framework.** The third restructuring was required to adjust the complex financing framework of the project, which markedly hindered project implementation planning and budgeting. This change did not affect the ToC.

II. OUTCOME

A. RELEVANCE OF PDOs

Assessment of Relevance of PDOs and Rating

27. **Alignment with World Bank strategy.** The project is aligned with the current Country Partnership Framework (CPF) for Tajikistan for FY19–FY23 (Report No.: 135875). Under Focus Area 1 ‘Human Capital and Resilience’, it seeks to address the challenges of limited access to nutritious food and particularly for the very young, with rates of stunting being high and early childhood development needs still largely unmet. Focus Area 2 ‘Public Institutions and Sustainability’ aims to strengthen both the institutional sustainability and ability of critical public service institutions to deliver according to their respective mandates. It highlights an integrated approach in the water sector as critical to ensure access and affordability of water. The CPF (FY19–FY23) also seeks to deepen citizen engagement activities and highlights the PAMP II foundational work for civil society partnership in project monitoring as a best practice example. It also reflects on the project’s contribution to the CPS for Tajikistan for FY15–FY18 (Report No.: 115002) on cross-cutting priorities such as gender empowerment and building climate resilience in water use and management. As of April 2019, the water and agriculture sector together accounted for 28 percent of the World Bank’s active (lending) portfolio in Tajikistan.

28. **Alignment with the Government program.** The project is aligned with Tajikistan’s NDS for 2016–2030.¹⁷ It contributes to the strategic development objective to ‘ensure food security and people’s access to good quality nutrition’ by diversifying agricultural production, increasing access to improved seeds and fertilizers, and developing land and water resources management systems. In addition, the rehabilitation and sustainable operations and maintenance (O&M) of I&D infrastructure as well as the development of sustainable operating WUAs are addressed to achieve the objective. The NDS 2030 also highlights IWRM as a main activity to achieve the strategic development objective to ‘ensure energy security and efficient use of electricity’. The project is fully aligned with the objectives of Tajikistan’s Water Sector Reform Program for 2016–2025.¹⁸ The program aims at strengthening the institutional structure of the irrigation sector and supporting investments in deteriorated irrigation infrastructure to improve irrigation water delivery and services to farmers, agricultural entities, and rural households. The project also responds to the needs for improving cost recovery and increasing efficiency and effectiveness of public institutions in charge of water management.

¹⁷ The Government of the Republic of Tajikistan. 2016. *National Development Strategy for the Period up to 2030*. Dushanbe, Tajikistan.

¹⁸ The Government of the Republic of Tajikistan. 2015. *National Water Sector Reform Program for the Period 2016–2025*. Dushanbe, Tajikistan.

29. **Rating.** The project’s objectives remain highly relevant with the current World Bank CPF for Tajikistan and the GoT’s development strategies and sector priorities.

B. ACHIEVEMENT OF PDOs (EFFICACY)

Assessment of Achievement of Each Objective/Outcome

30. **Approach taken in this ICR.** Over the course of the project, three restructurings were undertaken. The 2015 AF and first restructuring was associated with a significant change in the PDO statement by removing the objective ‘to improve food access and food availability’. Other objectives were only slightly rephrased to align them better with project activities. Additionally, the outcome targets were increased with the AF. Although these changes did not change the scope of the project, a split evaluation is applied to assess the achievement of the revised objectives pre- and post-AF, using original and revised targets. The second restructuring entailed a slight decrease in the outcome targets. However, since the results of the evaluation of each objective were found to be identical to the results of the first split evaluation, a subsequent split assessment is not applied. The third restructuring does not affect the efficacy evaluation. Table 2 provides an overview of the PDO indicators, associated targets, and the final values at project completion, which were used to assess the achievements of each outcome.

Table 2. Original and Revised PDOs, PDO Indicators, and Outcome Values at Project Closure

PDO Indicator	Pre-AF		Post-AF		Value at Evaluation
	Target	Achieved	Target	Achieved	
Outcome 1.	Provide employment to food-insecure people through the rehabilitation of I&D infrastructure		Provide access to temporary employment to food-insecure people through the rehabilitation of I&D infrastructure		
1. Person.days worked (number)	880,000	121%	1,255,000	85%	1,062,927
- female beneficiaries (number)	132,000	192%	188,250	135%	253,561
- severely food-insecure (number)	176,000	120%	251,000	84%	211,517
Efficacy Outcome 1	High		Substantial		
Outcome 2.	Increase crop production in response to improved I&D infrastructure		Increase yields of selected crops in response to improved irrigation and infrastructure		
2a. Increase in cereal, food and fodder crop yield on rehabilitated irrigated land (percentage) before AF	10%	>10%	Removed	Removed	>10%
2b. Increase in wheat and vegetable yield on rehabilitated irrigated land (percentage) after AF	Not included	Not included	10%	>10%	>10%
3. Direct beneficiaries (number)	772,000	180%	1,385,000	101%	1,393,276
- female beneficiaries (percentage)	10%	480%	30%	160%	48%
4. Beneficiaries of Flood Protection Works (number) added with second restructuring (Target: 62,400)	Not included	Not included	Not included	Not included	62,400
Efficacy Outcome 2	Substantial		Substantial		
Outcome 3.	Support the development of improved policies and institutions for water resource management		Strengthen the capacity of Tajikistan to introduce IWRM		
5. National IWRM strategy prepared and agreed with the MEWR (Y/N)	Yes	Yes	Yes	Yes	Yes

PDO Indicator	Pre-AF		Post-AF		Value at Evaluation
	Target	Achieved	Target	Achieved	
6. Kofarnihon River Basin Plan prepared and agreed with the MEWR (Y/N)	Yes	Yes	Yes	Yes	Yes
7. Operational WUAs created/strengthened (number)	95	137%	135	96%	130
- WUAs created (number)	20	100%	30	67%	20
- WUAs strengthened (number)	75	147%	105	105%	110
8. Registered WUA Members (number) added with AF, Baseline: 17,000	Not included	Not included	22,000	205%	45,163
- female WUA Members (percent) Baseline: 10%			10%	150%	15%
Efficacy Outcome 3	High		High		
Outcome 4.	Improve food availability and food access			Removed with AF	
9. Household income of direct beneficiaries	No target	n.a.			
10. Reduction in the proportion of the target population below the minimum level of dietary energy, disaggregated by gender and vulnerable	No target	n.a.			
Efficacy Outcome 4	Modest		n.a.		

Outcome 1. Provide employment to food-insecure people (pre-AF) and provide access to temporary employment to food-insecure people (post-AF) through the rehabilitation of I&D infrastructure

31. **Public works program.** The project provided employment through the implementation of a public works program, which engaged the most vulnerable individuals and households in manual cleaning and rehabilitation works of small-scale on-farm irrigation canals. The program was implemented during the non-irrigation seasons (November to March) from 2013 to 2019 in all 17 projects districts. It involved eight local nongovernmental organizations (NGOs) in the awareness campaign of the program, which contributed to the identification, selection, and mobilization of the most food-insecure individuals and households in the project area. The program generated 1,062,927 person.days of temporary employment against the targets of 880,000 (pre-AF), 1,255,000 (post-AF), and 1,146,000 (post-second restructuring). The target for this indicator was slightly oversized, which resulted in the shortfall of the achieved target value.¹⁹

32. In total, 30,005 participants benefited from the program against the final target of 29,950. Of the total number of beneficiaries, 25 percent were women and 20 percent were severely food-insecure individuals, exceeding the final targets of 20 percent and 15 percent, respectively. Every participant was employed, on average, for a total of 35 working days, which on average provided an additional income of US\$197 to each participant, or one-eighth of the average annual formal wage in Tajikistan. There is evidence that the program did improve food security, since 88 percent out of 640 interviewed beneficiaries stated that they spent this additional income on food.²⁰

¹⁹ The indicator was designed based on the estimated volume of soil (m³) to be excavated in the canals in the respective districts and on the assumption that each participant of the program will be contracted for the excavation of 75 m³ of soil. According to the borrower's ICR, the average volume of soil excavated by each participant was only 71.2 m³ over the project's life-span, as calculated at project completion.

²⁰ Borrower's ICR PAMP II. 2020. Impact Assessment with reference to the Household Survey conducted in 2019.

33. In total, 8,221 km of irrigation canals were cleaned manually through the program, which contributed to improved irrigation water supply on 251,500 ha of arable land (as further discussed under Outcome 2). The interviewed beneficiaries appreciated both the temporary financial support and the additional non-monetary, long-term benefits of the program. For example, 64 percent of beneficiaries surveyed in the project area believe that the irrigation water supply to their dehqan farms has improved in the past two years.²¹ ICR interviews with beneficiaries revealed that the additional income allowed beneficiaries to purchase land and start farming, while farmers were able to change their cropping pattern and shift to higher-value crops.

Box 1. Beneficiary Story from the Public Works Program (Borrower’s ICR, February 2020 [Annex 9])

Ms. Kurbonoy Tagoybekovna is a mother of six children. To support the children, she felt compelled to travel to Russia for work, but she was unable to find a permanent job and was forced to return home. “Upon completion of an agreed amount of work, I received 1350 Tajik Somoni (TJS). I bought beans, potato and sunflower seeds, and planted it on my homestead plot. I sell the crops for three TJS per kg in the district market. From the received yield and profit, I can make two to three times more profit. The project was a huge help for my family during the winter period, and our social and economic status has greatly improved.”

Bobokalonova Kurbonoy Tagoybekovna, beneficiary from Khuroson district.

34. **Rating.** Given the overachievement (pre-AF) and substantial achievement (post-AF) of the corresponding PDO indicator, the achievement of PDO 1 is rated High (pre-AF) and Substantial (post-AF), respectively.

Outcome 2. Increase crop production as a result of improved I&D infrastructure (pre-AF) and increase yields of selected crops in response to improved irrigation and infrastructure (post-AF)

35. **Crop production and crop yields.** In all 17 project districts, I&D infrastructure was rehabilitated with the aim of increasing crop production and yield. Table 3 shows the observed trends in crop yields for the main crop groups for the 10 original PAMP II districts, as project outcomes in these districts had more time to embed. As the interannual variability of crop yields is high, the base year was calculated as the average for 2010–2012 and the final year as the average for 2017–2018.²² The results show an increase for all cereals (25.2 percent), wheat (22.3 percent), vegetables²³ (15.1 percent), and fodder crops (22.3 percent) compared to the target of 10 percent yield increase (pre- and post-AF).

Table 3. Trends in Crop Yields (original project districts)

	Base (2010–2012)	Final (2017–2018)	Change (%)
	Crop Yield (tons/ha)		
Food crops			
All cereals	3.01	3.77	25.2**
Of which: wheat (10 districts ^a)	2.82	3.45	22.3**
All vegetables	27.30	31.43	15.1**
Fodder crops (10 districts ^a)	17.51	21.42	22.3 ^{ns}
Cotton	2.07	1.81	-12.6**

Source: TAJSTAT district-level data on crop production for 2010–2018, authors calculations.

Note: a. One district was omitted due to data limitations; **significant at 5 percent, ns = not statistically significant.

²¹ Borrower’s ICR PAMP II. 2020. Impact Assessment with reference to the Household Survey conducted in 2019.

²² TAJSTAT (Tajik National Statistical Agency) crop production data 2019 were unavailable due to the impact of the Coronavirus disease (COVID-19).

²³ ‘All vegetables’ were used to provide information on ‘food’ which is part of the PDO indicator (pre-AF).

36. **Changes in crop composition.** In addition, a switch from low returning crops, such as wheat and cotton, to higher returning crops and vegetable production, can be observed. The area of alfalfa production also increased, although this change reflects the ability to use otherwise marginal land more productively for livestock production, rather than the direct return to alfalfa production. Even though the percentage reduction of the cotton and wheat area was moderate, the areas released facilitated a significant percentage increase in the areas planted to other cereals, vegetables, and alfalfa. Further details are provided in annex 4: Efficiency Analysis.

37. **Rehabilitation of I&D infrastructure.** The irrigation rehabilitation works were implemented in all project districts, with the earliest project interventions starting in 2013 (annex 7: Irrigation rehabilitation schedule). Over the project's life-span, a total length of 8,571 km of irrigation canals were cleaned, significantly exceeding the final target of 7,065 km. This included the manual cleaning of 8,221 km on-farm irrigation canals through the public works as well as mechanized cleaning of 350 km of larger off-farm irrigation canals, exceeding the final target of 310 km. In addition, 1,112 km of drains were rehabilitated or cleaned mechanically, compared to the final target of 1,180 km.²⁴ According to the borrower's ICR, the cleaning of drains reduced the level of groundwater and soil salinity on a total area of 49,600 ha and resulted in land amelioration of 53,949 ha of irrigated land. This is 21 percent of the total command area where rehabilitation works of I&D infrastructure were conducted. At 1 km of the cleaned drains on average the condition of land on the area of 48 ha was improved. The project also financed various civil and electromechanical works for the rehabilitation and restoration of other priority infrastructure. This included the rehabilitation of 5,411 key hydraulic structures, including 16 pump stations (out of which 10 are operated by the ALRI and 6 are operated by WUAs), the installation of 585 observation wells (transferred to the ALRI), the installation and rehabilitation of 685 water measuring devices, 1,658 hydrants, and so on, which complemented the manual and mechanical rehabilitation works and significantly exceeded the final target of 4,030.

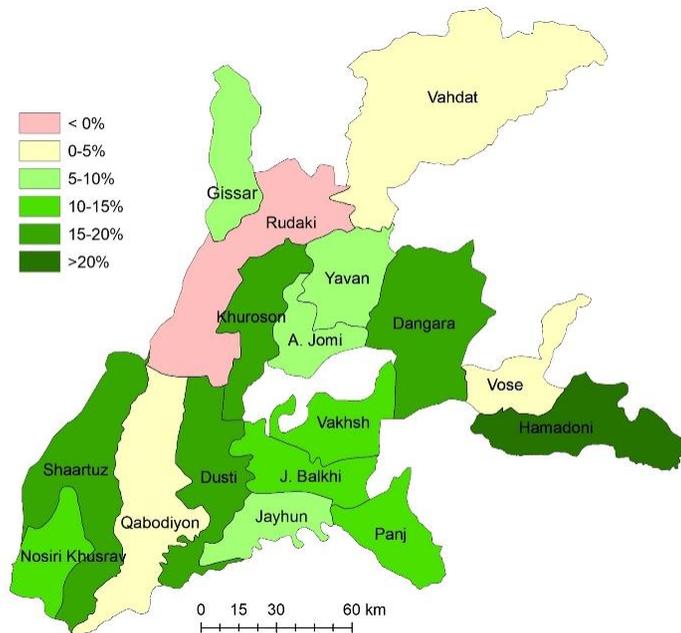
38. **Area with I&D services improved.** The project interventions improved a total command area of 251,528 ha, compared to the final target of 236,600 ha. The results of an independent remote sensing and geographic information system (GIS) analysis (annex 8: Remote sensing assessment of area under irrigation) estimate that 11.57 percent of the total project area was under irrigation at the baseline (2011–2013) and reached 12.79 percent at project completion (end line). This means that an additional 27,539 ha from baseline to end line were estimated to be actively irrigated as a result of either new irrigation development or rehabilitation of the existing I&D infrastructure. According to these estimates, the percentage change by project district ranged from –5.82 (Rudaki) to 22.36 (Hamadoni) (figure 2).

