IEG
Independent Evaluation Group

WORLD BANK GROUP
World Bank • IFC • MIGA

PROJECT PERFORMANCE ASSESSMENT REPORT

WHAT WORKS

UZBEKISTAN

# Irrigation and Drainage Interventions to Support the Agriculture Sector

**Report No. 134622**
MARCH 29, 2019

1818 H Street NW
Washington DC 20433
Telephone: 202-473-1000
Internet: www.worldbank.org

Attribution—Please cite the work as follows: World Bank. 2019. *Uzbekistan—Irrigation and Drainage Interventions to Support the Agriculture Sector.* Independent Evaluation Group, Project Performance Assessment Report 134622. Washington, DC: World Bank.


**Report No.: 134622**

# PROJECT PERFORMANCE ASSESSMENT REPORT

## REPUBLIC OF UZBEKISTAN

## FERGHANA VALLEY WATER RESOURCES MANAGEMENT PROJECT PHASE I (IDA-46480)

## RURAL ENTERPRISE SUPPORT PROJECT PHASE II (IDA-44330, IDA-51520)

March 29, 2019

*Financial, Private Sector, and Sustainable Development*

*Independent Evaluation Group*

## Currency Equivalents (annual averages)

*Currency Unit = Uzbek Som*

| | | |
|---|---|---|
| 2008 | $1.00 | Som 1,321 |
| 2009 | $1.00 | Som 1,467 |
| 2010 | $1.00 | Som 1,588 |
| 2011 | $1.00 | Som 1,716 |
| 2012 | $1.00 | Som 1,890 |
| 2013 | $1.00 | Som 2,097 |
| 2014 | $1.00 | Som 2,315 |
| 2015 | $1.00 | Som 2,573 |
| 2016 | $1.00 | Som 2,969 |

*Source:* Central Bank of the Republic of Uzbekistan

## Abbreviations

| | |
|---|---|
| BISA | Basin Irrigation System Authority |
| BAIS | Basin Administration of Irrigation Systems |
| CAS | Country Assistance Strategy |
| CPF | Country Partnership Framework |
| DID | difference-in-differences |
| EFA | economic and financial analysis |
| EIRR | economic internal rate of return |
| FFS | farmer field school |
| FIRR | financial internal rate of return |
| FVWRMP-I | Ferghana Valley Water Resources Management Project Phase I |
| FY | fiscal year |
| HGAE | Hydrogeology and Ameliorative Expedition (department) |
| I&D | Irrigation and Drainage |
| ICB | international competitive bidding |
| ICR | Implementation Completion and Results Report |
| ICRR | Implementation Completion and Results Report Review |
| IDA | International Development Association |
| IEG | Independent Evaluation Group |
| ILO | International Labour Organization |
| ISA | Irrigation Systems Authority |
| ISF | irrigation service fee |
| LLC | limited liability company |
| M&E | monitoring and evaluation |
| MAWR | Ministry of Agriculture and Water Resources |
| MFERIT | Ministry of Foreign Economic Relations, Investment, and Trade |
| NPV | net present value |
| O&M | operation and maintenance |
| PAD | project appraisal document |

| | |
|---|---|
| PDO | project development objective |
| PPAR | Project Performance Assessment Report |
| RESP-II | Rural Enterprise Support Project Phase II |
| RRA | Rural Restructuring Agency |
| SDC | Swiss Agency for Development and Cooperation |
| SDR | special drawing rights |
| Som | Uzbek Som |
| UNDP | United Nations Development Programme |
| WCA | water consumer association |
| WIS | Welfare Improvement Strategy |

*All dollar amounts are U.S. dollars unless otherwise indicated.*

## Fiscal Year

Government: January 1–December 31

| | |
|---|---|
| Director-General, Independent Evaluation | Ms. Alison Evans |
| Director, Financial, Private Sector, and Sustainable Development | Mr. José Carbajo Martinez |
| Manager, Sustainable Development | Ms. Midori Makino |
| Task Manager | Ms. Alexandra Horst |
| | Ms. Ebru Karamete |

# Contents

## Box



## Tables



## Appendixes

This report was prepared by Alexandra Horst and Ebru Karamete, who assessed the project in November 2018 with assistance from Ahmad Hamidov and Bakhodir Kuziyev. The report was peer reviewed by Bernhard Tischbein and panel reviewed by Jack W. van Holst Pellekaan. Romayne Pereira provided administrative support.

# Principal Ratings

### Ferghana Valley Water Resources Management Project Phase I

| Indicator | ICR* | ICR Review | PPAR |
|---|---|---|---|
| Outcome | Moderately satisfactory | Moderately satisfactory | Moderately satisfactory |
| Risk to development outcome | Modest | Modest | Substantial |
| Bank performance | Moderately satisfactory | Moderately satisfactory | Moderately satisfactory |
| Borrower performance | Moderately satisfactory | Moderately satisfactory | Moderately satisfactory |

*Note:* The Implementation Completion and Results Report (ICR) is a self-evaluation by the responsible Global Practice. The ICR Review is an intermediate Independent Evaluation Group product that seeks to independently validate the findings of the ICR. PPAR = Project Performance Assessment Report.

### Rural Enterprise Support Project Phase II

| Indicator | ICR | ICR Review | PPAR |
|---|---|---|---|
| Outcome | Moderately satisfactory | Moderately satisfactory | Moderately satisfactory |
| Risk to development outcome | Moderate | Moderate | Moderate |
| Bank performance | Moderately satisfactory | Moderately satisfactory | Moderately satisfactory |
| Borrower performance | Moderately satisfactory | Moderately satisfactory | Moderately satisfactory |

*Note:* ICR = Implementation Completion and Results Report; PPAR = Project Performance Assessment Report.

# Key Staff Responsible

### Ferghana Valley Water Resources Management Project Phase I

| Management | Appraisal | Completion |
|---|---|---|
| Project team leader | Mahwash Wasiq | IJsbrand Harko de Jong |
| Sector manager or practice manager | Peter D. Thomson | Michael Haney |
| Sector director or senior Global Practice director | | Jennifer J. Sara |
| Country Director | Motoo Konishi | Lilia Burunciuc |

### Rural Enterprise Support Project Phase II

| Management | Appraisal | Completion |
|---|---|---|
| Project Team Leader | Dilshod Khidirov | Dilshod Khidirov |
| Sector Manager or Practice Manager | Holger A. Kray | Julian A. Lampietti |
| Sector Director or Senior Global Practice Director | | Juergen Voegele |
| Country Director | Annette Dixon | Lilia Burunciuc |

IEG Mission: Improving World Bank Group development results through excellence in independent evaluation.

## About This Report

The Independent Evaluation Group (IEG) assesses the programs and activities of the World Bank for two purposes: first, to ensure the integrity of the World Bank's self-evaluation process and to verify that the World Bank's work is producing the expected results, and second, to help develop improved directions, policies, and procedures through the dissemination of lessons drawn from experience. As part of this work, IEG annually assesses 20–25 percent of the World Bank's lending operations through fieldwork. In selecting operations for assessment, preference is given to those that are innovative, large, or complex; those that are relevant to upcoming studies or country evaluations; those for which Executive Directors or World Bank management have requested assessments; and those that are likely to generate important lessons.

To prepare a Project Performance Assessment Report (PPAR), IEG staff examine project files and other documents, visit the borrowing country to discuss the operation with the government, and other in-country stakeholders, interview World Bank staff and other donor agency staff both at headquarters and in local offices as appropriate, and apply other evaluative methods as needed.

Each PPAR is subject to technical peer review, internal IEG panel review, and management approval. Once cleared internally, the PPAR is commented on by the responsible World Bank Country Management Unit. The PPAR is also sent to the borrower for review. IEG incorporates both World Bank and borrower comments as appropriate, and the borrowers' comments are attached to the document that is sent to the World Bank's Board of Executive Directors. After an assessment report has been sent to the Board, it is disclosed to the public.

### About the IEG Rating System for Public Sector Evaluations

IEG's use of multiple evaluation methods offers both rigor and a necessary level of flexibility to adapt to lending instrument, project design, or sectoral approach. IEG evaluators all apply the same basic method to arrive at their project ratings. Following is the definition and rating scale used for each evaluation criterion (additional information is available on the IEG website: http://ieg.worldbankgroup.org).

**Outcome:** The extent to which the operation's major relevant objectives were achieved, or are expected to be achieved, efficiently. The rating has three dimensions: relevance, efficacy, and efficiency. *Relevance* includes relevance of objectives and relevance of design. Relevance of objectives is the extent to which the project's objectives are consistent with the country's current development priorities and with current World Bank country and sectoral assistance strategies and corporate goals (expressed in Poverty Reduction Strategy Papers, country assistance strategies, sector strategy papers, and operational policies). Relevance of design is the extent to which the project's design is consistent with the stated objectives. *Efficacy* is the extent to which the project's objectives were achieved, or are expected to be achieved, taking into account their relative importance. *Efficiency* is the extent to which the project achieved, or is expected to achieve, a return higher than the opportunity cost of capital and benefits at least cost compared with alternatives. The efficiency dimension is not applied to development policy operations, which provide general budget support. *Possible ratings for outcome:* highly satisfactory, satisfactory, moderately satisfactory, moderately unsatisfactory, unsatisfactory, highly unsatisfactory.

**Risk to development outcome:** The risk, at the time of evaluation, that development outcomes (or expected outcomes) will not be maintained (or realized). *Possible ratings for risk to development outcome:* high, significant, moderate, negligible to low, and not evaluable.

**Bank performance:** The extent to which services provided by the World Bank ensured quality at entry of the operation and supported effective implementation through appropriate supervision (including ensuring adequate transition arrangements for regular operation of supported activities after loan or credit closing, toward the achievement of development outcomes). The rating has two dimensions: quality at entry and quality of supervision. *Possible ratings for Bank performance:* highly satisfactory, satisfactory, moderately satisfactory, moderately unsatisfactory, unsatisfactory, and highly unsatisfactory.

**Borrower performance:** The extent to which the borrower (including the government and implementing agency or agencies) ensured quality of preparation and implementation, and complied with covenants and agreements, toward the achievement of development outcomes. The rating has two dimensions: government performance and implementing agency(ies) performance. *Possible ratings for borrower performance:* highly satisfactory, satisfactory, moderately satisfactory, moderately unsatisfactory, unsatisfactory, and highly unsatisfactory.

# Preface

This is a Project Performance Assessment Report (PPAR) by the Independent Evaluation Group (IEG) of the World Bank Group on the Ferghana Valley Water Resources Management Project Phase I (P110538) and the Uzbekistan Rural Enterprise Support Project Phase II (P109126) in the Republic of Uzbekistan.

The Ferghana Valley Water Resources Management Project Phase I was approved on September 24, 2009 for a cost of $81.9 million supported by a World Bank credit of $65.6 million. The project cost at completion was $49 million, of which the World Bank financed $48.8 million. The project closed on December 31, 2016, six months later than the at-appraisal closing date.

The Uzbekistan Rural Enterprise Support Project Phase II was approved on June 12, 2008 for a cost of $75.03 million, supported by a World Bank credit of $67.9 million. Additional financing of $40 million was approved in September 2012. The total project cost at completion was $110.5 million, of which the World Bank financed $96.86 million. The project closed on December 31, 2016, 21 months later than the at-appraisal closing date because of the additional financing extension.

This PPAR provides insights into how these two projects identified and addressed critical irrigation sector needs to improve the country's irrigation and drainage systems and institutions, both at on-farm and inter-farm levels. The assessment pays special attention to the effectiveness and sustainability of capacity-building support provided to water consumer associations in both projects. Based on such assessment, the PPAR draws common lessons regarding the design and implementation of both projects, which were led by two separate World Bank Global Practices: Water, and Agriculture. The lessons from this PPAR feed into IEG's forthcoming *Evaluation on Strengthening Irrigation Management Models for Sustainable Service Delivery*.

The assessment is based on relevant documentation, interviews with World Bank staff at headquarters and in the Tashkent Country Office, and the findings of an IEG mission that visited Uzbekistan in October and November 2018. Project performance was discussed with different stakeholders linked to both projects, including the project implementation unit staff, government counterparts, financial institutions, project beneficiaries, World Bank staff, and donors active in the sector. Appendix C lists the persons met during the IEG mission.

Following standard IEG procedures, a copy of the draft report was sent to the relevant government officials and agencies for their review and feedback and no comments were received.

# Summary

## Irrigation and Drainage in Uzbekistan

Uzbekistan is one of the most water-dependent countries in the world; more than 80 percent of its water resources originate in neighboring countries. Agriculture depends on irrigation from the Amu Darya and Syr Darya rivers and groundwater sources. In recent years, Uzbekistan has experienced significant water shortages because of high conveyance losses, poor irrigation planning and scheduling, and inefficient water resources management practices. Aging of the large-scale irrigation infrastructure amplifies existing weaknesses in irrigation management, leading to low efficiency—as much as 70 percent of the irrigation water distributed does not reach the crops. In addition, insufficient drainage in some areas leads to salinization of croplands and major waterlogging problems, which lowers crop production yields and deteriorates ecosystems.

After Uzbekistan's independence after the disintegration of the Soviet Union in 1991, basin and district-level authorities became responsible for operating and maintaining irrigation and drainage (I&D) canals. Water consumer associations (WCAs) were created as nongovernmental and nonprofit organizations in the early 2000s to manage on-farm irrigation canals.

Farmers in Uzbekistan face several disincentives to invest in water-efficient production systems, including (i) no adequate pricing of irrigation water or water quotas, which leads to inefficient water use by farmers; (ii) state-mandated crop production quotas for cotton and wheat, which require large quantities of irrigation; (iii) limited access to rural credit for investments in water-efficient technologies or for switching to more water-efficient and more profitable crops; (iv) weak land tenure security, which reduces the capacity to borrow for more water-efficient technologies; and (v) the lack of an approved water code specifying water rights for water users such as the WCAs.