39. **Direct project beneficiaries.** The project interventions benefited a total number of 1,393,276 people residing in the area where rehabilitation works were implemented, significantly exceeding the targets of 772,000 (pre-AF), 1,385,000 (post-AF), and 1,343,450 (post-second restructuring). Compared to the final target of 30 percent, 48 percent were female.

40. **Flood protection and rehabilitation works.** The project financed critical flood protection rehabilitation works along 5.7 km of the lower section of the Tebalai flood channel in Kulob City. The completed works also reduce the risk of future flood damages on agricultural land and irrigation systems supported through the project down in Vose district. ICR interviews in Kulob City revealed that no damage was caused to the city or surrounding areas during the last flood in 2018. The project also financed the rehabilitation and construction of flood protection embankments along 1.52 km in Hamadoni and Shunon districts, therefore exceeding the final target of 6.2 km. The rehabilitation works, which were successfully implemented from February 2016 to March 2018, benefit 62,400 citizens, fully achieving the final target of 62,400.

²⁴ As stated in the borrower's ICR, the shortfall in achieving the target of the indicator was because of the price increase of fuel from TJS 6 to TJS 8 per 1 liter, resulting in a significant increase in the cost of excavation of 1 m³ of cleaned soil.

Figure 2. Percentage Change in Irrigated Area per District from the Baseline (2011–2013 average) to the End Line (2017–2019 average)



Source: Remote Sensing and GIS assessment, World Bank July 2020; author’s assessment.
Note: All but one district (Rudaki) show an increase in irrigated area.

Box 2. Interviews with Beneficiaries during Implementation Support Missions (World Bank 2018)

Abdurauf Azizov manages the “Chanori Sukhta” pumping station in Gissar district. Built in 1970, the station was not renovated for 20 years, after the dissolution of the Soviet Union. “The pumping station was in a critical condition. We could not find money to buy parts to keep it operational. The project helped to rehabilitate the pumping station in 2017, along with two other stations which now supply irrigation water to 700 ha of land.”

Abdurauf Azizov, ALRI staff and beneficiary in Gissar district.

Bobonazar Yatimov manages several greenhouses and employs eight people in Vahdat District. “The high groundwater table has seriously impacted soil quality, and consequently, crop yield. This year, with the rehabilitation of the drainage infrastructure, the situation is much improving. It means a lot in terms of the quality and quantity of vegetables we are growing.”

Bobonazar Yatimov, beneficiary and entrepreneur in Vahdat district.

Safar Omonov is a farmer and a member of the local WUA, which was established in 2016 under PAMP II. “This year, I planted wheat grain for the first harvest and then I also got good rice, beans and corn crops for the second harvest. If there is water, not a single square meter of land remains unused.”

Safar Omonov, beneficiary and farmer in Gissar district.

41. **Rating.** Given the observed increase in yield, the successful and timely completion of the I&D rehabilitation and flood emergency works as well as the number of beneficiaries overachieved, achievement of PDO 2 is rated Substantial pre-AF and post-AF. Even though all PDO indicators and most intermediate indicators were achieved, a conservative approach to the rating is applied as the observed yield increase might not exclusively be linked to project interventions.

Outcome 3. Support the development of improved policies and institutions for water resource management (pre-AF) and strengthen the capacity of Tajikistan to introduce IWRM (post-AF)

42. **Amendments to water legislations.** At the national level, the project assisted the GoT in the revision of two key water legislative documents to strengthen strategic policy development and coordination of the water sector reform. This included the ‘Water Code of the Republic of Tajikistan’ and the Law ‘On Water User Associations’. While there were initial delays in the preparation process, both draft amendments were finalized in 2019, fully achieving the target pre- and post-AF. The target was significantly exceeded with both amendments adopted at the parliamentary level in early 2020.²⁵

43. **National IWRM strategy.** The project further supported the preparation of a draft National IWRM strategy which was agreed with the MEWR in June 2017, fully achieving its target pre- and post-AF. The strategy provides a road map and action plan for the implementation of IWRM approaches for the period 2017–2025 at the national level and the Kofarnihon basin in particular. ICR interviews revealed that the draft strategy was used for consultations at the basin level and made an important contribution to the draft 2030 National Water Strategy, which is currently developed by the MEWR.

44. **Water Information System (WIS) concept paper.** The MEWR was supported in the development of a WIS concept paper, which was finalized for dissemination and consultations in 2019. The concept paper lays out the responsibilities for data collection and coding, as well as for data sharing between agencies in Tajikistan. It was not approved because it lacked consensus among the main sector ministries and agencies. Further to ongoing consultations, the amended Water Code, approved in early 2020, outlines that all agencies in Tajikistan are obliged to share data for free and contribute to the established WIS under the project.

45. **National Water Information System (NWIS).** The project supported the establishment of the country’s first NWIS, which was developed based on the principles outlined in the WIS concept paper. While project activities started late in the project (with a WIS team set up at MEWR in May 2018), the WIS hardware and software for the MEWR, ALRI, and RBOs were installed, fully tested, and functioning at the national level and in the Kofarnihon basin at project completion. The WIS includes three online applications on water accounting, basin planning and an Irrigation Management Information System (IMIS). The IMIS receives real-time data on flow and volume of irrigation water from 49 automated water sensors, which were installed at the main intake canals on the boundaries of the ALRI and WUAs in the Lower Kofarnihon basin. This information is used by the ALRI and WUAs to measure the actual water supply and for volumetric irrigation water pricing as well as to establish the water use plan for the next irrigation season. The NWIS is currently hosted at the MEWR with the ALRI, RBOs, and WUAs connected to the respective data applications. The NWIS website (<http://wis.tj>) was established to allow data sharing between sector stakeholders.

46. **Kofarnihon river basin management.** At the basin level, the project supported the preparation of the first River Basin Management Plan (RBMP) for the Kofarnihon basin. The RBMP was approved by the MEWR in 2019, fully achieving the target pre- and post-AF. As stated during the ICR mission by the MEWR and development partners, the Kofarnihon RBMP is the country’s first RBMP, which was developed based on the Drivers-Pressures-State Impact-Response²⁶ Framework and is seen as best practice for the development of future RBMP’s in the country. The program of measures for the first cycle of the RBMP (2020–2025) includes 49 measures with an estimated total cost of about US\$28.4 million.

²⁵ The amended Water Code was approved by the GoT on April 2, 2020. It built on the existing Water Code of the Republic of Tajikistan, which was adopted by the Parliament in 2000 and amended in 2006, 2008, 2009, and 2012. The amended Water Users Association Law was endorsed by the Parliament on January 3, 2020 and built on the existing ‘Water Users Association’ Law, which was adopted in 2006.

²⁶ The Drivers-Pressures-State Impact-Response Framework, developed by the European Environmental Agency, provides an overall mechanism for analyzing environmental problems and responses with regard to sustainable development.



A request for financing of the implementation of the RBMP has been sent to the MEWR. In addition, a River Basin Council (RBC) and two RBOs in the Upper and Lower Kofarnihon river basins were established. Staff were trained and equipped to undertake their roles effectively. The RBOs were formally approved by the GoT in early 2020.²⁷

Box 3. Interviews with the Project’s Two Counterparts (MEWR and ALRI) (World Bank, 2020)

“The World Bank’s support allowed us to advance all levels of the water sector reform—infrastructure, institutions, and legislation. It supported our efforts in developing the WUA Law and the new Water Code, which were adopted for implementation in 2020.”

Daler Abdurazoqzoda, Head of the Energy, Water and Sciences Policy Unit, MEWR.

“Reform in the irrigation sector is urgent for us. The old system heavily relied on the Soviet collective farm structure and, when it fell apart, suddenly nobody was responsible for local infrastructure and service delivery.”

Kurbonzoda Abdullo, First Deputy Head of the ALRI.

47. **Establishment and strengthening of operational WUAs.** At the local level, the project provided support to 130 WUAs or 31 percent of all WUAs in Tajikistan against the targets of 95 pre-AF, 135 post-AF, and 125 post-second restructuring. Over the project’s life-span, 20 WUAs were established and 110 were restructured, against the final targets of 28 and 97, respectively. At project completion, 100 percent of the WUAs were registered as legal entities and organized within hydraulic boundaries, servicing 233,080 ha or 58 percent of the country’s total arable irrigated land under WUAs. Extensive training and capacity-building measures were provided to a total of 8,954 staff across the 130 WUAs at varying levels of support, based on their maturity and specific needs. Further support was provided through construction or rehabilitation of association buildings, as well as through procuring equipment and machinery. Performance improvement is evidenced by over 85 percent of WUAs who conduct one annual meeting and 15 percent of WUAs who conduct two or more meetings per year.²⁸ According to the PMU, the WUA membership fee increased from TJS 28 to TJS 62 (or US\$2.72 to US\$6.02) between 2014 and 2019. The membership collection rate also increased from 21 percent to 56 percent in the same period. Additionally, the irrigation water supply collection rate increased from 43 percent to 76 percent. The financial situation of WUAs in all project districts on average has improved. However, most WUAs have not yet achieved financial stability. On average, WUAs cover about 50–60 percent of their O&M costs in 2019.

48. **WUA members.** The number of registered WUA members increased from 17,000 at baseline in 2015 to 45,163²⁹ at project completion, significantly exceeding the targets of 22,000 post-AF and 45,000 post-second restructuring. 15 percent of all WUA members are female, compared to the final target of 10 percent. Overall improvement in I&D services is evidenced by over 80 percent of WUA members who reported on the timely and correct volumetric water delivery, accurate water measurement, and improved conflict management between farmers, WUAs, and irrigation service provider. Furthermore, over 65 percent reported on improved infrastructure maintenance and collection of irrigation water fees at project completion.³⁰

²⁷ The GoT decided to formally establish and finance RBOs by the adoption of Decree No. 197 dated March 30, 2020.

²⁸ Borrower’s ICR PAMP II. 2020. Impact Assessment. During the end line survey in 2019, 40 out of 130 WUAs supported under the project were interviewed.

²⁹ The final ISR reports on a number of 40,965 registered WUA members. According to the PMU, the end reporting included, for the first time, the data from the billing system, which reports on both registered WUA members and water users who have a contract with the WUA.

³⁰ Borrower’s ICR PAMP II. 2020. Impact Assessment. As part of the end line survey, 320 WUA members across 40 WUAs (supported by the project) were interviewed.

Box 4. Interviews with Beneficiaries during Implementation Support Missions (World Bank, 2020)

“In the past, irrigation services were not systematized. In 2012, when we established our WUA, the farmers did not understand our role. They assumed that we were just collecting fees for the irrigation agency and issuing invoices to the farmers. Now our role is essential—we sit down with farmers and plan how much water they will need and when. Then, this information is stipulated in an agreement, which we deliver upon.”

Abdumalik Abbosov, Head of WUA, Shaartuz district.

“The WUA was provided with equipment, such as excavators. It cleaned the drains and the groundwater went down, and land productivity increased. After the first harvest of wheat, we planted carrots, turnips, radish. The harvest is as good as it can get.”

Ibodullo Norakov, beneficiary and farm owner.

“Together with the WUA, each farmer decides on the schedule and the volume of water needed for their land. Each farmer has a time slot, for example. I need more days, as I have 10 hectares of land to irrigate. We are thankful to the WUA, as it solves the disputes that existed among farmers and we can now discuss issues and come to an agreement. As a result, our yield increased, and we made a good income in 2019.”

Zulfiya Ishmirzoeva, beneficiary and farmer owner.

49. **Rating.** Given the significant achievements of the PDO and intermediate results indicators as discussed above, the achievement of PDO 3 is rated High pre-AF and post-AF.

Outcome 4. Improve food availability and food access for low-income people in poor rural areas supported by the project (pre-AF)

50. **Food availability.** According to the borrower’s impact assessment, it can be observed that households in the project districts purchased less food products and consumed more from their household production than in non-project districts at project completion. The amount of purchased food in both project and non-project districts decreased by 9-10 percent, while food consumed from household production slightly increased by one percent in project areas and decreased by 13 percent in non-project areas. This might be attributable to the fact that households had better access to irrigation in the project areas to produce more crops for consumption, while non-project areas had to rely more on stocks to compensate for the reduction in food purchases. These trends were taking place against the background of increasing prices of food (reportedly up by 33 percent in both project and non-project areas from 2013 to 2019 after adjusting for inflation). The household survey shows that the price of food in project areas increased at a slower pace than in non-project areas, while the cost of food is increasing comparably.³¹

51. **Food access.** The public works program provided temporary employment to 30,005 food-insecure people in the project area. This temporary income also benefited the families of the beneficiaries as extra income for the household. With the average household in project districts having eight individuals, this cumulatively affected approximately 240,000 household members. Overall, public works participants earned US\$5.9 million in wages over the project’s life-span. There is anecdotal evidence that the program did improve food access, since 88 percent (or 563 out of 640) interviewed beneficiaries stated that they spent this additional income on food.

52. **Rating.** The GAFSP indicators (income of direct beneficiaries, and minimum level of dietary energy) were measured during the baseline survey in 2013. However, as data collection experienced difficulties during project

³¹ Borrower’s ICR PAMP II. 2020. Impact Assessment. The household survey conducted in 2013 (baseline survey) included a sample size of 660 households in project districts (not covering all origin project districts) and 345 households in non-project districts. The household survey conducted in 2019 (as part of the end line survey) included a sample size of 968 households in all 17 project districts and 345 households in non-project districts.

implementation, the tracking of these indicators was not continued. There is anecdotal evidence that the project contributed to improved food security. Therefore, the achievement of PDO 4 is rated as Modest.

Justification of Overall Efficacy Rating

53. Given the achievements of the PDO outcomes as rated above, the overall efficacy is rated as Substantial pre- and post-AF. The project provided (temporary) employment through the implementation of the public works program and presumably contributed to the observed increase in crop production and yield through the rehabilitation of I&D infrastructure. The project fully supported the development of improved policies and institutions for water resource management, and strengthened the capacity of Tajikistan to introduce IWRM. While project-level indicators were not monitored, there is anecdotal evidence that it also improved food availability and food access for low-income people.

C. EFFICIENCY

Assessment of Efficiency and Rating

54. The expected project benefits included a yield increase of 10 percent for major crops on a total rehabilitated area of 260,000 ha (at AF) and 236,600 ha (at second restructuring), temporary employment of 32,000 (at AF) and 29,950 (at second restructuring) low-income people, and an improved capacity to manage water delivery for irrigation. At completion, the total rehabilitated area exceeded the planned area, more than 12,000 ha of previously unused land was brought back into production relative to the estimate of 2,000 ha, and crop yields for cereals and vegetables increased by more than 15 percent. Improved irrigation also facilitated reallocation of land from low returning wheat and cotton crops to other high returning vegetable crops. Some 30,005 low-income people were employed, and a high proportion of WUA members reported improvements in the O&M of I&D infrastructure and collection of water use fees.