The rehabilitation of I&D systems and the promotion of farm-level adoption of water-saving technologies in Uzbekistan have been partly financed by the World Bank, including through the two projects assessed in this report: the Ferghana Valley Water Resources Management Project Phase I (FVWRMP-I) and the Uzbekistan Rural Enterprise Support Project Phase II (RESP-II). Both projects identified and addressed critical irrigation sector needs to improve the country's I&D systems and institutions at both on-farm and inter-farm levels. Drainage rehabilitation was a key focus of FVWRMP-I, given that the Ferghana Valley had deteriorated drainage facilities and experienced significant waterlogging and soil salinization. The RESP II expanded on the experience of its predecessor project, RESP-I, and continued to address the lack of rural credit for farmers and agribusinesses in Uzbekistan to invest in agricultural production, diversification, and processing. Both FVWRMP-I and RESP-II included I&D infrastructure rehabilitations and strengthening WCAs' operational capacities. They also included support for

farmer field schools to train farmers on sustainable agriculture practices and water efficient technologies in selected districts.

### Project Performance Assessment Report Objectives

The main objective of this Project Performance Assessment Report (PPAR) is to provide insights into how FVWRMP-I and RESP-II identified and addressed critical irrigation and drainage needs at both on-farm and inter-farm levels with a focus on the effectiveness and sustainability of capacity-building support provided to WCAs in both projects. Based on this assessment, the PPAR draws common lessons regarding design and implementation of both projects, which were led by two separate World Bank Global Practices: Water, and Agriculture. The lessons from the PPAR feed into Independent Evaluation Group's (IEG) forthcoming *Evaluation on Strengthening Irrigation Management Models for Sustainable Service Delivery*.

## FERGHANA VALLEY WATER RESOURCES MANAGEMENT PROJECT PHASE I

### Project Performance and Ratings

The project development objective (PDO) for FVWRMP-I was "To improve agricultural production in areas affected by waterlogging, and to reduce damage to housing and infrastructure from rising groundwater levels and salinity in project districts." The project's overall outcome is assessed as **moderately satisfactory**. The project objectives were, and continue to be, highly relevant to the country's priorities and the World Bank Group's strategy for Uzbekistan. However, the project design weakly reflected a logical causal chain between activities and outcomes, and it is rated **modest**. Efficacy of Objective 1 (to improve agricultural production in areas affected by waterlogging) is rated **modest** given insufficient representative evidence on crop yields and production. Also, some of the key planned irrigation rehabilitation works could not be completed. The achievements resulting from project-funded capacity-building works to improve the functioning of WCAs—and thereby increase the application of sustainable agriculture and water management practices among farmers—were limited. Efficacy of objective 2 (to reduce damage to housing and infrastructure from rising groundwater levels and salinity in the project districts) is rated **substantial**. The project results at completion and during the IEG mission showed substantial reductions in groundwater levels, flooding, and soil salinity levels, but without a credible counterfactual. Nevertheless, available evidence strongly suggests that the extensive and successful drainage rehabilitation works were completed without major issues. Efficiency is **substantial** based on an economic internal rate of return of 51.7 percent (significantly above appraisal estimates), though there were some operational and administrative inefficiencies, particularly in procurement and contract management.

Risk to development outcome is **substantial** because of the continuation of policies and a regulatory environment that do not provide incentives for efficient water usage, and the uncertain availability of adequate funding for maintenance of I&D systems.

World Bank performance is rated **moderately satisfactory** because of weaknesses in the project's quality at entry, such as the lack of appropriate risk mitigation measures for better contract management, a poorly designed results framework, and delays during project implementation in the revision of the results framework.

Borrower performance is rated **moderately satisfactory** because of lengthy procedures for contract clearance, insufficient contract supervision that led to the shortfall in the completion of planned works, and understaffing of the project implementation unit at times, causing deficiencies in the implementation of environmental and social safeguards.

## Lessons

- Establishing adequate institutional arrangements is critical for sustainable use of improved agricultural technologies and practices such as land leveling and deep ripping. For example, IEG found that the deep ripping, land leveling equipment and tractors were not being used in for the benefit of the FVWRMP-I project areas after the project closed. The equipment was handed over to the Uzbekistan Mechanization Institute, a public agency in charge of equipment and machinery, but because the agency did not have a branch in Ferghana Valley, the equipment was not used in that area. WCAs in Ferghana Valley could take care of the equipment and machinery, but the government did not favor providing it to WCAs under the project.

- Sound selection criteria for identifying beneficiaries and areas are crucial for the farmers' uptake and use of water-saving technologies. FVWRMP-I promoted the implementation of drip irrigation as a pilot activity. However, the criteria used to select pilot locations and beneficiaries did not adequately consider the severity of water scarcity in the area, which would entice more water-scarce farmers to prefer using such systems. Other selection criteria to consider in similar projects in the future, based on expert knowledge of good practice, include the appropriateness of the technology in the agricultural system in terms of crops and cropping patterns, water-saving potential based on crop and soil characteristics, water quality to avoid clogging of drip systems, and the option to combine drip irrigation with water storage.

# RURAL ENTERPRISE SUPPORT PROJECT PHASE II

## Project Performance and Ratings

The PDO for RESP-II was "To increase the productivity and financial and environmental sustainability of agriculture and the profitability of agribusiness in the project area." The project's overall outcome is assessed as **moderately satisfactory.** The basis for this assessment is that the relevance of the PDO is rated **modest** because of the shortcomings in defining a measurable project objective. The relevance of the project design is rated **substantial** based on the components' logical and the mutually reinforcing alignment of project components. Efficacy of objective 1 on increased productivity is rated marginally **modest,** given insufficient representative evidence on yield and increases in income. Efficacy of objective 2 on financial sustainability is rated **substantial** based on demonstrated strengthened financial capacity of WCAs and farmers. Efficacy of objective 3 on environmental sustainability is also rated **substantial** because of the strong evidence on improvements in water efficiency, reductions in water losses and consumption, and uptake of water-saving practices. Efficacy of objective 4 on agribusiness profitability is rated **modest,** given insufficient evidence on the profitability of enterprises. Efficiency is rated **substantial** based on an ex post estimated economic rate of return of 47 percent for component 1 and 32 percent for components 2 and 3.

Risk to the development outcome is rated **moderate** given the capacity built and equipment provided to WCAs to operate and maintain on-farm I&D investments, and the continued adoption of water-saving irrigation practices among farmers during a rapid transformation process with continuous institutional change, causing uncertainly about the future institutional and policy environment.

World Bank performance is rated **moderately satisfactory** given design shortcomings at entry and during project implementation. The results framework lacked outcome indicators to environmental sustainability and clear indicators on agribusiness profitability, which were not revised appropriately during the project's several restructurings.

Borrower performance is rated **moderately satisfactory** based on implementation delays caused by lengthy internal review processes, despite being a second-phase project, and the government's insufficient support for WCAs in defining their role and access to budgetary support within the irrigation sector's administrative system.

### Lessons

- Coordinated and mutually reinforcing capacity building of financial institutions and farmers is crucial for establishing viable on-farm investments. For example, RESP-II strengthened banks' business plan appraisal and risk assessment capacities while providing farmers with the ability to develop high-quality business plans and adopt

improved production practices. This stimulated an increase in agricultural lending in Uzbekistan.

- Clear concept, measurement, and disclosure arrangements at project appraisal for sensitive data can ensure the availability of results at project completion. For example, the RESP-II appraisal document did not provide clarity on which aspects of agribusiness profitability the project was expected to increase as one of its objectives. Although the participating banking financial institutions collected data on aspects of agribusiness profitability, the project's design provided no arrangements to access such confidential information to assess the efficacy of the agribusiness development program.

## Comparison of FVWRMP-I and RESP-II in WCA Capacity Building

The capacity-building and operational strengthening results of WCAs in FVWRMP-I and RESP-II reveal several similarities and differences between the two projects. The type of support provided to the WCAs in both projects had similarities. Differences emerged in the results, which were strongly influenced by the availability of donor grant financing in RESP-II that provided structured support and financing for high-quality trainings and equipment essential for WCA operations and maintenance, empowering WCAs for better service delivery. Such financing was not available in FVWRMP-I. However, the RESP-II beneficiary WCAs became better equipped than the beneficiary WCAs under FVWRMP-I, but this did not make a difference in irrigation service fee collection rates, financial sustainability, or beneficiary satisfaction rates. The main evaluation key messages are the following:

- **WCA operational and managerial capacity**. Both projects provided consistent, practical trainings for beneficiary WCAs in financial management plans, irrigation scheduling plans, and operation and maintenance (O&M) plans for each WCA (25 for FVWRMP-I and 62 for RESP-II). However, an important difference was that RESP-II provided its beneficiary WCAs with a computer (with accounting software) and a printer, given their need for such equipment. WCAs in FVWRMP-I were not provided with such crucial equipment because credit sources were not considered for institutional capacity-building purposes.

- **WCA maintenance capacity**. Only RESP-II provided all of its beneficiary WCAs with equipment for canal cleaning and other maintenance services based on their needs and preferences. These included bicycles, motorcycles, tractors with a loading bucket or excavator attachment, and bulldozers, among others. As a result, at RESP-II completion, all WCAs could undertake on average 87 percent of their O&M work compared with 34 percent at baseline. By contrast, none of the 25 WCAs of FVWRMP-I could provide adequate canal maintenance services. These WCAs noted that one of the main reasons for the shortfall in maintenance was the lack of essential equipment to conduct maintenance.

- **WCA financial sustainability**. The WCAs of RESP-II faced similar challenges in service fee collection rates (43 percent under FVWRMP-I in 2015 and 45 percent for RESP-II

beneficiary WCAs on average in 2014), even though they were equipped to execute I&D maintenance services, and hence were providing better service delivery to their members.

- **Farmer satisfaction rating on WCA services.** Water user satisfaction with WCA services between the two projects differs only slightly, with 82 percent of member farmers of RESP-II WCAs expressing satisfaction with their performance in 2016. In comparison, in FVWRMP-I districts, on average 70 percent of farmers expressed satisfaction in equitable water distribution. This was a surprisingly high proportion given the inability to deliver maintenance services.

## Common Lessons from FVWRMP-I and RESP-II Assessments

- Expanding the uptake of water-efficient agricultural technologies requires policies that provide a strong incentive to adopt those technologies. Both projects included activities to promote farmers' application of water-saving technologies. However, such use was limited in FVWRMP-I. Despite generally better technology adoption in RESP-II at project completion, the sustainability of those practices is at risk given the current policy environment. An improved incentive structure would include policies encouraging adequate water pricing and/or quotas to avoid water overuse by farmers, promoting less water-intensive crop cultivation, and enhancing land tenure security and access to rural finance.

- Water consumer associations can deliver efficient irrigation services when backed by a legal framework that clearly specifies their responsibility and accountability within the entire irrigation service delivery institutional system. The assessment of WCAs in the FVWRMP-I and RESP-II projects revealed deficiencies because of the lack of specific regulation and accountability measures for WCAs in Uzbekistan. Such regulations are crucial to warrant the effective execution of contractual relationships between WCAs and local irrigation and drainage system authorities, and between WCAs and member farmers.

- Water consumer associations can deliver efficient irrigation services when they have access to continuous and sufficient financial resources. WCAs under FVWRMP-I and RESP-II suffered from persistently low service fees and insufficient collection rates. One reason for this was their inability to provide the services in delivering irrigation water and maintaining irrigation canals under their responsibilities, as in FVWRMP-I (disincentivizing farmers to pay for services not received). However, WCAs that execute their services often face challenges in collecting service fees owed by all of their member farmers. The lack of sufficient financial resources has led WCAs to accumulate significant debt and develop an inability to pay and retain staff, as evidenced under both projects.

- Coordination and consistent approaches across World Bank projects in the same sector are crucial to ensure broad and harmonized institutional capacity building. Both FVWRMP-I and RESP-II aimed at improving the capacity of WCAs and farmers, but they differed in their design and approach partially because of the availability of parallel donor grant financing and engagement under RESP II. Although training issues were similar in both projects, RESP-II also provided WCAs with small-scale equipment to enable them to execute their operational and maintenance needs. Field demonstrations and farmer field schools under RESP-II were designed better than those under FVWRMP-I because they were based on regular needs assessments of farmers and close monitoring, leading to a higher uptake of improved and sustainable practices.

José Carbajo Martínez
Director, Financial, Private Sector, and
Sustainable Development
Independent Evaluation Group

# 1. Background and Context

1.1 Uzbekistan is a landlocked country with a surface area of 448,900 square kilometers and comprised largely of desert or semi-desert (Sutton et al. 2013). The population is about 33 million (the largest among the five countries of Central Asia), more than 60 percent of whom live in densely populated rural communities. Administratively, the country is divided into 12 regions and one autonomous Republic of Karakalpakstan. Uzbekistan's climate is continental, with hot, dry summers and short, extremely cold winters. The annual evaporation rate is about 1,600 millimeters, which greatly exceeds the annual rainfall of about 100–200 millimeters (World Bank Institute 2007). Thus, large-scale irrigation for cultivated crops is essential for agriculture.

## Agriculture Sector

1.2 After Uzbekistan's independence in 1991, a slow transformation took place from Soviet-formed *kolkhoz* and *sovkhoz* (i.e. collective or state owned farms ) to family-oriented cooperative farms (*shirkat*). The establishment of individual leasehold farms within each shirkat started in the beginning of the 2000s. Individual farms are long-term leaseholdings of 30 to 50 years, leased by the state and held by a farmer, with each farm employing 10–15 permanent workers. Currently, about 89,700 leasehold farmers exist in Uzbekistan's agriculture sector. The average farm size is about 75 hectares, and individual leasehold farms use most of Uzbekistan's arable land. The state has retained the system of state planning for its main agricultural products, cotton, and wheat. Local authorities regulate the production outputs, and at the beginning of each growing period (April to September), they calculate a minimum amount that farmers need to produce. The state is the main buyer of the cotton production, and farmers must deliver a quota of wheat to the state but are free to sell the rest in the market (MWR 2018).

1.3 In addition, large portions of land were redistributed from collective production to household production. Each rural household received about 0.13 hectares as an additional plot as a long-term lease close to their 0.12 hectares of household plots. Each rural household obtained about 0.25 hectares of plot to use mainly for subsistence agriculture. The household plots were reclassified in 1998 as *dehkan* farms (also known as smallholders), and they grow vegetables and raise livestock. Presently, about 4.7 million smallholder farmers (with small land plots of less than 0.5 hectares) produce on less than 15 percent of arable land, and their production is less state-controlled. Their production has experienced a significant increase in output compared with that of the early 2000s (Veldwisch and Bock 2011).