55. The main results of the economic analyses for the original project, the AF, and project completion are summarized in table 4 and further discussed in annex 4. The lower economic net present value (ENPV) and higher economic internal rate of return (EIRR) estimated for project completion reflect the impact of actual patterns of investment and returns, which differed from the original assumptions. These differences reduced the ENPV and increased the EIRR.

Table 4. Economic Analysis Assumptions and Results

	Original Project ^a	AF ^a	Project Completion ^b
Area rehabilitated (ha)	190,000	236,600 ^d	251,433
Net increase in crop yields ^c (%)	10	10	> 10
ENPV (economic prices) (US\$, millions)	30.2	27.2	21.9
EIRR (economic prices) (%)	26.1	27.0	41.5
Benefit-cost ratio	5.82	7.14	2.83
Incremental benefits/ha (US\$)	158	110	87
Investment life (years)	12	12	12
Discount rate (%)	12	12	12

Note: a. Projected; b. Actual; c. Wheat, all cereals, all vegetables, and fodder; d. After removal of Bokhtar district.

56. Although the differing pattern of investments and returns reduced the project ENPV, the benefit-cost ratio, and the incremental return per ha relative to projected returns, the investment outcome was still highly positive, with an ENPV of US\$21.98 million and an EIRR of 41.5 percent. Sensitivity analysis also shows that the project outcomes are robust. A 20 percent reduction in yields reduces the ENPV to US\$11.31 million, a 20 percent reduction in output prices reduces the ENPV to US\$8.19 million and a 20 percent increase in input prices reduces the ENPV to US\$19.07 million.

57. Project implementation was broadly efficient, with no delays in implementation, full disbursement, and no cost overruns. The AF and restructuring in 2015 extended the project for two years to accommodate the addition of six new districts and not due to any delays in project implementation. Disbursement was below target during the first two years (2013–2014) of implementation but then recovered and remained on schedule for the remainder of the project. Actual project implementation costs amounted to 5.1 percent of total expenditure, which is acceptable for this type of project.

58. **Rating.** Project efficiency is rated as High in that the project achieved its targets, generated an acceptable return to investment, and was completed on time with no cost overruns and full disbursement. The economic analysis generated a benefit-cost ratio of 2.83 and sensitivity analysis showed that the economic return was robust to adverse changes in yields, crop output prices, and crop input prices. These outcomes were consistent with sector expectations.

D. JUSTIFICATION OF OVERALL OUTCOME RATING

59. Based on the High rating of the Relevance of Objectives, the Substantial achievement of the PDOs, and the High Efficiency rating, the overall outcome of the project is rated as Satisfactory.

Table 5. Split Evaluation

		Before AF and Restructuring	After AF and Restructuring
Relevance of PDOs		High	
Efficacy		Substantial	Substantial
	PDO1	High	Substantial
	PDO2	Substantial	Substantial
	PDO3	High	High
	PDO4	Modest	—
Efficiency		High	
1	Outcome ratings	Satisfactory	Satisfactory
2	Numerical value of outcome ratings	5	5
3	Disbursement ^a (US\$, millions)	13.77	42.62
4	Share of disbursements (%)	24	76
5	Weighted value of outcome ratings	1.2	3.8
6	Final Outcome rating	Satisfactory (1.2 + 3.8 = 5.0)	

Note: a. Disbursement figures (at the time of AF and project completion) as reported by the PMU in August 2020.

E. OTHER OUTCOMES AND IMPACTS

Gender

60. **The project facilitated female participation in a mostly male-dominated and often informal employment sector.** Based on the lessons learned under PAMP, the project enhanced women’s participation in the public works program by identifying tasks that were deemed more acceptable for women. This included the allocation of less demanding work sections to women at the same pay rate as men and allowing women to work in groups separate from men. Moreover, family groups (men and women) were allowed to work in close surrounding areas, which increased the flexibility of working hours for women. The project also assisted women in obtaining valid identity cards to participate in formal employment. As a result, the participation of women increased from 11 percent under PAMP to 25 percent in PAMP II. In total, 21 percent of households engaged in the public works were female-headed households.

Poverty Reduction and Shared Prosperity

61. **The project effectively targeted the most food-insecure individuals and households to reduce poverty in the project area.** In cooperation with the Ministry of Labor and Migration (MoLM), the project designed a methodology to identify and select the most vulnerable individuals and households and involve them in the works program. Participants not only received temporary additional income but also benefited from mid- and long-term social benefits. This included the project-facilitated official personal registration and documentation processes that then gave them access to mainstream public and social assistance programs, as well as project-effected future pension employer contributions to the social fund. The PMU and the MoLM collected the lessons learned from the program and prepared a manual, which can be used for future donor-funded projects and government programs. While the poverty situation in Tajikistan remains challenging, the project set a step toward poverty reduction and shared prosperity in the project districts.³²

Other Unintended Outcomes and Impacts

62. **The project contributed to increased transparency, accountability, and trust between stakeholders.** PAMP II supported the development and introduction of the country's first cashless billing system.³³ This enabled farmers to make direct payments of membership fees and irrigation water service fees, based on regular measurement of actual volume of water received, into the accounts of servicing WUAs and the ALRI. ICR interviews with WUAs and farmers revealed that the use of the cashless billing system allowed tracking of the payment flow and thus curbed corruption. This resulted in increased transparency, accountability, and, ultimately, improved levels of trust between stakeholders. The benefits of the cashless payment system have also been recognized by the ALRI at the national level, which is planning to roll out the system to the Upper Kofarnihon basin and then throughout the country, as revealed during the ICR mission.

III. KEY FACTORS THAT AFFECTED IMPLEMENTATION AND OUTCOME

A. KEY FACTORS DURING PREPARATION

63. **The objectives of PAMP II were well selected and highly relevant to tackle food insecurity and water sector reform.** PAMP II built on previous and ongoing World Bank support in the sector and the GoT's willingness for policy changes. The objectives were aligned with the Government's development and poverty reduction strategies and were supported by GAFSP and the World Bank's CPS (FY11–FY-13). PAMP II effectively capitalized on the previous work completed by the development partners and ongoing initiatives in the country.³⁴ The project built on the foundational work conducted under PAMP, which contributed to the nascent reform of water management policy by working with the GoT and MAWRM to delineate the principal river basins and draft a new institutional framework for IWRM.

64. **The project design was both logical and structured while managing to augment the successful approaches initiated under PAMP.** The project components had well-aligned objectives and clearly delineated the physical works and the institutional capacity initiatives to achieve the desired outcomes. The selection of the project districts was based on

³² It should be noted that despite reported economic growth in Tajikistan during the project (2013–2019), particularly in the agricultural sector, formal wage-based employment for the rural population remains limited. The number of people employed in the agriculture sector decreased by 5.3 percent of the employed population. Overall, there were approximately 467,000 people officially unemployed (5 percent of the total population) in Tajikistan, as of June 2019. (TAJSTAT. Employment by sector of economy, 1985–2018; Borrower's ICR PAMP II. 2020. Impact Assessment).

³³ The cashless billing system was introduced at the regional ALRI office and all 26 WUAs in the Lower Kofarnihon basin in April 2019. According to the PMU, a total number of 28,986 water users are registered with the billing system as of June 1, 2020.

³⁴ This included work undertaken by the United States Agency for International Development on WUA development, the World Bank on the Ferghana Valley Water Resources Management Project (FVWRMP), PAMP, and other donor initiatives. The main development partners during project design included the Swiss Agency for Development and Cooperation, Asian Development Bank, European Union, and Islamic Development Bank.



sound criteria such as the basis of their level of food insecurity, area under irrigation, agricultural potential, and progress with land reform. On the other hand, the selection of rehabilitation works was based on simple criteria of system deficiencies, which meant that detailed economic assessments were not conducted. However, this approach was appropriate given the urgent need for improving the irrigation infrastructure. The selection of the Kofarnihon basin for the IWRM pilot was aligned with development partners and benefited from experiences and lessons learned from earlier initiatives in other basins. In hindsight, an agricultural component for on-farm support, as recommended under PAMP, could have been considered to consolidate the second objective of agricultural increase.

65. **All levels of key stakeholders and beneficiaries were identified to build trust between them in the sector.** This was achieved through geographical extension and application of previous processes under PAMP. The project successfully addressed the importance of participatory water management for sustainable O&M and set a strong focus on WUA as a key community-level implementation entity. This is in line with internationally accepted good practices. PAMP II continued the good relationship with the MAWRM as the project's main governmental counterpart while accelerating the GoT's willingness and vested interest in the reform. The implementation arrangements followed those from the original project. The selected PMU had experience in implementing World Bank projects, including the original PAMP and the FVWRMP, which largely facilitated project preparation and implementation.

66. **The overall risk rating for the project was adequately assessed as Moderate.** Substantial risk ratings were adequately attributed to stakeholders and the capacity of the implementing agency. In detail, it was ambiguous whether the stakeholders would support a common approach to water sector reform because of conflicting views and interests. The plan to mitigate these risks consisted of close cooperation with the MARWM (and its successor) and donors in supporting the GoT. Additionally, capacity building and training of the PMU (in procurement, FM, M&E, and project administration) positively contributed to strengthen the PMU's ability to deliver the project.

B. KEY FACTORS DURING IMPLEMENTATION

67. **The commitment and leadership of the GoT remained strong upon the project's completion, as reflected by the approval of revised key water legislations.** A first major step toward the water sector reform was made by the GoT's decision to set up a different ministerial structure in 2014. The move to separate the water policy arm from the water delivery agency was a great achievement under the institutional reform. In the longer term, this had a lasting positive impact on the sector, though in the short term it led to implementation delays as several water sub-agencies were dissolved and responsibilities reshuffled.

68. **The national water reform elements progressed well but experienced delays as legal frameworks and funding commitments were completed toward project completion.** For instance, financing of the RBOs was planned to start in 2018. The project significantly supported the RBOs and RBC, but their vague status and missing budget allocation led to undefined roles and responsibilities during implementation. Moreover, the PMU and World Bank observed tensions between newly established WUAs and local district authorities with respect to legal, tax, and financial aspects. The PMU and the World Bank proactively coordinated between donors and supported the MEWR and different agencies in the reform process. However, the project's institutional component was rated 'Moderately Unsatisfactory' in the final months before completion because of the delayed approval of the new Water Code and Government Resolutions. This was also related to the fact that establishing the NWIS was hindered by consensus among agencies. Moreover, the MEWR decided on a centralized approach to operate and maintain the NWIS at the final stage of project completion.



69. **The complex budgetary structure of the original project markedly hindered project implementation planning and budgeting and resulted in a restructuring in 2018.** The financing instruments included IDA and GAFSP grants, which were set up in two different currencies and several expenditure categories, all of which were specified in the Financing Agreements. The cumbersome financing structure and adverse exchange rates accumulated in losses for the project³⁵ and hampered disbursements. Moreover, transactions made through TojikSodirotbank (TSB) affected the availability of funds because of bank restrictions. Although the majority of funds were recovered, a balance of US\$73,258 remained frozen. While the GoT, represented by the Ministry of Finance (MoF), and the World Bank were collaborating to resolve this issue, full cost recovery could not be achieved before the disbursement deadline of June 30, 2020.

70. **The World Bank's team was flexible in accommodating the GoT's request for emergency support and some non-core interventions in the wake of floods and mudflows throughout the country in 2015.** The project was restructured to respond to disastrous floods that impaired critical infrastructure. PAMP II offered a readily available vehicle for financing the restoration of flood control works in Khatlon and the rehabilitation of existing irrigation schemes in GBAO. As part of the restructuring, the World Bank, together with the PMU, rapidly analyzed the efficiency of the project and dropped the lowest performing district to release funding.

71. **The slowdown in the neighboring Russian economy necessitated the GoT to request additional financing.** Remittance inflows to Tajikistan reduced in 2015 and there was also a need to create adequate employment for returning immigrants. Although the World Bank team encouraged the GoT to facilitate early signing, effectiveness of the AF was delayed by six months, causing later disbursements for public and mechanized works.

IV. BANK PERFORMANCE, COMPLIANCE ISSUES, AND RISK TO DEVELOPMENT OUTCOME

A. QUALITY OF MONITORING AND EVALUATION (M&E)

M&E Design

72. At design, the M&E design had some shortcomings. First, the PDO statement was complex in that it included an outcome 'as a means to improve food availability and food access' which was not clearly linked to activities or components and rather articulated a higher-level objective beyond the purview of the project. Second, the assessment of the PDOs to 'increase crop production' and 'improve food availability and food access' was based on complex indicators and was attributed exclusively to project activities. The M&E adequately included a baseline, midterm, and end line survey to assess the project's contribution to crop production and food security but relied on limited in-country capacity to conduct these surveys. In general, the PDO indicators and intermediate indicators were adequate though broadly formulated. The baseline values for most indicators were zero and the target values were realistically estimated based on the experience of the original PAMP. Later, the PDO statement was improved with the 2015 AF and restructuring by omitting 'food availability and access' and related indicators and formally recognizing it as a higher-level objective. However, the attribution problem of the 'yield' indicator was still not correctly identified and continued to be used as the main indicator for assessing the revised PDO outcome to 'increase yields'.

M&E Implementation

73. During early project implementation, there were weaknesses in the M&E arrangement because of significant delays in the installation of the Project Management and Monitoring Information System (PMMIS), low capacity of M&E staff, and unsatisfactory reporting. After two years, these shortcomings were largely resolved. The data flows from the

³⁵ Estimated exchange rate losses at project closure are US\$1,437,621 (Source: World Bank Client Connection, August 6, 2020).



Project Coordination Unit (PCU) and NGOs to the PMU improved, and the PMMIS database was updated regularly. Progress reports were not always timely and consistent but served well as a basis for project review during implementation support missions. The 2016 midterm review raised concerns about the household survey data to assess the project's impact on crop production and recommended to engage with a third party such as the FAO. Although the PMU started to collaborate with the national statistical agency and WUAs to strengthen its monitoring through data triangulation, the M&E continued to largely rely on the project's end line survey. The results of the end line survey in 2019 were found to be inconclusive. Thus, the outcome evaluation in this ICR is largely based on data from the national statistical agency, whereas the results of a robust household survey could have provided a more comprehensive picture of the impact of the project interventions. The project closed with a 'Moderately Satisfactory' rating due to the observed deficiencies of M&E arrangements in data collection for the outcome indicator.

M&E Utilization

74. It is assumed that project management and decision-making were guided more by the economic and technical aspects of the project rather than the M&E tools. For example, the PDO indicator to measure the number of direct beneficiaries of flood protection works was never included in the RF of the progress reports. The M&E data on agricultural production were only included for two out of seven years RF and presumably not used to inform about the project's progress at the farmer household level. Nevertheless, the M&E arrangement under the project was used to establish a large database on several important project aspects and includes significant amounts of data, for instance, on the public works program, the performance of WUAs, and so on, which will, if maintained, considerably inform and support future project preparation or implementation.

Justification of Overall Rating of Quality of M&E

75. Due to abovementioned shortcomings during project design and implementation, and limited utilization of M&E tools, the quality of M&E is rated as Modest.

B. ENVIRONMENTAL, SOCIAL, AND FIDUCIARY COMPLIANCE

76. **Environmental and social safeguards.** The project was implemented in compliance with the World Bank's policies as well as with national environmental, occupation health, and labor safety requirements and Tajikistan's child labor law. The two safeguards Environmental Assessment (OP/BP 4.01) and Projects on International Waterways (OP/BP 7.50)³⁶ were triggered under the project although no direct or indirect potential large-scale, significant, and/or irreversible negative impacts were likely under the project. The project was assigned Category B, Partial assessment. A Generic Environmental Management Plan, which was prepared for PAMP, was updated and applied as the I&D rehabilitation activities were similar to the original project. Site-specific Environmental Management Plans were prepared, publicly disclosed, and consulted in the participating districts. Principal environmental clauses were appended to works contracts for contractors, while their implementation was monitored by the PMU and PCU staff.

77. Manual and mechanical excavation works were carried out only along existing canals and drains in already developed irrigated agriculture areas and mostly during the off-season. Detrimental environmental impacts were insignificant, short-term, and localized, such as noise, dust, water pollution, and vegetation degradation during the execution of the works. Improper maintenance practices were observed by the World Bank team and the PMU following

³⁶ OP/BP 7.50 was triggered at project appraisal and the subsequent AF and restructuring in 2015 as the project area covered irrigation networks which drew water from the tributaries of the Amu Darya River through Tajikistan's territory and then back into the river into the Aral Sea. An exception to the notification requirement under paragraph 7(a) of OP/BP 7.50 was granted by the Europe and Central Asia Regional Vice President with the Office Memorandum on October 2, 2012, during the project appraisal, and on May 15, 2015, for the AF and restructuring in 2015, respectively.



the works along the cleaned irrigation channels and the Tebalai flood canal. These issues were discussed with the local and district level authorities and mitigated by providing recommendations to strengthen preventive maintenance work.

78. A grievance redress mechanism was introduced with the AF and restructuring in 2015 to allow public works participants to provide anonymous feedback and record grievances on the program. A total of 1,034 grievances were recorded over the project's life-span. The main grievances concerned delays in payments (45 percent), and the calculation of soil volume excavated by participant (36 percent). Around 96 percent of beneficiaries' grievances were responded to within the stipulated service standards for response, exceeding the final target of 95 percent.

79. **Financial Management (FM).** Throughout project implementation, the FM arrangements were generally satisfactory and overall acceptable to the World Bank. During early implementation, the FM was rated 'Moderately Unsatisfactory' due to significant delays in the implementation of the PMMIS and the related 1C accounting software. From 2014, the FM improved. Over time it evolved as the main source of information for project planning and budgeting activities. It also enabled to track cash flows and generate reliable financial reports. Some challenges that were encountered and addressed during implementation support missions included an outdated register of fixed assets, delays in the preparation of disbursements plans, and irregular updating of the 1C accounting software. In general, the PMU had acceptable budgeting and planning capacity. The quarterly interim financial reports under the project were issued on time and found to be satisfactory by the World Bank. Annual audits of project financial statements were carried out on time by private auditors deemed acceptable by the World Bank. The auditor on the audit for CY2015 issued qualified opinion on the project financial statements due to the incorrect calculation of tax on income of nonresident organizations contracted under the project. The issue was raised with the tax committee and a tax refund was awarded to the project budget. From 2017, the project rating remained 'Moderately Satisfactory' until project closure mainly because of unresolved issues of blocked funds at Tojiksodirotbank.

80. **Procurement.** Procurement under the project complied with the provisions of the Financing Agreement and was found to be generally satisfactory by the World Bank. From the beginning of the project, the procurement performance was rated 'Moderately Satisfactory' mainly because of the initial low capacity of PMU procurement staff. After two years, the performance improved as a result of continuous capacity building provided by the World Bank team to the PMU and was rated 'Satisfactory'. Only minor shortcomings such as on contract management, advertisement and disclosure arrangements, and bidding processes remained. In 2018, the procurement rating was downgraded and remained 'Moderately Satisfactory' until project closure. Significant shortcomings such as substandard quality of bidding documents and weak procurement planning and processing capacity in the PMU were identified during implementation support missions. This was explained due to the increase in the procurement prior review thresholds which resulted in shifting more responsibility to the PMU while on the other hand the capacity of the staff remaining limited. Another reason was the expansion of procurement activities due to the addition of two new projects under the responsibility of the PMU. At project closure, the abovementioned problems were resolved, and all signed contracts were successfully completed.

81. **Governance and anti-corruption.** The project was implemented in accordance with the Country-level Governance and Anti-corruption Strategy and the World Bank's Guidelines on Preventing and Combating Fraud and Corruption. In general, mitigation measures were successfully put in place. This included strong public awareness programs, transparent selection procedures, detailed procurement procedures, effective record keeping of labor payments, and close oversight by independent local NGOs. Over the project's life-span, one misconduct was reported to the World Bank Group Integrity Vice Presidency, which was resolved within the project period.



C. BANK PERFORMANCE

Quality at Entry

82. The project design was well aligned with relevant GoT and World Bank strategies and reflected the strategic country context and sector challenges at the time of appraisal. The approach appropriately incorporated institutional reforms that were ‘top-down’ measures combined with ‘bottom-up’ measures at the community and water service provider levels to facilitate the achievement of the PDOs. The World Bank team involved several international experts in the design of the project. This included a senior I&D expert to identify and review infrastructure works together with the MAWRM and similarly, an international IWRM specialist who worked with senior policy makers to design the project’s contribution to policy and institutional reform. The team reflected well on the lessons learned from previous projects and risks were largely adequately identified and mitigated. A focus was set on the PMU’s capacity to undertake fiduciary function of the project, with an FM assessment and a procurement risk assessment prepared before project appraisal. Given the shortcomings in the M&E design, increasing support with international expertise may have proved to be useful.

Quality of Supervision

83. The World Bank team provided regular implementation support on the project. Over the course of the project, 11 implementation support missions were carried out. The team strengthened its implementation support by contracting international experts on various technical and institutional aspects who frequently joined implementation support missions and conducted additional technical visits to provide advice to both the team and the PMU when issues were encountered. The team also secured grant financing to strengthen project activities. This included a grant from the World Bank-managed ‘Central Asia Energy and Water Development Program’ trust fund to support the MEWR and ALRI in developing the structure and design of the NWIS. In addition, the World Bank team organized several study tours with both project and non-project stakeholders such as the Committee for Environmental Protection to learn from international best practices and strengthen collaboration between the sector stakeholders. The project certainly benefited from the fact that the task team leader was continuously based in the country and only one change in the task team leader took place during the project,³⁷ which provided the opportunity to quickly respond to challenges on-site. The team was both proactive and supportive to the GoT’s requests to upscale and restructure the project while the country was facing further economic uncertainty and emergency flood event.

Justification of Overall Rating of Bank Performance

84. The World Bank performance is rated as Satisfactory given the solid project design, close supervision, proactivity in project restructuring, and the efforts to bring international expertise into the project over the life of the operation.

D. RISK TO DEVELOPMENT OUTCOME

85. **Legislation.** PAMP II has made a considerable contribution to the water sector reform and to the first steps in the introduction of an IWRM approach in Tajikistan. Over the past months with the approval of the revised Water Code and the WUA Law, the sustainability of PAMP II interventions have been anchored on the legislative level. As the next step, several bylaws will need to be developed to strengthen water policies and institutions at the local and community level.

86. **Institutions.** At the basin level, RBOs have been established and equipped to carry out their role accordingly. Now that the GoT has formally recognized RBOs in Tajikistan and committed to temporarily finance them through the state budget, the existence of the RBOs established under PAMP II is secured in the short to medium term. At the local level,

³⁷ The change in the task team leadership was made during the handover mission in June 1–15, 2019.



WUAs were considerably strengthened at the technical and administrative levels. Although many WUAs are not yet able to cover their O&M costs, a positive development in terms of increasing membership collection rate can be observed. Since 2020, the World Bank is providing technical assistance to the MEWR and ALRI to develop a WUA development concept and support group to further strengthen WUAs at the national level, which will positively contribute to the development and sustainability of PAMP II interventions. However, it is still early in the process of defining clear roles and interactions between the various institutions in the water sector in relation to water planning and permitting, water allocation, monitoring, and reporting. Further efforts are required to strengthen water institutions in their roles and responsibilities and achieve long-term technical and financial stability under the ongoing institutional reform process.

87. **Infrastructure rehabilitation and O&M.** All infrastructure rehabilitation works were successfully completed and are operated and maintained by the ALRI and WUAs accordingly. The risk of inadequate O&M of the large-scale I&D infrastructure is low. However, there is a risk that on-farm irrigation channels will silt up again, as a clear allocation of responsibilities has not yet taken place, and this could jeopardize sustainability of the project interventions. The infrastructure investments that have accompanied the reform efforts have so far focused on rehabilitation rather than a more comprehensive modernization of the irrigation sector. In the coming years, a carefully detailed analysis will be required to guide investments that reduce the energy footprint of irrigation and enhance the climate resilience of the sector to bring greater economic benefits to Tajikistan.

88. **Employment generation.** The project has achieved its short-term objective and provided temporary jobs for more than 30,000 food-insecure people in the poorest region of Tajikistan. However, the growing population, declining employment in agriculture, increasing return migration, and rising food prices create a difficult environment for the rural population of Tajikistan; therefore, a project such as PAMP II and the continued support to the GoT remain essential. Further development of the agricultural sector, including private sector engagement, and a strong social safety net are indispensable to create long-term employment opportunities and food security, especially for the rural poor in Tajikistan.

89. **Coordination and continuation.** The GoT remains committed to advancing the ongoing water sector reform. These reform efforts are taking place in several river basins in Tajikistan and are supported by various donors. There is a need for continued coordination of these efforts, mutual learning, and ongoing capacity development. The ongoing World Bank-financed Tajikistan Zarafshon Irrigation Rehabilitation and Management Improvement Project (P158576) as well as a proposed new irrigation modernization and water resources reform project in Tajikistan will provide the opportunity to consolidate and follow up on the important results achieved under PAMP II.

V. LESSONS AND RECOMMENDATIONS

90. **The public works program proved successful in counteracting periods of high unemployment and negative effects of economic shocks.** Based on the lessons learned under the origin project, PAMP II allowed sufficient preparation time and allocated adequate resources for the implementation of the works program. Selection criteria were improved to better engage targeted beneficiaries, especially women, and implementation was strengthened by frequent site supervision through local NGOs. For potential future programs, the PAMP II concept can be usefully replicated in Tajikistan and in other regions. Key factors for success include: (a) correctly identifying the target population of workers; (b) setting the right wage level to attract the target beneficiaries without distorting local labor markets or displacing normal labor; and (c) working with local counterparts and the communities to ensure efficient and transparent implementation. The public works program, although powerful, cannot serve as a social safety net, as some groups may be excluded from benefitting from such programs (for example, persons with disabilities or unable to take part in heavy labor).

91. **Irrigation rehabilitation interventions should be clearly linked to agricultural on-farm support and improvement of the food value chain.** Under PAMP II, beneficiaries of the public works program were able to use the additional income to buy land and start farming. Farmers were able to buy high-quality seeds and, in conjunction with improved irrigation water supply, changed their cropping pattern and shifted to higher value crops. At project completion, however, there was a clear signal from WUAs that farmers would lack the knowledge to use irrigation water efficiently and to switch to better farming methods. To this end, it is recommended that the next irrigation project in Tajikistan should include a project component or technical assistance to provide on-farm support to farmers with the aim of increasing agricultural production. If applicable, this support should also extend to improving the value chain and providing a linkage to markets.

92. **Due to other contributory factors, care needs to be taken with attribution of increases in crop yields to project interventions.** Crop yields are a typical example used as an outcome indicator for many rural development projects. However, attributing yield increase to improved access to irrigation only does not provide a clear picture because of several external factors, among those, primarily climate and the availability of funds to purchase high-quality seeds, fertilizers, and other essential agricultural inputs. As experienced in PAMP II, this measurement problem can be compounded by practical problems that are typically most severe in low-capacity regions. Recording of crop yields, for example, will require a (household) survey that takes either physical samples or relies on farmer estimates. Both approaches will be subject to sampling and other errors that can only be reduced through intensive training and supervision of enumerators, activities that are costly and time consuming. Therefore, it is recommended not to include yield as an outcome indicator, unless supported by a robust impact evaluation, but to define measurable indicators that clearly attribute a change, or effect, to project activities.

93. **More flexible design and implementation approaches should be considered to enable better responsiveness in emergency situations.** As experienced in this project, flood-related damages and emergencies are not uncommon in Tajikistan and can readily disrupt similar rural development projects. Therefore, it is prudent to identify specific budgetary provisions at project preparation to allow rapid response and timely mitigation interventions when flood events occur. For the next similar project in Tajikistan, a Contingency Emergency Response Component could be considered in the project design, which would be triggered to allow for quick disbursements following the declaration of a flood emergency.

94. **The ownership and strong commitment of the client and a long-term cooperation between all project partners is paramount for the successful implementation of an ambitious water sector reform.** Building on the origin project in 2011 and the first steps in the introduction of an IWRM approach, PAMP II supported the GoT to formulate a common vision for the transition to a basin-based management approach and to successfully implement first pilots. During the reform process, setbacks and disagreements between stakeholders were encountered. Nevertheless, driven by the strong interest of the GoT, the long-standing support of the World Bank and the effective coordination of project interventions with other development partners, significant progress in the water sector reform has been achieved over the last decade. In this respect, the project demonstrated that long-term support and perseverance of all project partners, both in Tajikistan as well as in other countries undergoing a water sector reform, is and will continue to be crucial, to advance socially equitable, environmentally sustainable and economically efficient management of water resources at all levels.



ANNEX 1. RESULTS FRAMEWORK AND KEY OUTPUTS

A. RESULTS INDICATORS

A.1 PDO Indicators

Objective/Outcome: Provide access to temporary employment to food-insecure people (post-AF)

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Number of person.days worked by participants of public works program	Number	0.00 18-Dec-2013	880000.00 28-Feb-2018	1146000.00 06-Nov-2015	1062927.00 28-Feb-2020
of which female beneficiaries	Number	0.00 18-Dec-2013	132000.00 28-Feb-2018	171900.00	253561.00 28-Feb-2020
of which severely food insecure beneficiaries	Number	0.00 18-Dec-2013	176000.00 28-Feb-2018	229200.00	211517.00 28-Feb-2020

Comments (achievements against targets):

Number of person.days worked by participants of public works program: 93% of target achieved (of which female beneficiaries: 148% of target achieved; of which severely food-insecure beneficiaries: 92% of target achieved).