1.4 Agriculture remains an important sector for the economy of Uzbekistan, contributing to 19 percent of gross domestic product in 2016 and creating jobs for 3.6 million people, representing 27 percent of the country's labor force. In addition, 4.7 million dehkan farm households sustain their livelihoods from producing and selling horticulture and livestock products. This makes primary agriculture the largest employer in the country. In the last 20

years, the value of agricultural production almost tripled in nominal terms (State Statistical Committee of Uzbekistan). The growth in agricultural value added (average annual growth rate of 6.3 percent since 2000) was about three times higher than the global average growth of 2.8 percent, according to the World Bank's World Development Indicators. Diversification started as more land began to shift gradually from cotton to alternative crops. In 2000, cotton accounted for 40 percent of the total sown area, and this share dropped to 36 percent in 2017. Between 2000 and 2017, the production of wheat doubled because of the increase in both area and yields; the production of fruits, berries, grapes, vegetables, potatoes, and gourds increased fourfold; and the production of major livestock products tripled (State Statistical Committee of Uzbekistan). Recently, horticulture products (fruits, vegetables, berries, and gourds) have overtaken cotton as the major agricultural export commodity group. The recent liberalization of exports and the devaluation of the exchange rate helped horticulture export revenues grow by more than four times between 2007 and 2011 (State Statistical Committee of Uzbekistan and World Development Indicators of the World Bank).

## Water Resources, Irrigation, and Drainage

1.5 Uzbekistan is one of the most water-dependent countries in the world, and more than 80 percent of the country's renewable water resources originate in neighboring countries. Annual water availability is nearly 1,700 cubic meters per person and approaches stress levels. Almost all agriculture depends on irrigation because of the country's arid climate. About 97 percent of crop production is on irrigated land, and the country has an estimated 4.3 million hectares of land suitable for irrigation, a figure significantly larger than that in the other four Central Asian republics. The total annual water use is 51 cubic kilometers, of which about 46.8 cubic kilometers (more than 90 percent) is used in agriculture. The Amu Darya and Syr Darya Rivers supply 80 percent of water to Uzbekistan's irrigated fields. The rest is supplied by groundwater or originates in the country's mountainous areas. The two rivers discharge into the Aral Sea, formerly the fourth largest lake in the world with a booming fishing industry (World Bank 2017a).

1.6 Water resource availability in Central Asia has important seasonal, geographic, and economic dimensions, and downstream countries (including Uzbekistan) depend highly on upstream countries for essential irrigation water. Uzbekistan has been experiencing significant water shortages because of high conveyance losses, poor irrigation planning and scheduling, and inefficient application in the fields because water is free of charge. Water shortages could worsen with increasing aridity caused by anticipated climate change and continued use of conventional irrigation techniques, along with heavy reliance on irrigated agriculture. The World Resources Institute projects that Uzbekistan will be among the world's 33 most water-stressed countries by 2040. According to a national communication to the United Nations Framework Convention on Climate Change (UNFCCC), by 2050, cotton and wheat yields are projected to decrease by 11–13 percent and 5–7 percent in the Syrdarya basin, respectively, and

by 13–23 percent and 10–14 percent in the Amu-Darya basin, respectively (UNFCCC, 2008). Such declines will have major implications for both food security and the balance of payments, further underscoring the need to shift to more sustainable water and crop-management practices.

1.7 However, the absence of water pricing or water quotas and the government policy to cover operational and maintenance expenses of the irrigation systems constrains the adoption of water-saving technologies. In addition, weak land tenure security has been reducing farmers' incentives to invest in land and soil fertility improvements. The extensive irrigation and drainage networks that were built since the 1950s have been aging. During the past 25 years, operation and maintenance (O&M) has suffered from substantial underfunding, with only about 15–25 percent of requirements covered by the Ministry of Agriculture and Water Resources (MAWR). Aging infrastructure amplifies existing weaknesses in irrigation management, leading to low efficiency, with as much as 70 percent of the irrigation water distributed not reaching the crops (World Bank 2017a). In addition, insufficient drainage led to secondary salinization of croplands and major waterlogging problems. Soil salinization now affects more than 50 percent of the irrigated lands and is a major threat that is leading to declining crop production and deteriorating ecosystems (MWR 2018).

1.8 In 2003, a Basin Irrigation System Authority (BISA) and Irrigation System Authority (ISA) were established in place of regional and district-level irrigation system agencies and Hydrogeological Meliorative Expeditions in charge of drainage. To fill the large vacuum for managing on-farm irrigation canals that were previously managed and maintained by kolkhoz and sovkhoz, water consumer associations (WCAs) were created as nongovernment, nonprofit organizations to (i) ensure reliable distribution of water among water consumers; (ii) determine and collect irrigation service fees; (iii) resolve disputes on water use and management of the irrigation system in an appropriate, transparent, and democratic manner; and (iv) maintain, refurbish, and improve the irrigation system in the WCA operational area. By 2018, 1,503 WCAs were in operation (MWR 2018). However, many issues remain that affect WCAs' operations (Swinkels, Romanova, and Kochkin 2016):

- Water code and regulation for WCAs to regulate financial and operational sustainability of WCAs and to provide a stronger governance and accountability mechanism still need to be enacted. WCAs were generally created based on former shirkats' borders of, that is, on administrative, not hydrographic boundaries. A strong legal basis for the supervisory board of farmer representatives to oversee the WCA directors is lacking.
- Water allocation policy needs to be in line with land use liberalization policy. Although the government has indicated an interest in allowing farmers to grow the crops they prefer to grow, the water allocation policy prevents allocation of adequate irrigation water for crops that could generate higher returns per volume of water used.

- WCAs function without binding contractual relationships between the ISA and WCA and between WCA and the consumers, making it difficult to sanction violations. For example, an ISA cannot be held accountable for how much water it has agreed to deliver, and farmers cannot be held accountable for unpaid irrigation service fees.
- The irrigation service fee (ISF) is charged on a per hectare basis, and thus does not encourage water saving for farmers. The ISF rate and payment rate by farmers are low. WCAs are in debt because of low irrigation fees, high salaries, and substantial operational costs.
- WCAs lack the financial means and equipment to maintain the on-farm canals under their responsibility. WCAs also lack adequate water-measuring structures and the organization for water accounting. These factors may undermine the role and viability of WCAs over time.
- The needs of dehkan and household farmers are not always included in management of irrigation water because they are not members of WCAs. This complicates the delivery of irrigation water supply equitably for all users.

## Role of the World Bank

1.9 The World Bank has been actively providing support to the government to address these issues. The following is the list of the closed and active projects relevant to the two projects considered in this Project Performance Assessment Report (PPAR): (i) Rural Enterprise Support Project (P046043, $35 million, closed in 2008); (ii) Drainage, Irrigation, and Wetlands Improvement Project in South Karakalpakstan (P009127, $62 million, closed in 2013); (iii) Ferghana Valley Water Resources Management Project Phase I (FVWRMP-I; P1100538, $66 million, closed in 2016); (iv) Rural Enterprise Support Project Phase II (RESP-II; P109126, $105 million, closed in 2016); (v) Horticulture Support Project (P133703, $150 million, active); and (vi) Livestock Development Project (P153613, $150 million, active).

1.10 The two projects assessed in this report, FVWRMP-I and RESP-II, were prepared amid the changes resulting from the agricultural sector reform process. They identified and addressed critical irrigation sector needs at the time to improve the country's irrigation and drainage (I&D) systems and institutions both at on-farm and inter-farm levels, and to increase access to rural finance for agricultural production and processing. FVWRMP-I was conceived on the basis that although the Ferghana Valley lacked effective drainage facilities, the area suffered from waterlogging and soil salinization. Soil degradation, low water-use efficiency, overirrigation, weak infrastructure and institutions, and a lack of farmers' incentives were the main factors impeding the improvement of productivity and sustainability of irrigated agriculture in the area. RESP-II built on the experience of the pilot RESP-I (2002–08) and similarly aimed to address the serious deterioration of existing on-farm and inter-farm I&D systems and tackled persistent constraints to rural finance for private farmers and

agribusinesses. Responding to the demand of the government of Uzbekistan, RESP-II scaled up the RESP interventions from five pilot districts to seven regions (with 88 districts) and made project design modifications based on lessons from the RESP experience.

1.11 The main objective of this PPAR is to obtain insights into how both projects identified and addressed critical irrigation sector needs at the time to improve the country's irrigation and drainage systems and institutions, with specific attention to the effectiveness and sustainability of capacity-building support provided to WCAs in the two projects. The lessons drawn from this PPAR will also contribute to the Independent Evaluation Group's (IEG) forthcoming Evaluation on Strengthening Irrigation Management Models for Sustainable Service Delivery.

# 2. Ferghana Valley Water Resources Management Project Phase I

2.1 **Project dates, cost, and financing**. FVWRMP-I was financed through an International Development Association (IDA) specific investment loan credit of special drawing rights (SDR) 42.2 million, equivalent to $65.54 million at the time of appraisal (World Bank 2009). The actual IDA financial contribution was $48.82 million (74.5 percent of the appraisal amount). The borrower planned to contribute $16.31 million, but instead provided $0.21 million (1.29 percent of the appraised amount). The project was approved on September 24, 2009 and was expected to be closed on July 31, 2016, but closed on December 31, 2016 to allow completion of activities under the international competitive bidding (ICB-3) until the end of the construction season, which helped to expand project benefits for farmers.

2.2 **Restructuring**. The project had three level 2 restructurings during its life that did not involve revising the project development objectives (PDOs) or making substantial changes to the components and project scope. The first restructuring was in April 2015 to formalize an agreement made during the midterm review to address inconsistencies and discrepancies in the project's results framework (see the monitoring and evaluation [M&E] section for details). The second restructuring was in December 2015 to allow reallocation of funds from the unallocated category to the cash compensation and other assistance category. The third restructuring was in July 2016 to allow a five-month extension of the closing date.

## Relevance of the Objectives and Design

### Objectives

2.3 The same PDOs were stated in the project appraisal document (PAD) of August 31, 2009 for the FVWRMP-I and the financing agreement dated February 9, 2010: "To improve agricultural production in areas affected by waterlogging, and to reduce damage to housing

and infrastructure from rising groundwater levels and salinity in project districts" (World Bank 2009a).

## Relevance of the Objectives

2.4 The relevance of PDO is rated **high**.

2.5 The PDO remained highly relevant to Uzbekistan's country strategies. The PDO supported key areas of Uzbekistan's Welfare Improvement Strategy (WIS) that the World Bank developed jointly with the government in 2008. The strategy's priority areas included poverty reduction and improvement of the population's living standards, environmental protection, and provision of irrigation and drainage services. Specifically, the WIS objectives included "improving the irrigation system and increasing the efficiency of water resource management, including investment in land improvement" and "development of an integrated, sustainable water management system for supply of irrigation water" (World Bank 2008c). The project aimed to contribute to achieving the broader outcome of poverty reduction through increased productivity and incomes of small-scale and marginal landholders. The government's Program of Action for 2015 and subsequent years included the goals of increasing agricultural productivity, land restoration, and modernization of irrigation and drainage systems to achieve its strategic objectives for economic development. Uzbekistan's Development Strategy for 2017–21 prioritizes modernization and intensive development of agriculture through (i) further improvement of irrigated lands, (ii) development of the I&D facilities, and (iii) widespread introduction of intensive methods in agricultural production, especially modern water- and resource-saving agricultural technologies.

2.6 The PDO remained highly relevant to three World Bank strategies over fiscal years (FY) 08–20. The Country Assistance Strategy (CAS) for FY08–11 supported the government's WIS and comprised Pillar 2 on "increasing economic opportunities in rural areas" that included supporting projects on water resource management, irrigation, and drainage. In line with the objectives of the WIS, the World Bank assistance aimed at rehabilitating and modernizing irrigation systems, supporting more cost-effective supply and use of irrigation water, improving farmland management, and introducing modern technology and institutional development for improved irrigation (World Bank 2008c). The Country Partnership Framework (CPF) for FY16–20 includes focus area 2 (agricultural competitiveness and cotton sector modernization) and focus area 3 (public service delivery) that are aligned with the project PDO. Under results area 1, the CPF also emphasizes improving water resources management and climate change preparedness (World Bank 2016).

## Relevance of Design

2.7 **Project components:** The project had three components.

2.8 **Component 1: Improvement of irrigation and drainage network (**appraisal cost: $71.6 million; actual cost $42.05 million). This component aimed to address the problem of high groundwater levels by financing improvements in the surface I&D network and installation of subsurface horizontal drainage wells and vertical drainage wells. The component financed consultancy services for engineering designs, construction supervision, and contract management of works, and cash compensation and other assistance to individual leasehold farmers affected by the construction of new, open interceptor drains and loss of crops and trees, in accordance with the resettlement policy framework and specific resettlement action plan. The following revisions were made to scope during implementation through various restructurings: (i) cancelation of rehabilitation of earth irrigation canals because they were deemed unnecessary during implementation, and (ii) cancellation of rehabilitation of some collector structures because they were unsuitable, according to the selection criteria.

2.9 **Component 2: Institutional strengthening and agricultural development support** (appraisal cost: $6.09 million; actual cost: $3.35 million). This component supported institutional strengthening of public institutions through financing of supply of O&M, laboratory, information technology, and office equipment, and training and study tours. The component also supported private farmers' organizations involved in water management and utilization through dissemination of modern agricultural and water management practices to members of WCAs and small dehkan farmers through provision of training and establishment and operation of field demonstration plots, including pilot drip irrigation, on-farm water management. The technical assistance on drafting a new water code and the legislation and regulations for WCAs were dropped in 2010 because the United Nations Development Programme (UNDP) provided technical assistance to support the government in improving the national water legislation and the WCA regulation. An interagency group comprising 16 ministries and agencies developed the draft water code from 2010 to 2013.

2.10 **Component 3: Project management and monitoring and evaluation of project impact** (appraisal cost: $4.35 million; actual cost: $3.63 million), This component aimed to finance the strengthening the capacity of MAWR and the project implementation unit (PIU) for project management (one in Tashkent and the other in Rishtan) and M&E by providing goods, consultant services, project audit, and training, and financing of operating costs.