Objective/Outcome: Increase yields of selected crops (post-AF)

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Increase in wheat and vegetable yield on rehabilitated irrigated land	Percentage	0.00	10.00		15.00
		18-Dec-2013	28-Feb-2018		28-Feb-2020

Comments (achievements against targets):

Target achieved. Final value: >10% increase in wheat and vegetable yield on rehabilitated irrigated land (wheat: 22.3%, vegetables: 15.1%).

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Direct project beneficiaries	Number	0.00	772000.00	1343450.00	1393276.00
		18-Dec-2013	28-Feb-2018	06-Nov-2015	28-Feb-2020
Female beneficiaries	Percentage	0.00	10.00	30.00	48.00
			01-May-2018		

Comments (achievements against targets):

Direct project beneficiaries: 104% of target achieved (of which female beneficiaries: 160% of target achieved).



Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Beneficiaries of Flood Protection Works	Number	0.00	62400.00		62400.00
		18-Oct-2015	28-Feb-2020		28-Feb-2020
<p>Comments (achievements against targets): 100% of target achieved.</p>					

Objective/Outcome: Strengthen the capacity of Tajikistan to introduce integrated water resource management (post-AF)

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
National IWRM strategy prepared and agreed with the MEWR	Yes/No	N	Y		Y
		10-Aug-2012	28-Feb-2018		28-Feb-2020
<p>Comments (achievements against targets): 100% of target achieved.</p>					



Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Kofarnihon River Basin Plan prepared and agreed with the MEWR	Yes/No	N 10-Aug-2012	Y 28-Feb-2018		Y 28-Feb-2020
Comments (achievements against targets): 100% of target achieved.					

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Operational water user associations created and/or strengthened (number)	Number	0.00 18-Dec-2013	95.00 28-Feb-2018	125.00 06-Nov-2015	130.00 28-Feb-2020
WUAs created	Number	0.00 18-Dec-2013	20.00 28-Feb-2018	28.00 06-Nov-2015	20.00 28-Feb-2020
WUAs strengthened	Number	0.00 18-Dec-2013	75.00 28-Feb-2018	97.00 06-Nov-2015	110.00 28-Feb-2020
Comments (achievements against targets):					



Operational water user associations created and/or strengthened: 104 % of target achieved (out of which WUAs created: 71% of target achieved; out of which WUAs strengthened: 113% of target achieved).

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Number of registered WUA Members	Number	17000.00	22000.00	45000.00	45163.00
		18-Mar-2015	28-Feb-2020	06-Nov-2015	28-Feb-2020
Percent Female WUA Members	Percentage	10.00	10.00		15.00

Comments (achievements against targets):

Number of registered WUA Members: 100.4% of target achieved (out of which female WUA Members: 150% of target achieved).

A.2 Intermediate Results Indicators

Component: Public Works and Rehabilitation of Irrigation and Drainage Infrastructure

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Public works beneficiaries	Number	0.00	22000.00	29950.00	30005.00



disaggregated by gender and vulnerable group		18-Dec-2013	28-Feb-2018	06-Nov-2015	28-Feb-2020
Female	Percentage	0.00	20.00		25.00
Severely Food Insecure	Percentage	0.00	15.00		20.00
Comments (achievements against targets): Public works beneficiaries disaggregated by gender and vulnerable group: 100.2% of target achieved (out of which female: 125% of target achieved; out of which severely food-insecure: 133% of target achieved).					

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Length of canals cleaned	Kilometers	0.00 18-Dec-2013	5200.00 28-Feb-2018	7065.00 06-Nov-2015	8571.00 28-Feb-2020
of which manually cleaned	Kilometers	0.00 18-Dec-2013	4850.00 28-Feb-2018	6755.00 06-Nov-2015	8221.00 28-Feb-2020
of which mechanically	Kilometers	0.00	1770.00	310.00	350.00



cleaned		18-Dec-2013	28-Feb-2018	06-Nov-2015	28-Feb-2020
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Comments (achievements against targets):

Length of canals cleaned: 121% of target achieved (out of which manually cleaned: 122% of target achieved; out of which mechanically cleaned: 113% of target achieved).

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Length of drains cleaned	Kilometers	0.00	1300.00	1180.00	1112.00
		18-Dec-2013	28-Feb-2018	06-Nov-2015	28-Feb-2020

Comments (achievements against targets):

94% of target achieved.

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Key hydraulic sections, structures, installations, and equipment rehabilitated or provided	Number	0.00	5800.00	4030.00	5441.00
		18-Dec-2013	28-Feb-2018	06-Nov-2015	28-Feb-2020



Comments (achievements against targets):

135% of target achieved. Number of key hydraulic sections, structures, installations, and equipment rehabilitated or provided: observation wells – 585; vertical drainage wells – 7; sluice and valve gates – 2449 (out of which 30 at water intake / head works); water measuring devices/ structures – 685; hydrants – 1658; pump stations – 16; pipe crossing – 24; aqueduct – 1; water escape – 11; water conveying pipe system – 5.

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Area provided with irrigation and drainage services (ha)	Hectare(Ha)	0.00	190000.00	236600.00	251528.00
		18-Dec-2013	28-Feb-2018	06-Nov-2015	28-Feb-2020
Area provided with irrigation and drainage services - Improved (ha)	Hectare(Ha)	0.00	190000.00	236600.00	251528.00
		18-Dec-2013	28-Feb-2018	06-Nov-2015	28-Feb-2020

Comments (achievements against targets):

106% of target achieved.

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Length of flood channel and flood protection embankments rehabilitated	Kilometers	0.00	6.20		7.22
		16-Jul-2015	28-Feb-2020		28-Feb-2020



Comments (achievements against targets):
116% of target achieved.

Component: Assistance in WRM, including Technical Assistance for Policy and Institutional Reform

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Amendments to Water Legislation drafted	Yes/No	N 10-Aug-2012	Y 28-Feb-2018		Y 28-Feb-2020

Comments (achievements against targets):
100% of target achieved.

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
The Water Information System established	Yes/No	N 10-Aug-2012	Y 28-Feb-2018		Y 28-Feb-2020

Comments (achievements against targets):



100% of target achieved.

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Number of MEWR and ALRI and WUA staff trained in IWRM	Number	0.00 10-Aug-2012	50.00 28-Feb-2018	50.00	316.00 28-Feb-2020

Comments (achievements against targets):
632% of target achieved.

Component: Project Management

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Beneficiary Grievances Responded to within Stipulated Service Standards for Response	Percentage	0.00 01-Jul-2015	95.00 28-Feb-2018		96.00 28-Feb-2020

Comments (achievements against targets):
101% of target achieved.



B. KEY OUTPUTS BY COMPONENT

Objective/Outcome 1: Provide employment to food-insecure people through the rehabilitation of irrigation and drainage infrastructure (pre-AF) Provide access to temporary employment to food-insecure people through the rehabilitation of irrigation and drainage infrastructure (post-AF)	
Outcome Indicators	<ol style="list-style-type: none"> 1. Number of person.days worked by participants of public works program (number) <ul style="list-style-type: none"> - of which female beneficiaries (number) - of which severely food-insecure beneficiaries (number)
Intermediate Results Indicators	<ol style="list-style-type: none"> 1. Public works beneficiaries disaggregated by gender and vulnerable group (number) <ul style="list-style-type: none"> - Female (percentage) - Severely food-insecure (percentage) 2. Area provided with irrigation and drainage services (hectares) <ul style="list-style-type: none"> - Area provided with irrigation and drainage services - Improved (ha) 3. Beneficiary grievances responded to within stipulated service standards for response (included with AF)
Key Outputs by Component (linked to the achievement of the Objective/Outcome 1)	<p>Component 1: Public Works and Rehabilitation of Irrigation and Drainage Infrastructure</p> <ol style="list-style-type: none"> 1. 30,005 of public works beneficiaries <ul style="list-style-type: none"> - 25 % female - 20 % severely food-insecure 2. 251,528 hectares of area provided with irrigation and drainage services <ul style="list-style-type: none"> - 251,528 hectares of area provided with irrigation and drainage services – improved <p>Component 3: Project Management</p> <ol style="list-style-type: none"> 3. 96 % of beneficiary grievances responded to within stipulated service standards of response
Objective/Outcome 2: Increase crop production in response to improved irrigation and drainage infrastructure (pre-AF) Increase yields of selected crops in response to improved irrigation and infrastructure (post-AF)	
Outcome Indicators	<ol style="list-style-type: none"> 1. Direct project beneficiaries (number)



	<ul style="list-style-type: none"> - Female beneficiaries (percentage) 2. Beneficiaries of Flood Protection Works (number) (included with second restructuring) 3a. Increase in cereal, food and fodder crop yield on rehabilitated irrigated land (percentage) (pre-AF) 3b. Increase in wheat and vegetable yield on rehabilitated irrigated land (percentage) (post-AF)
Intermediate Results Indicators	<ul style="list-style-type: none"> 1a. Length of flood channel rehabilitated on the Tebalai river (removed with second restructuring) 1b. Length of flood channel and flood protection embankments rehabilitated (kilometers) (included with second restructuring) 2. Length of canals cleaned (kilometers) <ul style="list-style-type: none"> - of which manually cleaned (kilometers) - of which mechanically cleaned (kilometers) 3. Length of drains cleaned (kilometers) 4. Key hydraulic sections, structures, installations, and equipment rehabilitated or provided (number)
Key Outputs by Component (linked to the achievement of the Objective/Outcome 2)	<p>Component 1: Public Works and Rehabilitation of Irrigation and Drainage Infrastructure</p> <ul style="list-style-type: none"> 1a. No results achieved at the time of the second restructuring 1b. 7.22 km of flood channel and flood protection embankments rehabilitated 2. 8,571 km of canals cleaned <ul style="list-style-type: none"> - 8,221 km cleaned manually - 350 km cleaned mechanically 3. 1,112 km of drains cleaned 4. 5,441 key hydraulic sections, structures, installations, and equipment rehabilitated or provided
<p>Objective/Outcome 3. Support the development of improved policies and institutions for water resource management (pre-AF) Strengthen the capacity of Tajikistan to introduce integrated water resource management (post-AF)</p>	
Outcome Indicators	<ul style="list-style-type: none"> 1. Operational water user associations created and/or strengthened (number) <ul style="list-style-type: none"> - WUAs created (number) - WUAs strengthened (number) 2. Number of registered WUA members (number) (included with AF) <ul style="list-style-type: none"> - Female WUA Members (percentage) (included with AF) 3. National IWRM strategy prepared and agreed with the MEWR (yes/no) 4. Kofarnihon River Basin Plan prepared and agreed with the MEWR (yes/no)



Intermediate Results Indicators	<ol style="list-style-type: none"> 1. The Water Information System established (yes/no) 2. Amendments to Water Legislation drafted (yes/no) 3. Number of MEWR, ALRI, and WUA staff trained in IWRM (number) 4. Water users provided with new/improved I&D services disaggregated by gender (removed with AF) 5. Number of <i>Mirobs</i> established (removed with AF) 6. Number of <i>Mirobs</i> and WUAs staff trained (removed with AF)
Key Outputs by Component (linked to the achievement of the Objective/Outcome 3)	<p>Component 2: Assistance in Water Resources Management, including Technical Assistance for Policy and Institutional Reform</p> <ol style="list-style-type: none"> 1. Yes 2. Yes 3. 316 4. (No results achieved at the time of the AF) 5. (No results achieved at the time of the AF) 6. 45 (WUA) staff trained (at the time of AF)
Objective/Outcome 4. Improve food availability and food access for low-income people in poor rural areas (pre-AF)	
Outcome Indicators	<p>GAFSP core indicators (not included in RF):</p> <ol style="list-style-type: none"> 1. The household income of direct beneficiaries 2. The reduction in the proportion of the target population below the minimum level of dietary energy, disaggregated by gender and vulnerable
Intermediate Results Indicators	Not applicable
Key Outputs by Component (linked to the achievement of the Objective/Outcome 4)	Not applicable (Objective/Outcome 4 dropped with AF)



ANNEX 2. BANK LENDING AND IMPLEMENTATION SUPPORT/SUPERVISION

A. TASK TEAM MEMBERS

Name	Role
Preparation	
Bobojon Yatimov	Senior Rural Development Specialist, Task Team Leader
Adam Shayne	Lead Counsel
Ijsbrand Harko de Jong	Senior Water Resources Specialist
Alexander Rukavishnikov, Dilshod Karimova	Procurement Specialists
Tamir Ibragimoff, Lola Ibragimova	Social Development Specialists
Joseph Paul Formosa	Senior Finance Officer
Niso Bazidova	Financial Management Specialist
Arcadii Capcelea	Environmental Specialist
Farzona Mukhitdinova, Jeren Kabayeva	Operations Analyst(s)
Shodi Nazarov	Financial Management Analyst
Michael Sandoz, Usaid El-Hanbali	Irrigation Specialist(s), Consultants
Garry Christensen	Economist, International Consultant
Svetlana Sharipova	International Social Development Specialist, Consultant
Askar Satybekov	Procurement Specialist, Consultant
Dinara Doishenkul Kzy	Financial Management Specialist, Consultant
Firuz Saidov	Local Social Development Specialist
Jovidon Aliev	Local Economist, Consultant
Murodali Safarov	Rural Livelihoods Specialist, Consultant
Darman Alibaev	Irrigation Specialist, Consultant
Elmira Ibraimova, Rustam Babadjanov	Public Sector Specialists, Consultants
Malika Babadjanova	Local Environment Specialist, Consultant
Rimma Dankova	Water Resource Management Specialist, Consultant



Name	Role
Supervision/ICR	
Bobojon Yatimov, Farzona Mukhitdinova	Task Team Leaders
William Young, Christina Leb, Jeren Kabayeva	Co-Task Team Leaders
Ijsbrand Harko de Jong	Senior Water Resources Specialist
Dilshod Karimova, Rahmoune Essalhi, Farangis Dakhte	Procurement Specialists
Adam Shayne, Natalia Robalino	Counsels
Jasna Mestnik	Finance Officer
Arcadii Capcelea	Senior Environmental Specialist
German Kust	Environmental Consultant
Angela Nyawira Khaminwa	Senior Social Development Specialist
Kristine Schwebach	Social Specialist
Niso Bazidova, Oxana Druta	Financial Management Specialists
Valencia M. Copeland, Nodira Pirmanova	Program Assistant(s)
Tom Sheng	WIS Specialist, International Consultant
Michael Sandoz	Irrigation Specialist, International Consultant
Svetlana Sharipova	Social Development Specialist, International Consultant
Mark Svendsen	Water Resource Management Specialist, International Consultant
Murodali Safarov	Operations Specialist, Local Consultant
Verena Schaidreiter	Junior Professional Officer, ICR Author
Stefanie Herrmann	Remote Sensing and GIS Expert, ICR International Consultant
Garry Christensen	Economist, ICR International Consultant



B. STAFF TIME AND COST

Stage of Project Cycle	Staff Time and Cost	
	No. of staff weeks	US\$ (including travel and consultant costs)
Preparation		
FY13	15.762	397,019.74
FY14	11.540	12,361.15
Total	27.30	409,380.89
Supervision/ICR		
FY13	5.095	75,642.04
FY14	20.859	158,663.67
FY15	28.672	240,100.07
FY16	19.466	217,516.30
FY17	22.870	188,664.65
FY18	31.987	257,151.52
FY19	21.056	146,645.25
FY20	32.574	241,809.23
FY21	0	- 615.60
Total	182.58	1,525,577.13



ANNEX 3. PROJECT COST BY COMPONENT

Table 3.1. Original and Revised Project Costs by Component and Financing Source^a

Components	Amount at Approval^a (US\$, millions)	AF^b (US\$, millions)	Revised Total Amount (US\$, millions)
Component 1. Public Works and Rehabilitation of Irrigation and Drainage Infrastructure	35.82	9.72	45.54
of which IDA financing	13.97	9.72	23.69
of which GAFSP financing	21.85	0.00	21.85
Component 2. Assistance in Water Resources Management, including Technical Assistance for Policy and Institutional Reform	8.07	1.50	9.57
of which IDA financing	4.03	1.50	5.53
of which GAFSP financing	4.04	0.00	4.04
Component 3. Project Management	2.01	0.78	2.79
of which IDA financing	0.00	0.78	0.78
of which GAFSP financing	2.01	0.00	2.01
Total	45.90	12.00	57.90
of which IDA financing	18.00	12.00	30.00
of which GAFSP financing	27.90	0.00	27.90

Sources: a. PAD PAMP II. Dated October 25, 2012. Report No.: 72293; b. Project Paper AF PAMP II. Dated June 3, 2015. Report No.: PAD1334.



Table 3.2. Revised and Actual Project Costs by Component and Financing Source^a

Components	Revised Total Amount (US\$, millions)	Actual at Project Closing^b (US\$, millions)	Percentage of Approval (%)
Component 1. Public Works and Rehabilitation of Irrigation and Drainage Infrastructure	45.54	44.35	97
of which IDA financing	23.69	23.14	98
of which GAFSP financing	21.85	21.21	97
Component 2. Assistance in Water Resources Management, Including Technical Assistance for Policy and Institutional Reform	9.57	9.14	96
of which IDA financing	5.53	4.44	80
of which GAFSP financing	4.04	4.70	116
Component 3. Project Management	2.79	2.90	104
of which IDA financing	0.78	0.91	117
of which GAFSP financing	2.01	1.99	99
Total	57.90	56.39	97
of which IDA financing	30.00	28.49	95
of which GAFSP financing	27.90	27.90	100

Source: b. PAMP II PMU, Final disbursements, as of August 2020.

Note: a. The actual project costs in table 3.2 and as reported by the PMU in August 2020 deviate from the actual project costs (US\$56,462,038) included in the ICR datasheet. At project completion, a total amount of US\$73,258.24 remains blocked in TSB. Moreover, the project experienced an estimated exchange rate loss in the amount of US\$1,437,621.13 throughout implementation. At project completion, SDR340.77 (US\$481.45) remain undisbursed (Source: World Bank Client Connection Data, as of August 6, 2020).



ANNEX 4. EFFICIENCY ANALYSIS

Project Context

1. The original project design was based on the rehabilitation of an estimated 190,000 ha of high-potential arable land in 12 selected districts of Khatlon and the DRS region, an associated public works program that employed low-income local people to manually clean on-farm irrigation canals, and policy reform and capacity building for WUAs and the public institutions responsible for water management. Expected project benefits included a yield increase of 10 percent for major crops in the rehabilitated areas, temporary employment of 22,000 low-income people, and an improved capacity to manage water delivery for irrigation. Crop production in other high potential districts in the project area provided the without project (WOP) reference for estimating incremental project benefits. The original project launched in February 2013, with a planned completion date of February 2018.

2. The AF in 2015 allowed the project to accommodate the addition of six new districts to the project area from 2015–2020, increasing the target rehabilitated area to 260,000 ha. The AF also helped the GoT to expand public employment opportunities at a time when Tajik migrant workers to Russia were returning to Tajikistan following a severe contraction of the Russian economy, increasing the target for temporary employment to 32,000 people. The second restructuring in 2015 responded to the request of the GoT to finance additional flood emergency works. One project district (Bokhtar) was dropped in order to release funding, which reduced the target rehabilitated area to 236,600 ha and the target for temporary employment to 29,950.

3. The original assumptions for economic analysis were retained. However, the revised project added almost all the high potential districts, leaving only one WOP district (Bokhtar) as a reference point for economic analysis,³⁸ which limited the scope for incremental analysis. The project completion date was extended to February 2020 to allow time to implement the additional investment and the project closed as scheduled.

Project Performance Analysis

4. Table 4.1 summarizes the main results of the economic analyses for the original project, the AF, and project completion. Assumptions for the project completion analysis were based on trends in crop production in the 11 original project districts, as project outcomes in these districts had more time to embed and extrapolated to the full project area.

Table 4.1. Economic Analysis Assumptions and Results

	Original Project^a	AF^a	Project Completion^b
Area rehabilitated (ha)	190,000	236,600 ^d	251,433
Net increase in crop yields ^c (%)	10	10	> 10
ENPV (economic prices) (US\$, millions)	30.2	27.2	21.9
EIRR (economic prices) (%)	26.1	27.0	41.5
Benefit-cost ratio	5.82	7.14	2.83
Incremental benefits/ha (US\$)	158	110	87
Investment life (years)	12	12	12
Discount rate (%)	12	12	12

Note: a. Projected; b. Actual; c. Wheat, all cereals, all vegetables, and fodder. d. Target at second restructuring in 2015.

³⁸ Bokhtar district was included in the original project but dropped during the second restructuring in November 2015 because of slow progress with land reform and low performance during project implementation.



5. The lower ENPV and higher EIRR estimated for project completion reflect the impact of actual patterns of investment and returns, which differed from the original assumptions. Actual investment expenditures were lower than anticipated in the first two years, with lower consequent negative increments. Furthermore, the original projections assumed full impact in the final years, while some reduction was observed in practice because of the failure to adequately maintain the canals in some districts.

6. Although the differing pattern of investments and returns reduced the project ENPV, the benefit-cost ratio and the incremental return per ha relative to projected returns, the investment outcome was still highly positive, with an ENPV of US\$21.98 million and an EIRR of 41.5 percent. Sensitivity analysis (table 4.2) also shows that the project outcome is robust. A 20 percent reduction in yields reduces the ENPV to US\$11.31 million, a 20 percent reduction of output prices reduces the ENPV to US\$8.2 million, and a 20 percent increase in input prices reduces the ENPV to US\$19.1 million. The corresponding EIRRs and switching values further confirm the robust nature of project outcomes.

Table 4.2. Sensitivity Analysis

	Change ± (%)	ENPV (US\$, millions)	EIRR (%)	Switching Value (%)
Base case		21.981	41.5	100
Crop yield declines	-20	11.306	24.1	42.4
Crop producer prices decline	-20	8.189	18.9	31.9
Crop input prices increase	+20	19.071	37.2	-150.7

7. The satisfactory, positive economic return to investment was due to the combined impact of: (i) increased crop yields; (ii) a change in crop composition to more higher returning crops; and (iii) the restoration of more unused land to crop production in response to irrigation rehabilitation than originally envisaged.

8. **Crop yields.** The analysis of trends in crop yields was based on district-level data from TAJSTAT 2010–2018 as the project survey data were unsuitable for use. Economic analysis was based on conservative estimates of trends in crop yields in the 11 original project districts for 2010–2018. Equivalent trends in the non-project districts were based on national statistics (from the Food and Agriculture Organization Corporate Statistical Database [FAOSTAT]) due to the lack of comparable WOP districts and limited TAJSTAT data available for the one remaining WOP district. Table 4.3 shows observed trends in crop yields for the main crop groups for the 11 original project districts. As the interannual variability of crop yields and production is high, the base year was calculated as the average for 2010–2012 and the final year as the average for 2017–2018. Paired t-tests were used to calculate the statistical significance of the yield changes.

Table 4.3. Crop Yield Indicators

	Base (2010–2012)	Final (2017–2018)	Change (%)
	Crop Yield (tons/ha)		
Food crops			
All cereals	3.01	3.77	25.2**
Of which: wheat (10 districts ^a)	2.82	3.45	22.3**
All vegetables	27.30	31.43	15.1**
Fodder crops (10 districts ^a)	17.51	21.42	22.3 ^{ns}
Cotton	2.07	1.81	-12.6**

Source: TAJSTAT district-level data on crop production for 2010–2018; authors calculations.

Note: **significant at 5 percent, ns = not statistically significant; a. One district was omitted due to data limitations.



9. **Crop composition.** Economic analysis for the original project and AF assumed no change in crop composition. In fact, producers in the project districts have reduced the area planted to wheat and cotton since 2013 due to low returns and have used this land for higher returning crops. As wheat and cotton account for approximately 70 percent of arable land use, even a small shift in the area planted releases a relatively large area for reallocation to other crops. Improved access to irrigation facilitated the use of this land for vegetable production and the income from temporary employment provided beneficiaries with the means to purchase seeds. The area of alfalfa production also increased although this change reflects the ability to use otherwise marginal land more productively for livestock production rather than the direct return to alfalfa production. Table 4.4 shows that although the percentage reduction of the cotton and wheat area was moderate, the areas released facilitated a significant percentage increase in the areas planted to other cereals and alfalfa. A more modest increase occurred in the overall area planted to vegetables due to a decline in the area planted to potato production,³⁹ but this was offset by the high gross margins for vegetable crops.

Table 4.4. Changes in Crop Composition - Original Project Districts

	2010–2012 (ha)	2017–2018 (ha)	Difference (ha)	% Change	Gross Margin/ha ^a (TJS)
Other cereals	20,260	25,155	4,895	24.2	12,304 ^b
Wheat	58,503	54,257	-4,246	-7.3	5,997
All vegetables	11,598	12,205	607	5.2	14,766 ^c
Alfalfa	7,415	10,322	2,907	39.2	4,012
Cotton	69,824	65,864	-3,960	-5.7	2,452

Source: TAJSTAT district-level data on crop production for 2010–2018; authors calculations.

Note: a. financial prices; b. average for maize and rice; c. average for potatoes, tomatoes, cucumbers, onions, and cabbage.

10. **Restoration of unused arable land.** The original project design assumed that irrigation rehabilitation would facilitate the return to production of approximately 2,000 ha of unused arable land. The national irrigation authority (ALRI) estimated that 12,395 ha were returned to full production across all 17 project districts for 2013–2019. Further estimates based on satellite data indicate that this area was even higher (annex 8).

Non-quantified Benefits

11. In addition to increased crop production, the project generated the following further benefits:

- **Temporary employment for low-income people.** The public works program to manually clean on-farm irrigation canals created employment for 30,005 people slightly below the AF target of 32,000 people but well above the final target of 29,950. Beneficiaries received an average net income of US\$197 after the deduction of social security contributions. The project also paid their income and pension taxes. The total cost of implementing the public works program (including project payment of social security and other taxes) was US\$9.978 million, of which US\$5.9 million was received by beneficiaries with a benefit-cost ratio of 1.45. A detailed breakdown of these costs and benefits is presented in annex 5.
- **Increased integration with the formal economy (access to tax numbers, bank accounts, and social security).** The project assisted participants in the public works program to obtain tax numbers, open bank accounts, and register for social security. This support was particularly appreciated by the high proportion of rural women without these links to the formal economy.

³⁹ Potatoes are the largest component of vegetable production, with approximately 25 percent of the total area planted.



- **Improved capacity for flood risk mitigation.** The project financed emergency repairs for canals and riverbanks in GBAO, Kulob, and Hamadoni, which benefit 62,400 citizens and improved the capacity for flood risk mitigation.
- **Improved irrigation management.** The project strengthened 130 WUAs across the 17 project districts. At project completion, 80 percent of WUA members reported an improvement in water delivery and 65 percent reported an improvement in the maintenance of infrastructure and collection of irrigation water fees.

Project Implementation

12. Project implementation was broadly efficient, with no delays in implementation, full disbursement, and no cost overruns. The project was extended for two years to accommodate the addition of six new districts and not because of any delays in implementation. Disbursement was below target during the first two years (2013–2014) but then recovered and remained on schedule for the remainder of the project. Actual project implementation costs amounted to 5.1 percent of total expenditure, which is acceptable for this type of project. The planned and actual expenditures by component are provided in table 4.5.

Table 4.5. Planned and Actual Project Expenditures by Component

	Budget (US\$) ^a	Budget (US\$) ^b	Actual (US\$) ^c	Variance (US\$)	Variance (%)
Component 1. Public Works and Rehabilitation of Irrigation and Drainage Infrastructure	45,540,000	44,843,935	44,354,635	(489,300)	-1.1
Component 2. Assistance in Water Resources Management, including Technical Assistance for Policy and Institutional Reform	9,570,000	9,023,675	9,135,796	112,121	1.2
Component 3. Project Management	2,790,000	2,962,696	2,898,349	(64,347)	-2.2
Total	57,900,000	56,830,306	56,388,780	(441,526)	-0.8

Sources: a. AF Project Paper (dated June 2015); b. Borrower’s ICR PAMP II. 2020. Impact Assessment; c. PAMP II PMU, Final disbursements, as of August 2020.

Note: The approved budget as stated in the AF project paper differs from the actual budget as reported in the Borrower’s ICR due to exchange rate(s) (losses) throughout project implementation. Further information is provided in annex 3. Project cost by component.

13. **Rating.** Project efficiency is rated as High in that the project achieved its targets, generated an acceptable return to investment, and was completed on time with no cost overruns and full disbursement. These outcomes were consistent with sector expectations. The economic analysis generated a benefit-cost ratio of 2.83 and sensitivity analysis showed that this return was robust to adverse changes in yields, crop output prices, and crop input prices. The costs of project implementation were acceptable as a proportion (5.1 percent) of total expenditure.



ANNEX 5. PUBLIC WORKS PROGRAM - COSTS AND BENEFITS

Public Works Program - Costs and Benefits

1. The public works program was a major undertaking, with a total cost of US\$9.978 million. In addition to payments to beneficiaries, these costs included the hiring of local NGOs for social mobilization, awareness and communication, works supervision, management of payments to beneficiaries, and first aid training, the purchase of tools and protective clothing, and various administrative costs. To ensure that the net income received by beneficiaries was sufficient to motivate active participation in the public works program, the project also paid for the social fund contribution and pension and income taxes of beneficiaries. These expenditures are detailed in table 5.1.