2.11 **Implementation arrangements**. MAWR had the overall responsibility for project implementation. Through branches at the province and district levels, MAWR was responsible for water planning, O&M of I&D systems up to the boundary of leasehold farm boundaries, and administration of international river systems regarding water sharing and quality control. The deputy minister for water was the project coordinator, with the overall project management and coordination with other ministries and agencies. A project steering committee established in August 2009 provided overall guidance and helped to coordinate project implementation and

resolve issues across government agencies. The PIU conducted day-to-day project implementation.

## Relevance of the Design

2.12 Relevance of design is rated **modest**. The project had a complex objective comprising different outcomes of improving agricultural production in areas affected by waterlogging, and reducing damage to housing and infrastructure from rising groundwater levels and soil salinity. The intrinsic theory of change in the PAD suggested that the objective of improving agricultural production in areas affected by waterlogging would be achieved through (i) higher crop yields and increased cropping intensity resulting from better drainage, reduced waterlogging, an enhanced supply of irrigation water achieved through activities under component 1, and adoption of improved agronomic techniques and crop rotation achieved mainly through institutional strengthening activities under component 2; and (ii) avoidance of a gradual loss of production resulting from the increased waterlogging and soil salinity. The objective of reducing damage to housing and infrastructure from rising groundwater levels and soil salinity was planned to be achieved through drainage activities under component 1 that would lead to reduced flooding and waterlogging.

2.13 However, the causal chains linking the project's inputs and outputs to the outcomes that the project sought to achieve were not adequately developed in the results framework. Particularly, outcomes from component 2 (changes in the institutional capacity, including WCAs) and how they were contributing to increasing water use efficiency and achievement of the PDO were not measured. Although the results framework was weak, some outcome and intermediate outcome indicators were missing, and some indicators proposed were not measurable.

2.14 Because of the shortcomings in the M&E framework, many of the intermediate outcome indicators were modified or dropped during implementation, but weaknesses were not completely resolved (see the M&E section).

## Monitoring and Evaluation

2.15 The project's M&E is rated **modest**.

### Design

2.16 The project's original outcome indicators included decreased groundwater level, increased crop yields for major crops, and reduced flooded areas. Output indicators included length of irrigation and drainage canals rehabilitated, increased use and discharge in quantity of drainage water in cubic meters per second, decreased groundwater table and gradual reclamation of 1,180 hectares of waterlogged area, and number of people trained in sustainable agriculture and improved water resources management practice. During the restructuring in July 2015, the M&E framework was substantially revised—new indicators were introduced, and

some key indicators were dropped or revised to clarify the definitions, and to improve baseline and target values and mode of measurement. For example:

- "Decreased area with high groundwater mineralization" was introduced to measure the improvement in the level of water mineralization.
- "Land users adopting sustainable land management practices as a result of the project" was included to measure the impact of project training better.
- "Increased use and discharge in quantity of drainage water in cubic meters per second" was dropped because the quantity of water discharged varied throughout the year and could not indicate drainage system efficiency.
- "Length of irrigation canals and drains rehabilitated and functional (kilometers)" (the end target for the indicator) was reduced from 3,400 kilometers to 1,349 kilometers because it was found that the original volume of inter-farm and on-farm earth canals (about 2,000 kilometers) that were proposed in the feasibility study were not needed.

2.17 Still, the following shortcomings remained:

- There was no PDO indicator to assess the actual reduction in flood damage to housing and infrastructure.
- Intermediate outcomes under component 2 for the institutional capacity building targeting WCAs and public institutions were not monitored. For example, no indicators measured if and how much the capacity of public institutions increased implementation of investments in I&D systems. Additionally, no indicators measured whether capacity-building activities for WCAs made a difference—that is, whether WCAs improved planning and prioritizing of water delivery service to their members or if service fee collection rates improved.
- There were no indicators measuring irrigation and drainage canal efficiency and operability of the rehabilitated sections funded under the project (changes in water loss were not assessed). The M&E framework did not monitor whether water availability increased, particularly in summer months.
- There were no indicators measuring water use efficiency (amount of water used per amount supplied) and water productivity (yield per amount of water consumed).

### Implementation

2.18 The M&E responsibility for data collection and analysis was outsourced to a consortium of consulting companies that had local and international experience. This arrangement brought in additional expertise in data collection and analysis. A comprehensive baseline survey was conducted on project launch, and continuous efforts were made to keep monitoring results up

to date. The M&E consultants provided suggestions to improve the results framework, which resulted in clarifying the definition of some indicators and improving the methodology for the monitoring of others. However, the Implementation Completion and Results Report (ICR) noted in paragraph 33 that data related to wheat and cotton productivity, both from official statistics and from farmers' surveys, were questionable because, according to the ICR's argument, respondents had an incentive to understate productivity because of the mandated area quota arrangements on these crops (World Bank 2017b).

2.19 An effective counterfactual was not established. The control area selected for the impact evaluation (Kushtepe district) was deficient, even though selection was based on similar characteristics, such as altitude, crop profile, and type of irrigation system. The control group presented similar outcomes on several dimensions, including the yield outcomes for several of the crops, groundwater and soil salinity levels, and improvements in WCAs, for example. IEG was informed that the district drainage collectors also went through a similar rehabilitation exercise funded by state funds, which led to parallel results. A more systematic analysis was needed to select a more representative control group.

### Use

2.20 The M&E data were used mainly during the midterm review to inform proposals for restructuring the project and to improve the M&E framework. The project's M&E system contributed to improving data collection and analysis of water quality. Additionally, information gathered showed that the demand for drip irrigation equipment proved lower than forecasted, but it was not clear how this information was used in the project's management. The IEG mission found that project results were used to draw lessons that fed into the design of the follow-up, FVWRMP Phase II.

## Implementation Experience

2.21 **ICB contracts**. The project had three large ICBs instead of numerous smaller contracts. Although this made the project outcome dependent on a few major contractors, less time was spent on procurement procedures, which made managing the contracts easier. At project closing, the ICB-1 contract that constituted 65 percent of project funds was completely implemented even though there were delays regarding customs procedures for the heavy equipment. The ICB-2 contract that covered rehabilitation of on-farm networks was partly executed because of financial difficulties faced by the contractor, and eventually only about 50 percent of the originally planned facilities were rehabilitated. Regarding the ICB-3 contract, the contractor showed low responsiveness on contract signing, reflected in delayed contract execution until the last year of the project for reasons not clearly explained to the IEG mission. The contractor eventually mobilized and completed part of the contract (see the Achievement of Objectives section).

2.22 **Midterm review.** A midterm review of the project held in November 2013 (about 3.5 years after effectiveness) identified actions needed to resolve various deficiencies in the implementation of contracts and safeguards measures**.** Revision of the results framework was achieved during the midterm review, including revision of the methodology for monitoring certain indicators, clarification of the definition of indicators, and adjustment of the baseline and target values.

## Financial Management and Procurement

2.23 **Financial management:** A financial management manual was developed describing internal control procedures, accounting, budgeting and planning, reporting, internal controls, external audits, funds flow, and organization. The financial management staff had experience with World Bank procedures. The implementation of the system was acceptable to the World Bank in general. The project financial management system provided timely information and reporting for the project. Audit reports were reportedly received as planned with unqualified opinions on the project financial statements.

2.24 **Procurement.** The PIU's procurement capacity was adequate, but processing of procurement packages experienced delays caused by external factors, such as long registration by Ministry of Foreign Economic Relations and Trade (MFERIT). The World Bank considered the project's procurement performance as moderately satisfactory. The filing system was acceptable, and no major issues were noted.

## Safeguards Compliance

2.25 The project was a category B on environmental safeguards, considering rehabilitation and modernization of the I&D systems were not expected to involve any significant or irreversible adverse environmental impacts. Three safeguard policies were triggered: (i) Environmental Assessment (OP/BP 4.01), (ii) Projects in International Waterways (OP/BP 7.50), and (iii) Involuntary Resettlement (OP/BP 4.12). The project's location in Syr Darya River Basin (which Uzbekistan shares with its riparian neighbors) triggered the second safeguard. The involuntary resettlement safeguard was triggered because rehabilitation of drainage infrastructure required acquisition of agriculture land used by several farmers, and because of removal of trees planted along roadways, canals, and collector drains. As part of the environmental assessment, an environmental mitigation and management plan was prepared in 2009 to identify areas for environmental monitoring, and institutional strengthening and impact mitigation.

2.26 Overall, the project complied with the implementation of safeguards. Previous reviews of the safeguards confirmed full compliance.

## Achievement of the Objectives

2.27 For this assessment, the PDO was divided into two parts, referred to as objectives: (i) to improve agricultural production in areas affected by waterlogging, and (ii) to reduce damage to housing and infrastructure from rising groundwater levels and soil salinity.

2.28 IEG used four sources of evidence to assess the achievement of the PDO: (i) the ICR assessment (World Bank 2017b), (ii) the ICR Review (World Bank 2017c), (iii) the project impact evaluation (baseline and end of project), and (iv) the IEG PPAR fieldwork conducted in October and November 2018 covering all three project districts (Altiarik, Baghdat, and Rishtan). The IEG PPAR fieldwork applied several validation tools, including site visits, interviews with a sample of direct beneficiaries, and interviews with implementers and other stakeholders (described in appendix B). The IEG fieldwork was based on a small number of interviews that were not representative of the FVWRMP-I project beneficiary population.

### Objective 1

2.29 The achievement of the project's development objective (to improve agricultural production in areas affected by waterlogging) is rated **modest** because the project had only a modest impact on crop yields and production. FVWRMP-I aimed to increase agricultural productivity through rehabilitation of I&D works, and provision of technical assistance and advisory services to public institutions, WCAs, and farmers on improved agricultural and water management practices. Appendix D provides a detailed list of most relevant outputs. The results of institutional capacity building for WCAs and farmers on sustainable agricultural and water management practices are discussed in the next section.

#### Intermediate Outcomes

2.30 **Sustainable agriculture and water management practices**: Approximately 64 percent of all farmers in the project districts visited demonstration pilots to familiarize themselves with innovations. According to the farmer survey, of the 1,953 farmers who were trained through farmer field school demonstration pilots, 796 (about 40 percent) confirmed that they started to apply improved cotton and wheat production techniques, which were simple and did not require costly investment (the intermediate outcome indicator target of 1,000 farmers was achieved by 79 percent). However, the number of farmers who applied main demonstration pilot technologies, such as drip irrigation or deep ripping, was much smaller because of their high costs (World Bank 2017b, para. 49).

2.31 **IEG Assessment of Sustainable Agriculture and Water Management Practices**

- **Drip irrigation**. The IEG mission visited three leaseholder farmers chosen to implement pilot drip irrigation. During the visit, two of the farmers had taken away the drip irrigation pipes and kept them in storage. These farmers stated that they were

continuing to use the pipes in the summer only and removing them in the winter because of concerns that they would freeze in subzero temperatures. By contrast, the third farmer visited still had the pipes laid in his orchard and stated that concerns about freezing were unwarranted, and that winter storage of pipes is unreasonable because of the considerable effort needed to lay the pipes and remove them each time. IEG's conclusion from these interviews is that even though the farmers received the drip irrigation equipment under this pilot activity, two of the farmers (of the three IEG visited) were not using it. This is contrary to the ICR's argument that high costs are the only reason for the low demand for drip irrigation.

- IEG concludes that the project considered only certain aspects under its selection criteria that partly explain the low interest from farmers. According to the literature, criteria for introducing drip irrigation should consider the following: (i) degree or severity of water scarcity favoring introduction of drip irrigation; (ii) appropriateness of drip irrigation in the agricultural system (crops and cropping pattern); (iii) water-saving potential (crop water demand)—soil influences on water losses in surface irrigation, for example: higher potential for water saving on sandy soils that are difficult to irrigate with conventional furrow or basin methods; (iv) water quality (clogging of drip systems); and (v) option to combine drip irrigation with water storage (to ensure temporal availability of water). IEG obtained information on the criteria used for selecting farmers for drip irrigation, which were water scarce area, water availability for a minimum of 5–10 hectares of orchards close by, interest from the farmer, and young orchard trees. IEG was also informed that some farmers grow fodder crops around the orchards, and with drip irrigation, they cannot continue this practice, which may be another reason for the low demand for drip irrigation. However, criteria including water-saving potential, water quality, and particularly severity of water scarcity were not considered comprehensively during piloting of this technology.
- **Deep ripping and other techniques**. The IEG mission also visited three demonstration plot farmers (one in each district), two leaseholder farmers, and one dehkan farmer. All of the farmers stated that they benefited from the project's trainings and support. Regarding application of project-taught methodologies, two of the demonstration farmers mentioned that they still use the crop rotation technique, though one famer mentioned that he could not rotate crops because of the state-mandated quotas. One farmer mentioned that he continues to apply local fertilizers. All of the farmers visited mentioned increased yields (see the Outcomes section for details).

2.32 **Results of capacity-building activities for WCAs.** The project did not monitor any indicators to measure the results of WCA capacity-building activities. According to a 2016 survey of all 25 WCAs in project districts, all 25 found the project-financed trainings highly useful (MAWR, 2016) . Additionally, the project impact assessment measured farmers' opinions on the effectiveness of WCAs in water distribution, water supply reliability, governance, and

irrigation service fee collection rates. However, the results were inconclusive—there was no credible counterfactual because the control group was poorly specified.[1]

**Box 2.1. Summary of the Efficacy of WCA Capacity-Building Activities by the Project's Impact Evaluation**

- Seventy-eight percent of farmers in project districts stated that there was equitable distribution in 2015. Regarding quantity of irrigation water in the summer, 60 percent of famers in project districts said the water supply was adequate, and only 53 percent of farmers said it was delivered on time (no control group data were presented on these aspects).
- WCA members' satisfaction with WCA services increased from 38 percent to 70 percent between 2011 and 2015: 68.8 percent of farmers considered that WCAs' performance in making fair decisions had improved substantially, and 25.8 percent stated that this performance had "somewhat" improved.
- WCA records show that the average irrigation service fee collection rates increased from 33.5 percent in 2011 to 42.9 percent in 2015 for three WCAs in the project district. In Baghdat and Rishtan district WCAs, the irrigation service fee collection rates increased during this period, though the collection rate of WCAs in Altiarik district declined by 10.7 percent.
- Cumulative WCA debts continue to be high, even though the government compensated the WCA electricity bills in 2014 and 2015. Debts mainly included staff salaries, taxes, and electricity expenditures.
- The impact evaluation report noted that the effect of project training for the WCAs could not be sustained because of high turnover in the WCA staff.