Table 5.1. Public Works Program Expenditures^a

	Expenditures (US\$)	Percentage (%) of Total Expenditure
Beneficiary Payments		
Amount paid to beneficiaries	5,901,537	59.1
Of which: income tax and pension tax	826,215	n.a.
Social security contribution	1,476,945	14.8
Operating Costs		
Consulting - social mobilization	804,303	8.1
Consulting - public awareness and communication	508,441	5.1
Consulting - works supervision	535,236	5.4
Equipment	445,252	4.5
Disbursement specialists	16,452	0.2
Administrative Costs		
Insurance	179,748	1.8
Banking charges	101,156	1.0
Total	9,978,282	100.0

Source: PAMP II PMU. Expenditures (Subcomponent 1a) as of February 28, 2020.

Note: a. Payment of US\$439,448 for support to land reform was excluded as it was not relevant to the public works program; n.a. = not applicable.

2. Operating and administrative costs amounted to 23.3 percent and 2.8 percent of total program expenditure, respectively. The remaining expenditure was used for direct payments to beneficiaries, plus payment of their social fund contributions. Direct payments to beneficiaries also included coverage of their income and pension taxes. Social fund contributions alone accounted for 14.8 percent of total program expenditure.

3. Derivation of the benefit-cost ratio for the program depends on whether or not project payment of social security fund contributions is regarded as an imputed benefit to beneficiaries. If these payments are viewed as an imputed benefit, then beneficiaries receive the equivalent of US\$7.38 million and the associated benefit-cost ratio is 2.84. If not, then beneficiaries receive US\$5.9 million and the benefit-cost ratio is 1.45. The latter approach was used for analysis.



ANNEX 6. REVISED INDICATORS AND OUTCOME TARGETS

Table 6.1. Original and Revised PDO-level Results Indicators by Outcomes (outcome targets in brackets)

No.	Original Financing (November 29, 2012)	AF and Restructuring (June 22, 2015)	Second Restructuring (November 6, 2015)	Third Restructuring (July 23, 2018)
Outcome 1: Provide access to temporary employment to food-insecure people through the rehabilitation of irrigation and drainage infrastructure (post-AF)				
1	Person-days worked by participants of public works program, disaggregated by gender, vulnerable group (880,000)	Number of person.days worked by participants of public works program (1,255,000)	Number of person.days worked by participants of public works program (1,146,000)	Number of person.days worked by participants of public works program (1,146,000)
1.1	Women (132,000)	of which female beneficiaries (188,250)	of which female beneficiaries (171,900)	of which female beneficiaries (171,900)
1.2	Severely food-insecure (176,000)	of which severely food-insecure beneficiaries (251,000)	of which severely food-insecure beneficiaries (229,200)	of which severely food-insecure beneficiaries (229,200)
Outcome 2: Increase yields of selected crops in response to improved irrigation and infrastructure (post-AF)				
2	Increase in cereal, food and fodder crop yield on rehabilitated irrigated land (10%)	Increase in wheat and vegetable yield on rehabilitated irrigated land (10%)	Increase in wheat and vegetable yield on rehabilitated irrigated land (10%)	Increase in wheat and vegetable yield on rehabilitated irrigated land (10%)
3	Direct project beneficiaries, disaggregated by gender (772,000)	Direct project beneficiaries (1,385,000)	Direct project beneficiaries (1,343,450)	Direct project beneficiaries (1,343,450)
3.1	Women (10%)	Female beneficiaries (30%)	Female beneficiaries (30%)	Female beneficiaries (30%)
4	<i>Not included</i>	<i>Not included</i>	Beneficiaries of Flood Protection Works (62,400)	Beneficiaries of Flood Protection Works (62,400)
Outcome 3: Strengthen the capacity of Tajikistan to introduce integrated water resource management (post-AF)				
5	National IWRM strategy prepared and agreed with the MAWRM (Yes)	National IWRM strategy prepared and agreed with the MEWR (Yes)	National IWRM strategy prepared and agreed with the MEWR (Yes)	National IWRM strategy prepared and agreed with the MEWR (Yes)
6	Kafarnigan River Basin Plan prepared and agreed with the MAWRM (Yes)	Kofarnihon River Basin Plan prepared and agreed with the MEWR (Yes)	Kofarnihon River Basin Plan prepared and agreed with the MEWR (Yes)	Kofarnihon River Basin Plan prepared and agreed with the MEWR (Yes)
7	Operational WUAs created and/or strengthened (95)	Operational WUAs created and/or strengthened (135)	Operational WUAs created and/or strengthened (125)	Operational WUAs created and/or strengthened (125)



No.	Original Financing (November 29, 2012)	AF and Restructuring (June 22, 2015)	Second Restructuring (November 6, 2015)	Third Restructuring (July 23, 2018)
7.1	WUAs created (20)	WUAs created (30)	WUAs created (28)	WUAs created (28)
7.2	WUAs strengthened (75)	WUAs strengthened (105)	WUAs strengthened (97)	WUAs strengthened (97)
8	<i>Not included</i>	Number of registered WUA Members (22,000)	Number of registered WUA members (45,000)	Number of registered WUA members (45,000)
8.1	<i>Not included</i>	Percent Female WUA Members (10%)	Percent Female WUA Members (10%)	Percent Female WUA Members (10%)

Table 6.2. Original and Revised Intermediate Results Indicators by Components (outcome targets in brackets)

No.	Original Financing (November 29, 2012)	AF and Restructuring (June 22, 2015)	Restructuring (November 6, 2015)	Restructuring (July 23, 2018)
Component 1: Public Works and Rehabilitation of Irrigation and Drainage Infrastructure				
1	Public works beneficiaries disaggregated by gender, vulnerable group (22,000)	Public works beneficiaries disaggregated by gender and vulnerable group (32,000)	Public works beneficiaries disaggregated by gender and vulnerable group (29,950)	Public works beneficiaries disaggregated by gender and vulnerable group (29,950)
1.1	Women (20%)	Female (20%)	Female (20%)	Female (20%)
1.2	Severely food-insecure (15%)	Severely food-insecure (15%)	Severely food-insecure (15%)	Severely food-insecure (15%)
2	Area provided with irrigation and drainage services (ha) (190,000 ha)	Area provided with irrigation and drainage services (ha) (260,000 ha)	Area provided with irrigation and drainage services (ha) (236,600 ha)	Area provided with irrigation and drainage services (ha) (236,600 ha)
2.1	Area provided with irrigation and drainage services (ha) - improved (190,000 ha)	Area provided with irrigation and drainage services (ha) - improved (260,000 ha)	Area provided with irrigation and drainage services (ha) - improved (236,600 ha)	Area provided with irrigation and drainage services (ha) - improved (236,600 ha)
3	<i>Not included</i>	<i>Not included</i>	Length of flood channel and flood protection embankments rehabilitated (6.2 km)	Length of flood channel and flood protection embankments rehabilitated (6.2 km)
4	Water users provided with new/improved irrigation and drainage services disaggregated by gender (750,000)	<i>Removed</i>	<i>Removed</i>	<i>Removed</i>



No.	Original Financing (November 29, 2012)	AF and Restructuring (June 22, 2015)	Restructuring (November 6, 2015)	Restructuring (July 23, 2018)
4.1	Women (75,000)	<i>Removed</i>	<i>Removed</i>	<i>Removed</i>
5	Length of flood channel rehabilitated on the Tebalai river (5 km)	Length of flood channel rehabilitated on the Tebalai river (5 km)	<i>Removed</i>	<i>Removed</i>
6	Length of canals cleaned (5,200 km)	Length of canals cleaned (8,820 km)	Length of canals cleaned (7,065 km)	Length of canals cleaned (7,065 km)
6.1	of which manually cleaned (4,850 km)	of which manually cleaned (7,050 km)	of which manually cleaned (6,755 km)	of which manually cleaned (6,755 km)
6.2	of which mechanically cleaned (350 km)	of which mechanically cleaned (1,770 km)	of which mechanically cleaned (310 km)	of which mechanically cleaned (310 km)
7	Length of drains cleaned (1,300 km)	Length of drains cleaned (1,300 km)	Length of drains cleaned (1,180 km)	Length of drains cleaned (1,180 km)
8	Number of key hydraulic installations, controls, and structures renovated (5,800)	Key hydraulic installations, controls, and structures renovated (5,800)	Key hydraulic sections, structures, installations, and equipment rehabilitated or provided (4,030)	Key hydraulic sections, structures, installations, and equipment rehabilitated or provided (4,030)
Component 2: Assistance in Water Resources Management , including Technical Assistance for Policy and Institutional Reform				
9	Amendments to Water Legislation drafted (Yes)	Amendments to Water Legislation drafted (Yes)	Amendments to Water Legislation drafted (Yes)	Amendments to Water Legislation drafted (Yes)
10	The Water Information Center for IWRM established (Yes)	The WIS established (Yes)	The WIS established (Yes)	The WIS established (Yes)
11	Number of Mirops established (At least two Mirops established)	<i>Removed</i>	<i>Removed</i>	<i>Removed</i>
12	Number of Mirops and WUAs staff trained (200)	<i>Removed</i>	<i>Removed</i>	<i>Removed</i>
13	Number of staff trained in IWRM (50)	Number of MEWR and ALRI and WUA staff trained in IWRM (50)	Number of MEWR and ALRI and WUA staff trained in IWRM (50)	Number of MEWR and ALRI and WUA staff trained in IWRM (50)
Component 3: Project Management				
14	<i>Not included</i>	Beneficiary grievances responded to within stipulated service standards for response (95%)	Beneficiary grievances responded to within stipulated service standards for response (95%)	Beneficiary grievances responded to within stipulated service standards for response (95%)



ANNEX 7. IRRIGATION REHABILITATION SCHEDULE

Table 7.1. Time Schedule for the Implementation of Irrigation Rehabilitation Works under PAMP II

	District name	Rehabilitation Works (period)	2013	2014	2015	2016	2017	2018	2019	Total Area Rehabilitated (ha)
Origin Financing Project Districts	Rudaki	2014–2016	—			12,222	—	—	—	12,222
	Hisar	2014–2016	—			13,328	—	—	—	13,328
	Yavan	2014–2017	—		3,555	0	—	—	—	3,555
	A. Jomi	2013–2015			18,268	—	—	—	—	18,268
	Khuroson	2016–2017	—	—	—		8,278	—	—	8,278
	Pyanj	2014–2015	—		16,613	—	—	—	—	16,613
	N. Khusrav	2016–2017	—	—	—	7,788	0	—	—	7,788
	J. Rumi	2013–2015			24,858	—	—	—	—	24,858
	Jilikul	2013–2015			17,954	—	—	—	—	17,954
	Hamadoni	2016–2017	—	—	—		19,999	—	—	19,999
	Vose	2015–2017	—	—			16,773	—	—	16,773
	Sub-total									159,636
AF Project Districts	Vahdat	2017–2018	—	—	—	—		13,078	—	13,078
	Dangara	2017–2018	—	—	—	—		5,404	—	5,404
	Vaaksh	2017–2018	—	—	—	—		14,988	—	14,988
	Shaartuz	2016–2018	—	—	—			16,045	—	16,045
	Qabodiyon	2016–2018	—	—	—			18,330	—	18,330
	Kumsangir	2016–2018	—	—	—			23,952	—	23,952
	Total		0	0	81,248	33,338	45,050	91,797	—	251,433

Source: ALRI, February 2020.



ANNEX 8. REMOTE SENSING ASSESSMENT OF AREA UNDER IRRIGATION

Independent Remote Sensing-based Assessment of Area under Irrigation

1. **Methodology.** From the vantage point of space, satellite remote sensing provides a means of observing the land surface that could be used to independently assess the spatial expansion of irrigation over time. Multispectral satellite data from the Landsat-7 Enhanced Thematic Mapper+ (ETM+) sensor⁴⁰ was used to compute a greenness index and the Normalized Difference Vegetation Index (NDVI), which is strongly related to plant biomass and has been used extensively to identify and characterize areas of green, photosynthetically active vegetation. Because irrigated croplands stand out by their relatively higher biomass compared to their sparsely vegetated surroundings in drylands, the NDVI is suitable for mapping and analyzing their spatial extent and temporal dynamics.

2. To map irrigated croplands, 750 reference points were defined by visual analysis of a satellite image, of which 350 represented irrigated cropland and 400 represented various other land cover types found in the project region. Irrigated croplands are defined here as actively cropped irrigated areas, in which biomass production, and hence the NDVI, significantly differs from that in other land cover types over the course of the year. A random forest machine learning algorithm was trained with the help of the 750 reference points and six independent NDVI-derived variables to differentiate between irrigated cropland and other land covers. Overall accuracies achieved for training (70 percent of data) and validation (30 percent of data) points were 98.86 percent and 99.10 percent, respectively, which is considered highly accurate. The algorithm was then applied to the independent variables across the entire region for each year from 2011 to 2019 and resulted in annual maps of irrigated cropland. Figure 8.1 shows the spatial pattern of irrigation in the project region, expressed as the number of years for which each pixel was classified as irrigated from 0 (never irrigated) to 9 (continuously irrigated from 2011 to 2019).

3. **Results.** From these maps, the area of irrigated cropland in ha was extracted for each PAMP II district, as well as the percentage it occupies in each district and how it has changed from year to year. Because actively irrigated cropland is variable from year to year, and its remote sensing signature can also be influenced by the amount of precipitation in each individual year (which was significantly below average in 2011 and above average in 2019), the baseline was defined as the average size of the irrigated area from 2011 to 2013, and the project end line was defined as the average size of the irrigated area from 2017 to 2019. At the baseline, a total of 261,175 ha was estimated to be under irrigation in 17 districts, corresponding to 11.57 percent of the total project area. The area of irrigated croplands reached 288,714 ha by the conclusion of the project (end line), corresponding to 12.79 percent of the total project area. This means that an additional 27,539 ha from baseline to end line were estimated to be actively irrigated because of either new irrigation development or rehabilitation of existing irrigation infrastructure. According to these estimates, the percent change by project district ranged from -5.82 (Rudaki) to 22.36 (Hamadoni) where all but one project district (Rudaki) showed an increase in irrigated areas (figure 8.2). The changes in irrigated cropland area per hectare and project district are further presented in figure 8.3.

⁴⁰ While a newer sensor, the Landsat-8 Operational Land Imager (OLI), has been available since mid-2013, the analysis has been carried out using Landsat-7 data to ensure data continuity throughout the entire project period.