*Source:*: Project Impact Evaluation Report 2016 (pages 175–206).

2.33 **IEG assessment of the project's WCA capacity-building activities**. IEG interviewed nine WCAs of 25 project-supported WCAs (three in Altiarik, five in Bagdat, and one in Rishtan). Interviewees noted that the project provided several seminars to WCA staff and its members on water scheduling, accounting, preparing business plans, water rights, and so on. They were generally pleased with the trainings' quality. All of the WCAs that met with IEG stated that they continue preparing annual budgets and apply a water-scheduling regime. ISF collection rates ranged from 25 percent to 80 percent depending on the WCA. The WCAs interviewed mentioned the following issues:

- The project did not provide computers or other office equipment for the WCAs, which made the application of the skills they learned challenging. Some WCAs used ISA computers while others used the WCA chairperson's personal computer.
- The project did not provide equipment or machinery to conduct canal maintenance. On-farm canal cleaning is organized based on *khashar* (mobilization of community action),

and the farmers are mainly responsible for it. If a farmer's territory needs to be cleaned, the farmer pays for diesel and the driver's cost because the farmer receives a diesel subsidy from the state. WCAs do not receive subsidized diesel. Several WCAs mentioned that if WCAs could lease machinery, they could provide services to farmers, which could positively affect their ISF collection rates.

- WCAs prepared budgets by including staff salaries and taxes, but they did not include a maintenance budget as the project training programs taught because WCAs don't handle maintenance service.
- Planned concrete irrigation canals and hydro posts were not rehabilitated or constructed because of the failure of the ICB-2 contract. One WCA in Altiarik district mentioned that because of this, the farmers do not receive water in requested amounts in this district and thus do not contribute to the ISF payment.
- ISF collection amounts were not sufficient to cover all the WCAs' costs. Several WCAs mentioned that they could not pay adequate staff salaries and repay debts, and thus they cannot retain staff.

### Outcomes

2.34 The achievement of objective 1 (to improve agricultural production in areas affected by waterlogging) is rated **modest**. Based on the analysis of data in the ICR and additional data obtained by the PPAR mission, the project had only a modest impact on crop yields and production. Although project-funded drainage works were mostly accomplished, some of the planned irrigation rehabilitation works could not be completed because ICB-2 was only partially implemented. There were also limited achievements regarding project-funded capacity-building works to improve functioning of WCAs and to widen application of sustainable agriculture and water-management practices among farmers.

2.35 The project results framework measured the objective in relation to changes in yield per hectare. According to the ICR (page 30), project M&E data showed increased yields for wheat, maize, potatoes, and orchards for both leaseholder and dehkan farms. Yields declined for cotton, rice, and vineyards in leaseholder farms and melons in dehkan farms (World Bank 2017b). IEG's Implementation Completion and Results Report Review (ICRR) used a difference-in-differences (DID) calculation by comparing results against control group results (Ferghana Valley region districts as a whole) between the baseline and project completion years. (The DID estimate is defined as the difference in average outcome in the treatment group before and after treatment minus the difference in average outcome in the control group before and after treatment.) Accordingly, wheat, melons, and vineyards for leaseholder farms, and wheat, maize, and melons for dehkan farms showed negative net yield increases, and cotton showed a zero increase for leaseholder farms at project closing (World Bank 2017c). IEG obtained data on 2017 yields for the same crops in the three project districts and observed yield reductions for

cotton, maize, and vegetables on leaseholder farms and for maize, vegetables, and melons on dehkan farms compared with the baseline (table 2.1).

**Table 2.1. Crop Productivity in Project Districts by Farm Type**

| Crops | Leasehold Farms | | | | Dehkan Farms | | | |
|---|---|---|---|---|---|---|---|---|
| | 2011 Yield *(tons/ha)* | 2015 Yield *(tons/ha)* | Change DID Effect 2015 *(percent)* | 2017 Yield *(tons/ ha)* | 2011 Yield *(tons/ha)* | 2015 Yield *(tons/ha)* | Change DID Effect 2015 *(percent)* | 2017 Yield *(tons/ha)* |
| Cotton | 2.9 | 2.7 | 0 | 2.2 | n.a. | n.a | n.a | n.a |
| Wheat | 5.6 | 5.8 | −1.8 | 5.9 | 7.3 | 7.5 | −2.7 | 7.5 |
| Maize | 5.5 | 6.7 | 7.3 | 4.8 | 7 | 8 | −2.9 | 5.1 |
| Rice | 2.9 | 2.8 | 41.4 | 3.2 | 3.8 | 3.9 | 10.5 | 6.04 |
| Potatoes | 15.3 | 33.4 | 9.2 | 21.9 | 25.7 | 27.8 | 7.4 | 25.7 |
| Vegetables | 28.0 | 35.4 | −2.9 | 24.2 | 29.2 | 32.6 | −3.8 | 28 |
| Melons | 13.8 | 24.4 | −24.6 | 18.7 | 28.3 | 19.2 | −7.4 | 18.1 |
| Perennials | | | | | | | | |
| Orchards | 5.5 | 7.9 | 14.5 | 8.2 | 14.6 | 24.2 | 9.6 | 29.1 |
| Vineyards | 11.8 | 10.1 | −9.3 | 8.1 | 14.1 | 23.5 | 4.3 | 37.9 |

*Source:* Implementation Completion and Results Report, Implementation Completion and Results Report Review, and 2017 yield data based on data from the Ministry of Agriculture Water Resources. The DID analysis for 2017 was not updated because baselines had been amended, making subsequent DID analysis incomparable with the earlier DID analysis. DID = difference-in-differences; ha = hectare.

2.36 The objective of an increase in production is a function of yields and area expansion. The ICR noted an increase in cropping intensity (ratio of total cropped area to net cultivated area) because more farmers are diversifying their production with high-value crops and through inclusion of secondary crops (ICR page 29). Changes in production figures in tons are presented in table 2.2. Accordingly, an increase in total production in the project districts (as of project closing and at the end of 2017) is observed. The increase is 179,192 tons—a 46 percent increase relative to the baseline in 2015 and an increase of 273,925 tons, or 70 percent increase relative to the baseline in 2011 (World Bank 2017b). Considering what would have happened without the project, although aggregate production has increased relative to the baseline, production has increased faster under the without-project situation in 2015 (DID calculations for the aggregate production in 2015 showed 0.4 percent less production relative to what would have happened under the situation without the project).

**Table 2.2. Total Annual Crop Production in Project Districts**

| Crops | 2011 Production *(tons)* | 2015 Production *(tons)* | Change DID Effect 2015 *(percent)* | 2017 Production *(tons)* |
|---|---|---|---|---|
| Cotton | 46,777 | 42,719 | 15.4 | 44,373 |
| Wheat | 110,735 | 112,771 | 9.9 | 153,241 |
| Maize | 2,025 | 5,197 | −37.3 | 6,207 |
| Rice | 184 | 263 | −189.7 | 2,265 |
| Potatoes | 15,266 | 40,289 | -45.9 | 47,130 |
| Vegetables | 134,471 | 208,741 | 42.9 | 253,156 |
| Melons | 4,688 | 10,157 | −66.8 | 11,286 |
| Fodder | 26,607 | 67,737 | −273.6 | - |
| Oil seed | - | 360 | - | 723 |
| Legumes | 36 | 432 | −219.4 | 2,174 |
| Orchards | 34,535 | 55,252 | −6.1 | 87,066 |
| Vineyards | 14,568 | 25,175 | 57.7 | 56,196 |
| **Total** | **389,892** | **569,093** | **−0.4** | **663,817** |

*Source:* ICR, ICRR, and 2017 production data based on data from Ministry of Agriculture and Water Resources. The DID analysis for 2017 was not updated because baselines had been amended making subsequent DID analysis incomparable with the earlier DID analysis. DID = difference-in-differences.

## Objective 2

2.37 The achievement of the project's development objective (to reduce damage to housing and infrastructure from rising groundwater levels and salinity in the project districts) is rated **substantial**. The same outputs explained under objective 1 also contributed to the achievement of objective 2.

### Outcomes

2.38 To measure the objective, the project PDO indicators in the results framework were as follows: (i) decreased groundwater levels, (ii) reduced flooding in settlement areas, (iii) decreased area with high groundwater mineralization, and (iv) decreased area with soil salinity. Reduced groundwater mineralization and reduced soil salinity also affect yields and were therefore linked to the achievement of the first objective.

2.39 Based on the results, the achievement of objective 2 is rated **substantial**, but with two caveats. Several factors that influenced soil salinity need to be considered in addition to the representativeness of the years that assessments were made. Furthermore, the ICR did not include a counterfactual analysis; the project impact evaluation compared project district data with the control district and showed that nonproject areas also had similar improvements in

groundwater and salinity level reductions. However, IEG mission interviews with the key stakeholders and selected project beneficiaries supported the substantial achievements of reduced flooding and waterlogging in project areas. The efficacy of this objective is rated **substantial** considering the substantial achievements regarding the rehabilitation of drainage works, including rehabilitation of on-farm and inter-farm drainage canals, collector structures, construction of pressure wells, and vertical drainage wells, which would contribute to the achievement of this objective.

2.40 **Groundwater levels**. Groundwater levels were measured using piezometers.[2] The targets for reduced groundwater levels were significantly met. At the end of the project, there were almost no areas with less than one meter of groundwater level—7.7 percent of areas had between 1 and 1.5 meters of groundwater level, and 33 percent of the areas had between 1.5 to 2 meters. The IEG mission confirmed the sustained results on groundwater levels as of 2017 (table 2.3).

**Table 2.3. Average Groundwater Levels in Project Districts (2011-2017)**

| Groundwater Level | Baseline *(% of area)* | Target *(% of area)* | 2015 Result *(% of area)* | 2017 Result *(% of area)* |
|---|---|---|---|---|
| Less than 1.0 meter | 1.5 | 0.1 | 0 | 0 |
| Between 1.0 to 1.5 meters | 18 | 7 | 7.7 | 6.4 |
| Between 1.5 to 2 meters | 43.5 | 52.5 | 33.1 | 46.7 |

*Source*: ICR and Ministry of Agriculture and Water Resources.

2.41 **Flooding in settlement areas.** According to the project impact evaluation, the percentage of settlement areas affected by flooding was reduced from 67.4 percent (baseline in 2011) to 13.1 percent in 2016 (against the revised target of 0 percent and the original target of 6 percent). The revised target was almost 80 percent achieved.

2.42 **Area with groundwater mineralization and soil salinity.** The targets for reduced groundwater mineralization levels were also met. The target areas with non-, low-, and mid-mineralization levels were met. The IEG mission also confirmed the sustained results on salinity levels (table 2.4).

**Table 2.4. Average Mineralization Levels in Project Districts (2011–17)**

| Mineralization Level | Baseline *(% of area)* | Target *(% of area)* | 2015 Result *(% of area)* | 2017 Result *(% of area)* |
|---|---|---|---|---|
| Non-mineralized (0–1 grams/liter) | 38.2 | 42 | 41.7 | 51.1 |
| Low mineralized (1–3 grams/liter) | 51.4 | 57 | 57.7 | 48.7 |
| Medium mineralized (3–5 grams/liter) | 10.3 | 0.99 | 0.7 | 0.2 |
| High mineralized (5–10 grams/liter) | 0.1 | 0.01 | 0 | 0 |

*Source*: ICR,updated by IEG based on data from the Ministry of Agriculture and Water Resources.

2.43 Soil salinity levels also showed similar improvement (table 2.5).

**Table 2.5. Soil Salinity Levels in Project Districts**

| Soil Salinity Level | Baseline *(% of area)* | 2015 Result *(% of area)* | 2017 Result *(% of area)* |
|---|---|---|---|
| Low salinity (0-0.3 g/l) | 51.55 | 61.19 | 67.2 |
| Low salinity (0.3-1 g/l) | 39.04 | 30.3 | 31.9 |
| Medium salinity (1-2 g/l) | 8.94 | 8.43 | 0.8 |
| High salinity (less than 2 g/l ) | 0.46 | 0.08 | 0.1 |

*Source: ICR,updated by IEG based on data from the Ministry of Agriculture and Water Resources*

2.44 Regarding incidence and cost of damage from flooding for the households, the project impact evaluation showed that the number of households suffering damage declined by 40 percent, and the cost of repairs per affected household declined by 8 percent during the project duration (World Bank 2017b, 32).

## Efficiency

2.45 **Economic efficiency**. The project prepared ex ante and ex post economic analyses, and the following main economic benefits were considered: (i) improved crop productivity and increased cropping intensity, (ii) avoidance of a gradual loss of production caused by an increase in waterlogging and salinization that was anticipated in the without-project situation, and (iii) mitigation of the damage to housing and civil infrastructure resulting from inundation and flooding, particularly in the urban areas. For calculation of crop productivity and increased cropping intensity, crop budgets were prepared for nine crops: cotton, fodder, maize, orchards, potatoes, rice, vegetables, vineyards, and wheat. Because of significant discrepancies between leaseholder farms and dehkan farms, crop budgets were prepared for both farm types. For wheat and cotton, the State Statistics Department provided yields, production data and input and labor requirements, machinery utilization, and output and input prices. For the remaining crops, feasibility study figures were used to calculate costs.

2.46 At appraisal (ex ante), the project economic and financial analysis (EFA) estimated an overall economic internal rate of return (EIRR) of 29.3 percent with a net present value (NPV) of Som 127.8 billion (PAD, paragraph 17). Ex post EFA calculations estimated the project's financial internal rate of return (FIRR) at 48.5 percent and the EIRR at 51.7 percent. Compared with 12 percent as the opportunity cost of capital, the project is reported to have produced high returns. However, sensitivity analysis ex post showed that the EIRR was reduced to about 28 percent if all project benefits decreased by 10 percent to 90 percent of the estimated values (indicating significant sensitivity to the estimated benefits). The economic NPV in the ex post EFA was estimated at Som 444 billion, which was almost four times the appraisal value (World Bank 2017b, paragraph 56).

2.47 The higher EIRR ex post compared with ex ante was mainly due to (i) the lower total cost of the project, which was estimated at Som 144 billion ($82 million at the exchange rate

adopted in the ICR) at appraisal, but actual was about Som 94.7 billion ($49 million at the exchange rate adopted in the ICR); and (ii) higher prices for agricultural commodities using inflation adjustment (using the gross domestic product deflator) and significantly increased gross margins on most crops (especially those to which the producers have increasingly shifted, like vegetables and orchards). The EFA indicates that the combination of lower costs and higher returns on crops led to an increase in the EIRR.

2.48 **Operational and administrative efficiency**. The project closing date was extended for five months. Lengthy procedures of different agencies were an issue, particularly contract clearance by MFERIT that delayed decision making. Additionally, considerable time was lost because of the government's unwillingness to accept failure in the ICB-2 and ICB-3 contracts, which reduced the project output results.

2.49 Despite these operational and administrative inefficiencies, the efficiency of the objective is rated **substantial** because of the significant economic rates of return.

## Ratings

### Outcome

2.50 Overall outcome is assessed as **moderately satisfactory**. The project objectives were and continue to be highly relevant to the country's priorities and the World Bank Group's strategy for Uzbekistan. The project design weakly reflects a logical causal chain between activities and outcomes and is rated **modest**. The efficacy of objective 1 (to improve agricultural production in areas affected by waterlogging) is rated **modest**. The project had only a modest impact on crop yields and production. Additionally, some of the planned irrigation rehabilitation works could not be completed, and there were limited achievements regarding project-funded capacity-building works to improve WCAs' functioning and to widen application of sustainable agriculture and water management practices among farmers. The efficacy of objective 2 (to reduce damage to housing and infrastructure from rising groundwater levels and salinity in the project districts) is rated **substantial**. The project results at completion and as assessed during IEG's mission showed substantial reductions in groundwater levels, flooding, and soil salinity levels, but without a credible counterfactual. Project results were strongly supported by the extensive drainage rehabilitation works that were completed without major issues. Efficiency is **substantial** with an EIRR significantly above appraisal estimates, though with some operational and administrative inefficiencies.

#### Risk to Development Outcome

2.51 The risks to development outcome are rated **substantial**.

**Policy and Institutional Risks**

2.52 One of the key risks is the continuation of current policies and regulatory environment regarding water resources management that do not adequately incentivize efficient water usage. The value of irrigation water is not considered in water allocation decisions, leading to abundant usage of water resources and creating further waterlogging and drainage problems. The state-mandated quota on high water-consuming cotton crop advances this vicious cycle, though the government has recently started implementing different approaches to tackle cotton production. However, a water code that was drafted during the project is yet to be enacted. WCAs do not have a regulatory framework or financial means that would significantly improve irrigation water distribution and operation and maintenance of on-farm irrigation canals.

2.53 Several stakeholders informed IEG's mission that some of the sustainable water and land management practices are not utilized because of a lack of a dedicated service provider to deliver these services. For example, regarding the project-financed deep rippers and land levelers, the plan was to establish the branch of Uzbekistan Mechanization Institute in the Ferghana and give the equipment to the branch, and then farmers would use or rent the equipment. This had not happened at the time of the IEG mission.

2.54 Another issue on institutional capacity building that many stakeholders mentioned during the IEG mission was the high staff turnover within local public water institutions and the WCAs, resulting in a loss of institutional memory on the acquired skills. IEG was informed that the project trained the Hydrogeology and Ameliorative Expedition Department (HGAE) and provided a database, but nobody was in charge of the database.

**Financial Risks**

2.55 Another risk to continuity of this project's development outcome is the availability of funds to allow proper maintenance of the I&D systems and a power supply for the vertical drainage wells (ICR, paragraph 69). However, this risk is partly mitigated by the strong commitment of the central and local authorities to ensure smooth operations of water drainage and prevent waterlogging from happening again, and ensuring additional power supply facilities that are already under construction in the project districts. The IEG mission was also informed that the government is continuing to provide maintenance of drainage canals through its own budget (World Bank 2017b). The IEG mission was informed that the power supply issue was resolved in the region after completing the construction of additional power generation facilities.

## Bank Performance

2.56 Bank performance is rated as **moderately satisfactory.**

### Quality at Entry

2.57 According to the PAD, the project's design considered important lessons learned from the World Bank's experience in the I&D sector in Uzbekistan and other countries, including India, Kazakhstan, the Kyrgyz Republic, Mexico, and Turkey, and from models used by other donors, including the European Union–UNDP Enhancement of Living Standards Program. A key lesson from the program is that improving agricultural productivity and ensuring the sustainability of irrigation water management systems require participatory approaches; therefore, capacity building for WCAs should be included in the project design. A second key lesson is that successful project implementation requires a PIU and field-based PIUs that develop links with the MAWR and responsible oversight institutions, local authorities, local people, and beneficiaries in supporting project implementation and the transfer of knowledge and training.

2.58 The risk assessment adequately captured the critical risks but fell short of designing appropriate mitigation measures. For example, the risk of failing to recruit capable consulting firms and construction companies was assessed as moderate and to be mitigated through ICB contracts. These contracts would have prequalification for works contracts and encouraging local contractors to collaborate with international contractors as subcontractors. The project still ended up with two low-capacity local contractors that led to the cancelation of some of the works because adequate assessment of bidding companies could not be made. Another risk that was identified and rated as high was the delay in contract registration. This was planned to be mitigated through involvement of high-level stakeholders through the project steering committee. However, this measure did not resolve the MFERIT's lengthy contract review process (World Bank 2009a, 10).

2.59 Project preparation from concept review to appraisal was lengthy (3.5 years). A feasibility assessment identified the amount of works to be included in the results framework, but the data were not assessed and discussed with the government thoroughly when preparing the project results framework because a substantial amount of rehabilitation works of on-farm earth irrigation canals had to be reduced later.

2.60 The design of project monitoring arrangements and data collection instruments in the PAD were not adequately planned, which caused deficiencies in the collection and evaluation of data during implementation. For example, some indicators could not be measured, and baseline and targets for others established in the PAD as part of the feasibility study were not discussed and finalized with the government. Additional effort during preparation and baseline studies could have improved the M&E framework.

2.61 Based on these issues, the quality at entry is rated as **moderately unsatisfactory**.

### Quality of Supervision

2.62 Regular supervision missions were conducted, and 14 ISRs were filed during 2009–16 (approximately every six months). The missions comprised relevant technical, fiduciary, and environment specialists. Project ratings were generally candid, and Aide Memoirs had sufficient details guiding the implementing agency and the government on the project's technical and administrative issues. The project had two World Bank task team leaders, both of whom had extensive experience of the sector and the region. During IEG's mission, the PIU staff at the Tashkent office and at the local level expressed their appreciation for the available technical and fiduciary support from the World Bank team and its proactive approach to solving problems.

2.63 A midterm review was conducted in November 2013 to help facilitate implementation. The midterm review mission discussed the weaknesses in the project results monitoring framework extensively and agreed on the action plan to rectify the problems. However, the World Bank team did not follow up adequately on the recommendations made during the midterm review regarding revision of the results framework, though these materialized with some delay. The project team's recommendations to terminate the failing ICB contracts were not considered fully during subsequent meetings, and therefore, the issue persisted for an extensive period.

2.64 Based on this assessment, quality of supervision is rated as **satisfactory**.

2.65 The overall Bank performance is rated as **moderately satisfactory**.

## Borrower Performance

2.66 Borrower performance is rated **moderately satisfactory.**

### Government Performance

2.67 The government was committed to project activities, and the project is the result of government's willingness to address irrigation and drainage issues in the region. The government agencies and local authorities supported the project and were motivated to achieve desired results. This is evidenced by the eventual resolution of the customs clearance issues that delayed operations of some critical equipment under the project's ICB-1 contract.

2.68 However, lengthy procedures for contract clearance (particularly by MFERIT) delayed project implementation and affected project performance negatively. MFERIT contract registrations were completed only after the Ministry of Economy intervened directly. In addition, despite major delays in implementation of the ICB-2 and ICB-3 contracts, the government took a long time to terminate them, even though the World Bank team strongly advised it to do so (World Bank 2017b, 8). This was partly explained by the government's belief that issues with the local contractors would be resolved eventually. However, because of the

time lost, these contracts could not be included in a new contract bidding process, and thus some of the planned project works were not accomplished.

2.69 Because of these weaknesses, government performance is rated as **moderately unsatisfactory.**

### Implementing Agency Performance

2.70 The MAWR and the PIU showed high commitment toward achievement of the project results. According to the ICR, they met regularly with the World Bank's project team, openly discussed project issues, and followed up on the agreed actions in line with their responsibility. In addition, the PIU handled fiduciary aspects well, and the only issues related to MFERIT's long clearances, which was beyond the PIU's control. The performance of other agencies involved in project management, including consulting companies for technical supervision and M&E, was also adequate.

2.71 The PIU was understaffed to carry out environmental and social safeguards, which partly led to noncompliance with both. Although environmental performance was rectified eventually, issues related to approval of the resettlement action plan and delays in compensation payments to the project-affected people persisted for some time, causing the downgrade in safeguards performance ratings.

2.72 Based on this assessment, implementing agency performance is rated as **moderately satisfactory**.

2.73 The overall borrower performance is rated as **moderately satisfactory**.

## Lessons on FVWRMP-I Project

2.74 **Establishing adequate institutional arrangements is critical for sustainable use of improved agricultural technologies and practices such as land leveling and deep ripping**. For example, IEG found that the deep ripping, land leveling equipment and tractors were not being used in for the benefit of the FVWRMP-I project areas after the project closed. The equipment was handed over to the Uzbekistan Mechanization Institute, a public agency in charge of equipment and machinery, but because the agency did not have a branch in Ferghana Valley, the equipment was not used in that area. WCAs in Ferghana Valley could take care of the equipment and machinery, but the government did not favor providing it to WCAs under the project.

2.75 **Sound selection criteria for identifying beneficiaries and areas are crucial for the farmers' uptake and use of water-saving technologies.** FVWRMP-I promoted the implementation of drip irrigation as a pilot activity. However, the criteria used to select pilot locations and beneficiaries did not adequately consider the severity of water scarcity in the area, which would entice more water-scarce farmers to prefer using such systems. Other selection

criteria to consider in similar projects in the future, based on expert knowledge of good practice, include the appropriateness of the technology in the agricultural system in terms of crops and cropping patterns, water-saving potential based on crop and soil characteristics, water quality to avoid clogging of drip systems, and the option to combine drip irrigation with water storage.

# 3. Rural Enterprise Support Project Phase II

3.1 **Project dates, cost, and financing.** The World Bank approved the Uzbekistan RESP-II on June 12, 2008 with an IDA credit of SDR 41.3 million ($67.96 million equivalent). The government made a commitment of $6.58 million, and beneficiaries were anticipated to contribute $0.487million (World Bank 2008b, iii). As a result, the total project cost at appraisal was $75.03 million. Early in this project's implementation (March 2009), the Swiss Agency for Development and Cooperation (SDC) approved parallel grant financing of $7.7 million to strengthen the capacity of WCAs and finance farmer field schools (FFSs) on improved I&D technologies under component 2. Moreover, the World Bank approved an additional financing of SDR 26.40 million ($40.00 million equivalent) in September 2012 to provide additional funds for component 1 horticulture-related investments in both the original seven regions and a newly added Jizzakh region. The original closing date was March 31, 2015. An extension of the closing date was approved at the time of the additional financing, and the project closed on December 31, 2016. At project completion, the actual total project cost was $110.5 million, including $96.86 million IDA, $5.97 million borrower contribution, and $7.7 SDC parallel financing (World Bank 2017d, 28).

3.2 **Restructurings.** RESP-II underwent one level 1 and three level 2 restructurings during implementation. The level 1 restructuring in September 2012 involved the additional financing, the project closing date extension, and the amendment of the results framework through the elimination and addition of indicators and the adjustment of indicator targets. The first level 2 restructuring in January 2011 entailed reallocating unallocated funds of $227,549 toward consultants' services because the costs for the I&D rehabilitation engineering design were higher than estimated. The second restructuring in March 2012 reallocated $5 million for micro subloans toward investment and working capital subloans because in late 2012, the government abolished credit unions, which had been envisioned as the main financial intermediaries for RESP-II micro subloans. This restructuring also led to the removal of results indicators related to micro subloans. The final restructuring in July 2014 involved the reallocation of original credit across disbursement categories, the revision of component costs because of exchange rate fluctuations, and additional costs for project management.

## Relevance of the Objectives and Design

### Objectives

3.3 The PDO of RESP-II was "To increase the productivity and financial and environmental sustainability of agriculture and the profitability of agribusiness in the project area" (World Bank 2008a, 5; 2008b, iv). The PDO was not revised during implementation.

### Relevance of the Objectives

3.4 Relevance of the PDO is rated **modest**. At appraisal, the PDO was aligned with the World Bank's development approach for the agricultural sector in Uzbekistan. The FY08–11 CAS pillar II (increasing economic opportunities in rural areas) focused on (i) increasing agricultural productivity and farm incomes through improved incentive structures and access to credit, inputs, and skills; and (ii) improving the I&D system and increasing the efficiency and environmental sustainability of water resource management. The CAS emphasized the need for medium-term finance and advisory services for newly independent leasehold farmers, and for higher cost effectiveness and productivity, especially in the state procurement system for cotton and wheat (World Bank 2008c, 32). Moreover, the PDO was consistent with the government's 2008–10 WIS (its poverty reduction strategy) that highlighted the importance of agricultural growth, farmers' access to the credit and financial services market, sustainable irrigation and water management, soil improvement, and drainage (Uzbekistan 2008, 37).

3.5 At closing, the project objectives remained aligned with both focus areas of the World Bank's FY16–20 CPF. Specifically, focus area 1 continues to emphasize the need for access to finance and financial services for the private sector, including agriculture and highlights for job creation potential in agribusiness (World Bank 2016, 16f). In addition, the CPF focus area 2 calls for the modernization of the state-procured cotton sector, increased agricultural productivity and competitiveness, and in particular, "diversification toward higher-value, more job- and less water-intensive crops" (World Bank 2016, 19). Similarly, the government's 2013–15 WIS with respect to agriculture and rural development focused on diversification of agricultural production, modernization (including irrigation and water-saving technologies), enhancing productivity, and profitability (Uzbekistan 2013, 50f). These focus areas and needs identified in the CPF and WIS remained valid and were confirmed by different stakeholders during IEG's PPAR mission.