Figure 8.1. Number of Years Irrigated between 2011 and 2019

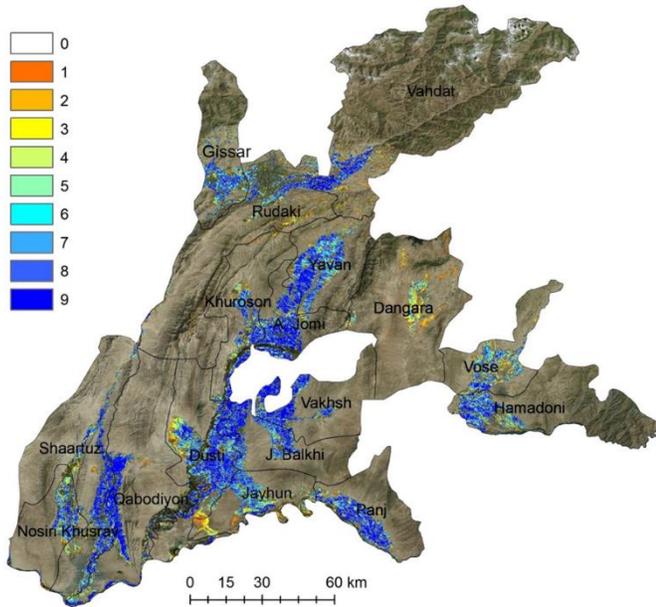


Figure 8.2. Percentage Change in Irrigated Area per District from the Baseline (2011–2013 average) to the End Line (2017–2019 average)

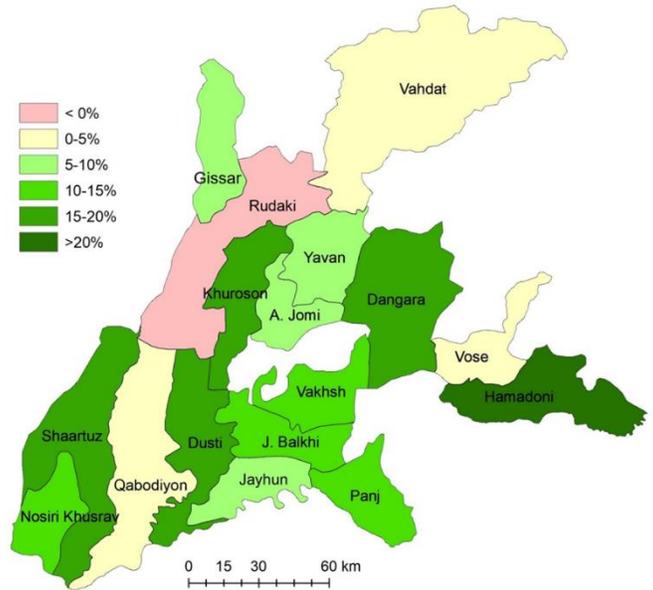
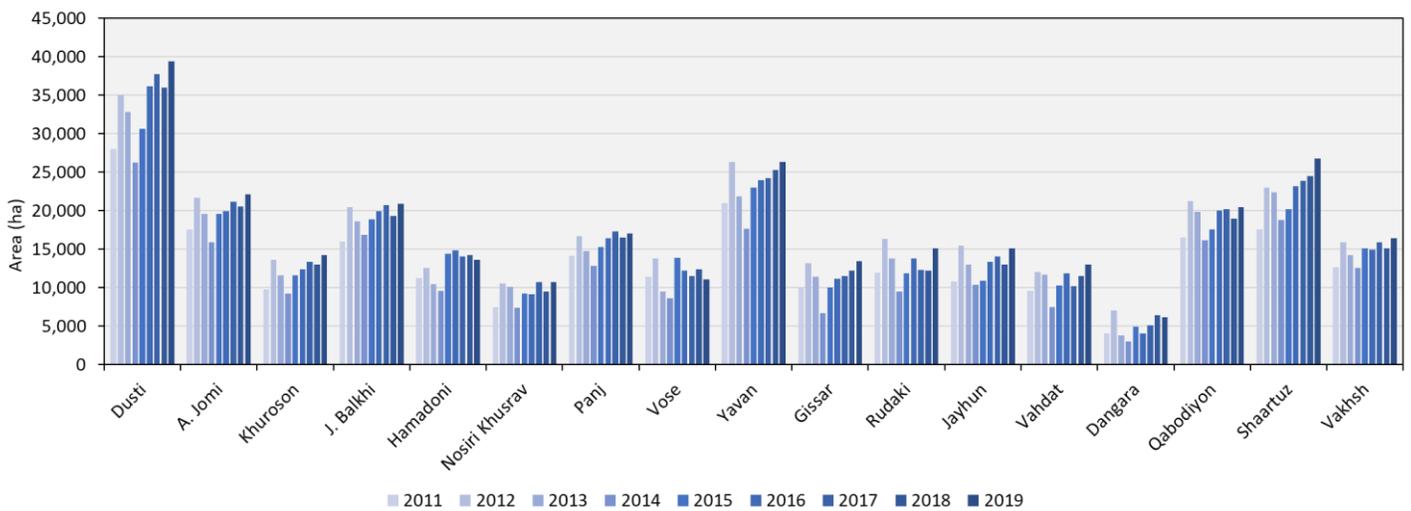


Figure 8.3. Change in Irrigated Cropland Area (in ha) per Project District (2011–2019)



Source: Remote Sensing and GIS assessment, World Bank, July 2020; author's assessment.



ANNEX 9. BORROWER, CO-FINANCIER AND OTHER PARTNER/STAKEHOLDER COMMENTS

The draft ICR was shared with the borrower on August 4, 2020. Some clarifications and editorial comments were provided by the ALRI and the PMU on August 20, 2020, all of which have been reflected in this ICR. A borrower's ICR (M&E Completion Report) and impact assessment was shared with the World Bank in March 2020 and is available on file. A summary is presented in the following paragraphs.

SECOND PUBLIC EMPLOYMENT FOR SUSTAINABLE AGRICULTURE AND WATER RESOURCES MANAGEMENT PROJECT

M&E COMPLETION REPORT

Dushanbe, February 2020

1. The M&E Completion Report for the PAMP II covers the period from May 5, 2013, to February 15, 2020. The project was financed by the GAFSP multi-donor trust fund and IDA with the objective to: (i) provide employment to food-insecure people through the rehabilitation of irrigation and drainage infrastructure; (ii) increase crop production in response to improved irrigation and drainage infrastructure; and (iii) support the development of improved policies and institutions for water resource management, as a means to improve food availability and food access for low-income people in poor rural areas supported by the project.

Project Implementation

2. To achieve the PDO, the project was implemented in two directions: (a) physical rehabilitation of infrastructure; and (b) the creation of a legal framework for the sustainable development of the water sector. Work in both directions had to be carried out in parallel, as the effectiveness and sustainability of many activities depend on several institutional, operational, and regulatory actions that have to be agreed or actually adopted. The project has achieved almost all the targets of the project and intermediate performance indicators, and many of them have surpassed the initial targets. It should be noted that the continuous support of the World Bank and involvement and support of the state executive bodies such as the ALRI, MEWR, MoLM, MoF, State Committee for Investment and State Property Management of Tajikistan, *jamoats*, *mahalla* committees, and WUAs have provided essential contributions to the successful implementation of the project.

Key Achievements

3. One of the main achievements of the project was the successful implementation of the public works program which generated jobs for 30,005 people, of which 25 percent were female and 20 percent were food-insecure people. The program provided 1,062,927 man-days of temporary employment for the rural poor population, or an average of 35 working days per person. Seasonal employment provided about TJS 50.7 million of additional income to the beneficiaries, equivalent to about US\$7.4 million or US\$246 per person, including all taxes (social security fund, income tax, and deductions to the social fund). Public works were fully completed in February 2019. In total, 8,221 km of channels were cleaned manually with an average volume of excavation for each participant of 71.2 m³. The rehabilitation of irrigation networks helped improve the water supply on a total of 251.5 ha arable land. The project had a direct impact on the living conditions of the target group of vulnerable beneficiaries using market overpaid temporary work. Effective and efficient processes, which have been developed and improved over the course of implementing this program, led to the development of a manual for the public works program.



4. The project has also achieved significant results under the ongoing water sector reform in Tajikistan. Under Component 2, PAMP II provided support to the GoT, including the MEWR, ALRI, and other relevant agencies in the implementation of the water sector reform process at national, basin, and local levels. The responsibility for the implementation of this component was assigned to the MEWR. The main achievements under this component include the following:

- The revised ‘Water Code’ of the Republic of Tajikistan was approved by the Parliament of Tajikistan on February 12, 2020, and the revised Law ‘On Water User Associations’ was adopted on January 3, 2020;
- The country’s first NWIS was established;
- The Kofarnihon RBO and Kofarnihon RBC were established and trained under the project. The offices of the Upper Kofarnihon RBO in Dushanbe and the Lower Kofarnihon RBO in Shaartuz district have been equipped with necessary equipment and furniture and became fully operational in 2019;
- The Kofarnihon RBMP (2020–2025) was established and agreed with the MEWR;
- 130 WUAs were established and/or strengthened to improve management of on-farm I&D infrastructure. Training and new equipment further helped improve water planning and the delivery of irrigation services;
- The project supported improved payment and financial accountability practices between farmers, WUAs, and ALRI through the introduction of a billing system in the Lower Kofarnihon basin.

World Bank Performance and Support

5. The World Bank held 11 implementation support missions. The visiting mission team consisted of thematic experts, who shared their practical experiences and provided advice. The missions Aide Memoires were informative and well composed, highlighting successes and challenges of the project implementation both for the project and implementing partners on a timely basis. During these missions, the status of the project implementation according to the components, achieved objectives, and milestones was assessed. Urgent activities of the project for the next reporting period were identified and necessary steps were taken to support the PMU for the project’s implementation. With the help of the World Bank task team leader in Tajikistan responsible for the project, the supervision team was able to provide immediate responses and assistance in resolving of the difficulties encountered. At the end of each mission the World Bank task team leader held meetings with the PMU team and partners to address the problems identified during the mission and identified the next steps. These measures allowed to make timely decisions for the successful and effective implementation of the project. Three additional visits were conducted by the World Bank Country Manager in Tajikistan and representatives of GAFSP.

Lessons Learned

6. With seven years of project implementation, two key lessons for a project like PAMP II include:
- The need to have an authority (beyond the implementation agency, MEWR in this case) with the power to make and enforce decisions based on evidence and agreed actions; and
 - The importance of effective project management, including engagement and retention of qualified staff, and ongoing support from the World Bank, as it proved instrumental in achieving project results.
7. PAMP II managed to tackle a range of challenges related to FM, including developing an efficient payment framework for public work participants and dealing within an insolvent bank. Some of the other key lessons from the project management point of view include the need to streamline procurement processes and strengthen M&E capacity by adding additional staff given multiple projects that were handled by the PMU.



Box 9.1. Beneficiary Story from the Public Works Program (Borrower’s ICR, February 2020)

Ms. Bobokalonova Kurbonoy Tagoybekovna lives in the Khuroson district, Jamoat Ghallaobod, village Mehnatobod-2. She is a mother of six children, and one of her sons suffers from a congenital physical disability for which he requires additional care and attention. To support the children, she felt compelled to travel abroad for work, but she was unable to find a permanent job and was forced to return home. Aside from her homestead plot, she owns 1 ha of land under a Dehkan farm, but due to a shortage of funds, she rents it to neighbors. To ensure that she has some income to buy food and necessities for her family, she helps neighbors to milk their cows, and sells both the milk and the derivative of milk-chakka (yogurt) in the district market.

One day in the village a meeting was conducted, during which they were informed that they had been selected for a project which would give extremely needy families work cleaning canals by hand. Ms. Kurbonoy participated in a further meeting at a local school which gave her additional information about the project. She eagerly filled in the required forms with her details, awaiting a positive response.

The chairman of *mahalla* committee soon informed her that they wanted to offer her employment. She was very glad to get the work and was helped by her elder son. Upon completion of an agreed amount of work, she received a total salary amounting to TJS 1,350. From the received money she bought beans, potato, and sunflower seeds, which she planted on her homestead plot and on the Dehkan farmland. Currently she reaps the benefits from these crops and sells them for TJS 3 per kg. Ms. Kurbonoy expects that after harvesting the beans, her potato crop will be ready for sale, and after that, the sunflowers will then be ripe. From the received yield and profit, her children are very happy too. They have already worked out that based on her current earnings and costs, it is possible to earn two to three times more profit. The project was a huge help to her family during the winter period, and the social and economic status of her family has greatly improved.



Source (picture): World Bank Country Office Tajikistan, communications team.



The World Bank

TAJIKISTAN SECOND PUBLIC EMPLOYMENT FOR SUSTAINABLE AGRICULTURE AND WATER RESOURCES
MANAGEMENT PROJECT (P133327)

The draft ICR was shared with the co-financier GAFSP on August 4, 2020. The co-financier acknowledged the receipt and conveyed that they have no comments on the draft ICR.



ANNEX 10. SUPPORTING DOCUMENTS

1. Project Information Document (PID) Appraisal Stage. Dated September 20, 2012. Report No.: PIDA614.
2. Project Appraisal Document (PAD). Dated October 25, 2012. Report No.: 72293.
3. Financing Agreement between the Republic of Tajikistan and the International Development Association. Dated February 5, 2013. Grant No.: H823-TJ.
4. Supplemental Letter No. 2 Performance Monitoring Indicators. Dated February 5, 2013 . Grant No.: H823-TJ and GAFSP Grant No.: TF013997.
5. Grant Agreement between the Republic of Tajikistan and the International Development Association acting as Trustee of the Global Agriculture and Food Security Multi-Donor Trust Fund. Dated February 5, 2013. GAFSP Grant No.: TF013997.
6. Project Paper on a Proposed Additional IDA Credit and a Proposed IDA Grant to the Republic of Tajikistan for an Additional Financing for the Tajikistan Second Public Employment for Sustainable Agriculture and Water Resources Management Project. Dated June 3, 2015. Report No.: PAD1334.
7. Financing Agreement (Additional Financing for Second Public Employment for Sustainable Agriculture and Water Resources Management Project) between the Republic of Tajikistan and the International Development Association. Dated August 7, 2015. Credit No.: 5697-TJ.
8. Financing Agreement (Additional Financing for Second Public Employment for Sustainable Agriculture and Water Resources Management Project) between the Republic of Tajikistan and the International Development Association. Dated August 7, 2015. Grant No.: D081-TJ.
9. Supplemental Letter No. 2 Performance Monitoring Indicators. Dated August 7, 2015. Credit No.: 5697-TJ and Grant No.: D081-TJ.
10. Project Restructuring Paper (Data Sheet). Dated [No date included]. Report No.: RES21017.
11. Second Amendment to the Grant Agreement. Dated November 9, 2015. GAFSP Grant No.: TF013997.
12. Second Amendment to the Grant Agreement. Dated November 9, 2015. Grant No.: H823-TJ.
13. Restructuring Paper on a Proposed Project Restructuring of the Tajikistan Second Public Employment for Sustainable Agriculture and Water Resources Management Project. Dated July 23, 2018. Report No.: RES31886.
14. Country Partnership Strategy for the Republic of Tajikistan for the Period FY10–FY3. Report No.: 50769.
15. Country Partnership Strategy for the Republic of Tajikistan for the Period FY15–FY18. Report No.: 86372.
16. Country Partnership Framework for the Republic of Tajikistan for the Period FY19–FY23. Report No.: 135875.



ANNEX 11. PROJECT MAP

Figure 11.1. Project Map at Appraisal