3.6 Despite the alignment of RESP-II with World Bank and government priorities, IEG considers the formulation of the PDO unclear and unmeasurable based on the results framework indicators. The PAD did not clearly define the scope of expected achievements for the different PDO aspects (agricultural productivity, financial sustainability, environmental sustainability, and agribusiness profitability). Additionally, it does not lay out potential variations in the expected achievements across the different beneficiary types targeted through

RESP-II (such as farmers, agribusinesses, financial institutions, WCAs, and so on). Furthermore, the results framework lacks an indicator for agribusiness profitability and includes an indicator for financial sustainability focused on the banks' perspective only, and the PDO indicators for environmental sustainability measure outputs instead of outcomes. These shortcomings are discussed in more detail in the M&E and the Efficacy sections.

## Relevance of Design

3.7 **Project components**. RESP-II comprised four components: (i) rural enterprise finance, (ii) irrigation and drainage, (iii) rural training and advisory services, and (iv) project management. During project implementation, the components were not formally revised, but the World Bank approved reallocation of funds and additional financing for component 1.

3.8 **Component 1: Rural enterprise finance** (appraisal cost: $36.7 million; revised cost: $76.7 million; actual cost: $72.13 million). This component expanded activities of the RESP from five districts to seven regions (covering 88 districts) focusing on the following: (i) to enhance access to commercial financial services for private farmers (mostly newly independent leasehold farmers) and small to medium-size rural enterprises (agribusinesses) through the provision of a credit line, (ii) to improve the banking sector's capacity to provide agriculture financing by training the participating financial institutions' staff in sector-specific lending skills and risk assessments, and (iii) to provide assistance to potential loan recipients on business planning to reduce associated lending risks. Additional financing of $40 million approved in September 2012 led to scaled-up support for horticulture investments and expansion to the Jizzakh region.

3.9 **Component 2: Irrigation and drainage** (appraisal cost: $33.2 million; actual cost: $26.4 million). This component aimed to improve water management of irrigated areas in seven specific districts within the seven project regions through (i) the rehabilitation of critical on-farm and inter-farm I&D systems, to be selected by the main stakeholders in the districts, including the BAIS and its branch organizations (the AIS), MAWR district authorities, and WCAs, with technical assistance from a consulting firm; (ii) the strengthening of 84 WCAs and capacity building of relevant institutions to train and support WCAs to rehabilitate, operate, and maintain on-farm I&D systems; and (iii) the piloting and demonstration of applied modern irrigation techniques in the districts.

3.10 **Component 3: Rural training and advisory services** (appraisal cost: $2.6 million; actual cost: $1.60 million). This component financed (i) the provision of training and advisory services to farmers in various farm management skills (such as business, accounting, and legal) and production management skills (such as agronomy, water management, and pest management), and (ii) the dissemination of technical information and advisory services through mass media campaigns to generate demand for training and publicize the project services and information, targeting primarily nonbeneficiary farmers.

3.11 **Component 4: Project management** (appraisal cost: $2.5 million; actual cost: $4.45 million). This component covered the overall project implementation management, studies on relevant sector and subsector issues to inform policy debate, and M&E activities. The cost increase was mainly due to the additional financing and related closing date extension.

3.12 **Implementation arrangements**. The RRA was the designated implementation agency for RESP-II and maintained the PIU that had also implemented RESP-I. At appraisal, RRA was part of MAWR and was responsible for the implementation of several rural donor-funded projects. For RESP-II, the RRA had a central PIU in Tashkent and established regional offices in the project's seven regions for day-to-day management, coordinating with regional and district governments, monitoring field implementation, and progress reporting.[3]

3.13 Relevance of design is rated **substantial**. The RESP-II components were logically aligned with the project objectives. The results chain was clear and consistent, though the results framework had some weaknesses, described in the M&E section. The component design was mutually reinforcing to address gaps in Uzbekistan's agricultural sector at the time of project preparation.

3.14 The objective of increasing agricultural productivity was supported by (i) the I&D infrastructure investments and capacity-building activities of component 2 to improve water management and soil structure, (ii) the training activities of component 3 that aimed to increase yields and product quality through improved practices, and (iii) the provision of credit to farmers and agribusinesses through component 1 to make investments and foster diversification. Regarding the objective of fostering financial sustainability in agriculture, (i) the infrastructure and training activities of component 2 for WCAs increased their capacity in operation and maintenance, and (ii) the loan investments in farm and postharvest infrastructure of component 1 and related farm management skills-building activities of component 3 promoted increased farmers' access to financial resources, yields, reduced losses, and market expansion. The objective of enhancing of environmental sustainability was strongly related to both the on- and inter-farm I&D infrastructure improvements and provision of maintenance equipment, and capacity-building activities in water management and water-saving practices of WCAs and farmers supported by components 2 and 3. The objective of increasing profitability of agribusinesses was interrelated to the former objectives. The combination of component 1 (which supported the training of financial institutions in agricultural risk assessment for different production systems and the increased financial support for viable sector-specific business plans) and component 3 (which supported farmers to enhance agricultural productivity of their current production through modern farming, storage, and processing techniques or switch to higher-value crops) was of great importance to complement hard finance with soft skills.

3.15 Overall, the RESP-II approach of combining physical on-farm equipment acquisition and off-farm irrigation infrastructure rehabilitation (components 1 and 2) with capacity building of

different agents in the sector (component 1 for direct beneficiary farmers and financial institutions; component 2 for I&D agencies, WCAs, and direct beneficiary farmers; and component 3 for direct and indirect beneficiary farmers) was substantially relevant in the country and agricultural sector context. Based on the RESP experience, the RESP-II design continued and expanded to support the sector's changing needs and the government's shifting priorities away from predominantly inefficient, distorted cotton and wheat production toward a more market-led, diversified, and high-value agricultural production system (World Bank 2008b, 3). However, the funding of component 2 limited I&D investments to on-farm and some inter-farm works, leading to only a partial rehabilitation of canals or other infrastructure in several cases. This limitation was already highlighted as a lesson in the RESP ICR (World Bank 2009b), upon which the average investment amount per hectare was increased from $85 to $255 in RESP-II (World Bank 2017d, 6). Despite this substantial increase, partial rehabilitation continued to be an issue for some of the RESP-II component 2 activities. However, based on ICR reporting and IEG interviews, the executed investments prioritized the most urgent sections identified by project engineers, local authorities, WCAs, and farmers.

## Monitoring and Evaluation

3.16 Overall M&E quality rating is **modest**.

3.17 **M&E design**. The PAD for RESP-II described the project results framework, data collection instruments, and responsibilities for M&E among the different agencies involved in project implementation (the RRA, the BISA/ISA, WCAs, financial institutions, and consultant companies providing training activities). The results framework design at appraisal was partially adequate, but it had several weaknesses, some of which were acknowledged in the ICR and ICRR (World Bank 2017d, 2017e). Specifically, the indicators tracking progress toward the achievement of the PDO were inadequate. For example, the results framework did not contain a PDO indicator to assess changes in agribusiness profitability or an intermediate outcome indicator to capture changes in agribusinesses' market access or expansion resulting from RESP-II interventions. Similarly, the results framework did not include an indicator to measure changes in water use or the adoption of the project-promoted, water-saving technologies among farmers, and it did not have an indicator to assess the reduction in waterlogging or other effectiveness measures for the project drainage works (only "areas with adequate water supply and drainage").

3.18 More important, the formulation of some indicators in the results framework did not measure outcomes. For example, the PDO indicators for environmental sustainability measured only outputs ("Farmer access to information about and demonstrations of environmentally sustainable practices improved") instead of intermediate outcomes, such as behavior change among beneficiaries (for example, "Percentage of farmers regularly applying environmentally friendly practices taught in project-supported trainings and demonstrations," with specifics on the regularity and type of applied practices). Similarly, the PDO indicator "Growth in overall

agricultural portfolio of the commercial banks at least 10 percent per year during the project period" was not comprehensive because it focused on the perspective of the financial institutions and only indirectly measured the change in farmers or agribusinesses' access to finance. The IEG mission learned that the financial institutions collected additional data on the characteristics of loan recipients and repayment rates, but these indicators were outside the results framework and not disclosed because of data privacy issues. Furthermore, the PDO indicator on agricultural productivity included measuring changes in farmer incomes ("Overall farmer productivity and income in project regions have increased"). Including income-level objectives in the results framework is considered ambitious because the project lacked knowledge ex ante on which subprojects would be financed under the different components (the expected orchard-related investments, for example, have high sunk costs such as seeds and drip irrigation equipment, and long gestation periods delaying profitability), confounding factors affecting farm income and thereby weakening RESP-II claims on attribution, and beneficiaries' general unwillingness to share accurate information on incomes, as highlighted in the ICR (World Bank 2017d, iv).

3.19 **M&E implementation**. The PIU was staffed with one M&E specialist, who provided quarterly progress reports on the results framework indicators. During implementation, some of the weaknesses in the results framework were recognized and addressed during restructurings. However, these restructurings addressed its weaknesses only partially, including the continued lack of an indicator on agribusiness profitability and the missed opportunity to either remove or modify the PDO indicator on farmer incomes based on the difficulty in collecting reliable information during implementation (World Bank 2017d, iv). Furthermore, no RESP-II-specific information was provided at project completion or during the PPAR mission regarding loan repayment rates or arrears in the commercial banks to assess financial sustainability and profitability of the RESP-II loan investments (World Bank 2017f).[4]

3.20 Progress monitoring and reporting during implementation differed by project component. For component 1, the financial institutions submitted regular progress reports to the RRA on loan applications, effectiveness, and repayment, among others. In addition, the RRA credit line coordinator and World Bank missions regularly visited financed subprojects to verify progress after loan disbursement, and met with all financial institutions to assess documents and data. Furthermore, for the preparation of the additional financing, RRA conducted a rapid midterm assessment of component 1, surveying 70 farmers (10 per region based on random stratified sampling, according to the ICR Review) and agribusinesses on the purpose and details of the loan, and changes in processing volume, yields, sales, profits, and household income, among others (World Bank 2011, annex 1). For component 2, the consulting firm responsible for the works reported progress on the I&D rehabilitation monthly. The regional RRA engineers and the central RRA I&D coordinator visited all rehabilitation sites during project implementations. Regarding the capacity-building activities for WCAs and farmers under component 2, SDC's involvement in the execution of the activities led to strong

results monitoring and reporting. Specifically, SDC submitted regular progress reports to RRA and conducted surveys and focus group discussions to evaluate achievements with WCAs and with MAWR system specialists, farmers, local self-administration bodies, and (socially vulnerable) households in 2010 (baseline), 2012 (endline SDC first phase), and 2015 (endline SDC second phase). The SDC sample always included all project-supported WCAs, and part of the sample (especially farmers) was based on stratified random sampling (SDC 2015, 28). For component 3, monitoring took place based on the respective indicators in the results framework.

3.21 To complement results framework results monitoring, an independent consulting firm conducted and end-of-project assessment in 2016. IEG confirmed with the consulting firm that the assessment had applied a stratified random sampling method for the 957 interviews conducted. IEG's review of the assessment identified several weaknesses. Foremost, the assessment did not capture data from control groups that would have allowed a rigorous assessment of project impact. Although the assessment provided some important complementary information to the results framework (such as information on new market access, water loss, and soil salinity), much of the reported data in the assessment is descriptive, and not much detail is provided on the survey-based results presented. Moreover, the assessment relies on district-level data (for yields) and not primary data collection, which should be interpreted cautiously given varying data quality and reliability of district-level data, as noted during the IEG mission.

3.22 **M&E use**. Data from the RESP-II monitoring system of the results framework and additional project-related data collected by RRA were used for ISRs. The data also supported the restructuring of the results framework and was important input to the ICR. Based on IEG interviews with the central PIU and the local PIUs visited, RRA staff confirmed that they relied on the data collected for M&E purposes for day-to-day project management activities and decision making. Moreover, the project database specifying the beneficiaries, type of investments, production systems, and location was used for the sample selection for the IEG PPAR mission field visits.

## Implementation Experience

3.23 The preparation and implementation of RESP-II benefited from the capacity built under the RESP implementation in terms of the experience, incorporated lessons, and existing central PIU structure within RRA. However, there were several delays early in the project and later during implementation mainly caused by different internal government processes. Specifically, with RESP-II scaling up from five RESP districts to seven regions (88 districts), there were initial delays in setting up the seven regional offices because of slow governmental approval procedures. Similarly, lengthy review and approval processes significantly slowed the signing of subsidiary agreements between the Ministry of Finance and the participating financial institutions by nine months, and the later approval of the additional financing that took 20

months to start implementation after World Bank Board approval. These delays and the approval of the additional financing led to the extension of the project closing date by 21 months.

3.24 Despite the different implementation delays related mostly to component 1, disbursement of the credit line was rapid because of the farmers and agribusinesses' high demand for loans. Specifically, at the midterm review in December 2011, 83 percent the total credit line allocation of component 1 had been disbursed (World Bank 2011, 2). Farmers and agribusinesses' demand was much higher than anticipated for longer-term, lower-interest loans, and the option to borrow in either Uzbek Som or foreign exchange credit, which enabled importing of high-productivity crops or livestock and quality equipment. These terms were unique to the RESP-II–supported credit lines because market rates were less favorable and borrowing in foreign exchange strongly limited. The rapid disbursement of component 1 led to the government's request for additional financing of $40 million and the expansion to an eighth region. With the government's focus shifting away from state-controlled cotton and wheat production, the additional financing targeted horticulture production, storage, and value-added processing, and allowed for larger loan sizes per credit recipient compared with the original project.

3.25 Early in the project implementation, RESP-II and SDC established a memorandum of understanding for the parallel grant financing of $7.7 million resulting from the project's engagement with other donors active in the sector and the Swiss' leading role in irrigation and water resource management issues in Uzbekistan. The implementation of the capacity-building activities of component 2 was strongly shaped by the SDC engagement because of reallocation of funds that allowed for the implementation of four more rehabilitation works, and because of a structured and focused approach on strengthening WCAs and training farmers in water-saving technologies and other practices through FFS and demonstrations.

## Financial Management and Procurement

3.26 The RRA retained the RESP fiduciary staff for the RESP-II implementation, allowing a smooth transition and continuous familiarity with World Bank fiduciary guidelines and procedures. The World Bank assessed financial management and procurement performance in this project as satisfactory throughout implementation.

3.27 Regarding financial management, one of the two World Bank financial management specialists responsible for this project was stationed in the nearby Almaty country office (and the other one was at headquarters), allowing for easy communication. The project had unqualified and timely financial audit reports and no notable concerns during implementation. The final audit for RESP-II was available at the time of the PPAR. The independent auditing company identified no significant shortcomings or weaknesses in accordance with International Public Sector Accounting Standards.[5] Regarding procurement, the World Bank procurement

specialist was in the Tashkent country office, which facilitated constant communication with RRA staff. This local presence was crucial, given the high risks associated with procurement implementation identified at preparation based on the assessment that Uzbekistan "does not have a public procurement environment conducive to transparent and economic procurement" (World Bank 2008b, 16). Based on its experience with RESP-I, RRA procurement staff diligently followed the World Bank's Procurement and Consultant Guidelines, and conducted and adequately filed the procurement processes as planned. RRA built procurement-related capacity among the participating financial institutions in areas like competitive procurement and other areas relevant to RESP-II implementation, as planned during project preparation.

### Safeguards Compliance

3.28 **Environmental safeguards**. RESP-II was classified as environmental category B (partial assessment). It triggered safeguards Environmental Assessment (OP 4.01) and International Waterways (OP 7.50). Because the specific works and investments to be implemented by RESP-II were not known during preparation because of its demand-driven nature, the anticipated environmental impact was not known. However, it was expected to be insignificant given their small scope and scale. RRA had the capacity for adequate environmental management based on its RESP implementation experience, and it had a full-time environmental specialist who conducted regular site visits, submitted semiannual environmental reports for I&D contractors, and ISRs. No environmental safeguards issues or deficiencies were reported during project implementation in the ICR or during the PPAR mission. Therefore, RESP-II is assessed to have complied with its environmental safeguards commitments.

3.29 **Social safeguards,** Inspection Panel Case. In September 2013, the World Bank's Inspection Panel received a complaint from three local and one international nongovernmental organizations alleging that RESP-II contributed to the use of child and forced labor in cotton production.[6] According to Inspection Panel documents, World Bank Management responded swiftly and satisfactorily to these claims, and the Inspection Panel mission to Uzbekistan in November 2013 found no evidence that RESP-II caused or aggravated any possible related harm. In response to the claims, RESP-II adopted mitigation measures, including third party social monitoring through the International Labour Organization (ILO). Based on these actions, the Inspection Panel decided not to conduct a full inspection. IEG reviewed related documents and interviewed the responsible ILO representatives, and assesses RESP-II as have complied with the social safeguards.

## Achievement of the Objectives

3.30 The RESP-II PDO as stated in the financial agreement was "To increase the productivity and financial and environmental sustainability of agriculture and the profitability of agribusiness in the project area" (World Bank 2008a, 5). This assessment divides the PDO into four parts (referred to as objectives): (i) To increase productivity of agriculture in the project

area, (ii) to increase financial sustainability of agriculture in the project area, (iii) to increase environmental sustainability of agriculture in the project area, and (iv) to increase profitability of agribusiness in the project area. IEG uses four sources of evidence to assess and rate the achievement of the PDO: the ICR (World Bank 2017a), the ICR Review (World Bank 2017e), the reports and studies on RESP-II (particularly the end-of-project assessment and the SDC final report), and the IEG assessment based on the PPAR fieldwork in November 2018. The latter applied validation tools described in appendix B, including site visits, farm-level asset verification, interviews with a sample of direct beneficiaries, and interviews with implementers and other stakeholders. The IEG fieldwork included a small number of interviews with direct beneficiaries, which are not representative of the RESP-II beneficiary population.

**Objective 1: Increase Productivity of Agriculture in the Project Area**

3.31 IEG rates the efficacy of objective 1 as **modest** given insufficient evidence on yield and income increases. RESP-II aimed to increase agricultural productivity in the project area through three types of activities: (i) rehabilitation of I&D works and improvement of on-farm irrigation water supply and drainage services, (ii) provision of technical assistance and advisory services on production practices, crop diversification, and water resource management technologies, and (iii) access to credit for farmers and agribusinesses to purchase production, processing, and storage equipment. A detailed list of the most relevant outputs and intermediate outcomes disaggregated by type of activity is provided in appendix D.

### Intermediate Outcomes

3.32 At project completion, all 62 WCAs operated based on project-promoted O&M plans, manuals, procedures, and irrigation schedules. They undertook 87 percent of the maintenance work for their I&D infrastructure compared with the baseline of 34 percent. Water user satisfaction with WCA performance was high at 82 percent. More important, according to the SDC final report, water loss during transportation decreased by 37 percent (from 24 percent in 2010 to 15 percent in 2016) because of the rehabilitated I&D infrastructure and canal lining. IEG interviews revealed that this led to reductions in waterlogging and salinity and to improved soil quality.

3.33 A shortcoming of the RESP-II results framework and the end-of-project assessment is the lack of information on adoption rates of practices taught in the workshops of component 3 (adoption rates of FFS trainings are discussed under objective 3). IEG interviews with farmers confirmed that project trainings on farm accounting and tax fundamentals were crucial for their farm management. Additionally, all farmers interviewed confirmed that they continued to apply at least one of the farming practices regularly (especially pest and disease verification and control, ameliorative land improvements, or practices related to horticulture, viticulture, or livestock farming). However, no representative data on adoption rates are available. Similarly, there is no information on repayment rates or arrears of the RESP-II loan investments.

### Outcomes

3.34 The RESP-II results framework included the PDO indicator "Overall farmer productivity and income in project regions have increased." Productivity was measured by changes in yield per hectare. According to the ICR, project M&E data showed a 33 percent average increase in yields per hectare for the nine most common crops (wheat, corn, rice, cotton, potatoes, vegetables, melons, fruits and berries, and vineyards) across all eight project regions. This exceeded the indicator target of 20 percent, but is based on irrigated lands only (World Bank 2017d). For the seven project districts with RESP-II I&D interventions, the end-of-project assessment estimated a weighted average yield increase of 12 percent between 2008 and 2015 on the district-level for the same nine primary crops and based on a stratified random sample (Expert Info 2016, 76). This average increase did not meet the appraisal expectations, particularly for the predominant cotton and wheat production, reflecting an overall national trend of declining cotton yield increases since 1980. However, the end-of-project yield increases exceeded those assumptions for melon, fruits and berries, rice and vineyards—crops promoted for diversification purposes under the RESP-II (World Bank 2017d, annex 3).

3.35 Complementing the yields data presented in the ICR, the midterm review prepared for the additional financing in November 2011 showed a 32 percent increase in yields per hectare based on 70 surveyed beneficiary farmers (10 per region based on random stratified sampling, according to the ICRR). The majority of the sampled farmers (64 percent) produced field crops (most commonly cotton and wheat), 17 percent produced livestock, and 11 percent produced poultry.

3.36 The PDO indicator for objective 1 also includes income. However, farm household income data were not collected consistently during implementation. A reference point for this measure is the midterm review based on 70 loan recipients selected based on stratified sampling, stating an average increase in household income of 151 percent compared with income before the loan (World Bank 2017d, vi). Other proxies for income collected during the same survey were an 86 percent average increase in sales, 306 percent average increase in agricultural enterprise profits, 230 percent average increase in animal heads for livestock farms, and a 33 percent average increase in land area under cultivation for crop farmers (World Bank 2011, annex 1). However, the sample size is small and the baseline is unclear, and there are no counterfactual data that attribute these increases to the project.

**IEG Assessment of Yields and Farm Income**

3.37 IEG interviews with eight farmers and agribusinesses and six WCAs during the fieldwork supported ICR conclusions that the uptake of improved agricultural practices and water-saving technologies, the I&D rehabilitation works, and enhanced irrigation scheduling led to improvements in soil quality and increases in yields for cotton and wheat. The average increase in yields found in the small, nonrandom IEG sample was 22 percent for cotton and 61

percent of for wheat. Orchard farmers interviewed by IEG stated they had earned significantly higher income (about 33 percent) compared with cotton from their respective product (mostly apples). Similarly, livestock producers highlighted increases in yields and presumably income from the project-financed imported breeds compared with their former local breeds. The two interviewed farmers who used the RESP-II loan to invest in cold storage rent part of their storage space to other farmers based on high demand, which provided them with additional income throughout the year. However, this information is not representative of all RESP-II beneficiaries, and IEG did not collect counterfactual data.

3.38 Although the other activities promoted under RESP-II—access to rural credit for farmers for the acquisition of inputs or equipment, conversion to high-value crops, and the adoption of project-promoted improved farming practices—could potentially increase yields, the project did not provide sufficient evidence to support this causal chain or the yield outcome. Moreover, IEG was concerned that the outcome data on yields provided in the ICR and project-related assessments were at the district level and not specific to project beneficiaries or project areas. Furthermore, these results were not compared against a counterfactual and thus have limited value for a rigorous assessment of the extent to which objectives were achieved. Additionally, including income at the PDO level is considered overambitious given the project duration and design. The project team missed the opportunity to remove the income formulation from the results framework during restructuring or to enhance impact measurement efforts for this measure.

**Objective 2: Increase Financial Sustainability of Agriculture in the Project Area**

3.39 IEG rates the efficacy of objective 2 as **substantial** based on demonstrated strengthened financial capacity of WCAs and farmers. RESP-II efforts to increase financial sustainability in the project area are categorized in two main activities: (i) provision of irrigation infrastructure rehabilitation, equipment, and training to WCAs, and (ii) loan investments in production and processing complemented with capacity building in farm and agribusiness management and business plan development. A detailed list of the most relevant outputs and intermediate outcomes are provided in appendix D.

### Intermediate Outcomes

3.40 Regarding WCAs' financial sustainability, WCAs increased their service fees from what they were before the project and increasingly apply legal procedures to enforce compliance with contracts on service fee payments and conflict resolution with nonpaying farmers, based on the project training (SDC 2015, 15). IEG corroborated an increased legal support to WCAs, which has increased the fee collection rates for some WCAs.

3.41 Regarding farmers' financial sustainability, despite the weak evidence on yield increases, there are indications that a proportion of RESP-II beneficiary farmers achieved yield increases and therefore possible improvements in financial sustainability, particularly the high-

value horticulture farmers. A financial assessment of 14 RESP-II loan recipients for the ex post economic analysis in the ICR estimated the average incremental net profit for the four most common types of investments (88 percent of all investments). The results were an average incremental net profit of $3,500 for agricultural machinery, $218,000 for cold storage, $250,000 for greenhouses, and $178,000 for orchards for the period of 25 years. Moreover, the end-of-project assessment found a reduction in agricultural production losses, especially for fruit, vegetable, milk, and dairy farmers because of loan investments in postharvest infrastructure. However, it does not quantify the reduction of production losses. Similarly, farmers and agribusinesses who invested in greenhouses (12 percent of RESP-II loans)—typically combined with drip irrigation investments—were able to extend their growing season and reach domestic or international markets earlier than they could before the project. The ICR does not provide data that are more detailed, but IEG interviews supported the conclusion that investments in greenhouses and storage facilities allowed for market expansion and reduced farmers' necessity to engage in ad hoc low-price sales during harvest time. It also allowed them to rent out part of their storage infrastructure for extra income, strengthening their financial sustainability.

### Outcomes

3.42 The RESP-II results framework includes the PDO indicator "Growth in overall agricultural portfolio of the commercial banks of at least 10 percent per year during the project period." This is an incomplete measure for objective 2 because it captures only farmers' and agribusiness' access to financing, which can but does not automatically aid their financial sustainability. At project completion, 57 percent of participating banks increased their agricultural portfolio by at least 10 percent compared with the baseline (before the RESP-II). The results framework did not include a specific PDO-level indicator for WCA financial sustainability, but it included intermediary indicators measuring WCA maintenance performance and user satisfaction, both of which exceeded their targets.

3.43 The project I&D rehabilitation investments, provision of operating equipment, and capacity-building activities for WCAs helped to increase their operational and financial strength. The SDC final report highlights that at project completion, 100 percent of WCAs operated based on operational and financial management plans, O&M plans, and demand-based irrigation schedules approved by the annual WCA general assembly meetings (which in 2015 were attended on average by 87 percent of member farmers compared with only 11 percent in 2011). The development of such plans (formerly uncommon), together with the provision of small equipment, software, and water measurement tools, contributed to WCAs' structured financial planning and eased the identification of risks to financial sustainability. SDC reported that in 2014, 78 percent of the supported WCAs were able to implement 75 percent of their planned O&M irrigation canal cleaning targets (SDC 2015, page 14), cleaning 19 percent more canal kilometers than they did in 2010. By project completion, WCAs conducted 87 percent of maintenance work (World Bank 2017d). WCAs increased their revenues from

service fees and collection rates because of better I&D infrastructure and O&M services (for example, the fee for cotton and wheat farmers increased 32 percent between 2011 and 2014 (from Som 7,193 per hectare to Som 9,483). In line with this, IEG interviews confirmed continuous increases in service fees after the project closed as agreed in the WCA assembly, and improvements in collection rates, particularly from horticulture producers. However, average collection rates are low (45 percent in 2014 for the 62 project WCAs and 53 percent for WCAs that IEG interviewed), and increasing taxes and salary costs have led to debt accumulation among WCAs (SDC 2015, page 15), negatively affecting their financial status. RESP-II took measures to address these risks to financial sustainability by analyzing the financial status and loan-carrying capacity of beneficiary WCAs, supporting them in legal actions that have led to increased revenues, and increasing operational efficiency through trainings and software for financial planning and accounting, among others. The ex post EFA estimated general financial sustainability of I&D rehabilitation works and training investments and calculated a positive financial NPV of $9.9 million (World Bank 2017d, annex 3).

**IEG Assessment on Rural Finance**

3.44 IEG interviews with three participating banks covering 56 percent of RESP-II loans provided during project implementation, six loan recipient farmers and agribusinesses, and other stakeholders, including local authorities and WCAs, revealed the importance of the availability of credit for growing business in the rural space for both banks and farmers. In line with the verbal statements of all bank representatives, a large portion of RESP-II beneficiary farmers (such as 83 percent of the interviewed loan recipients) were first-time loan takers who were attracted by the RESP-II loan conditions. All interviewees reiterated that the project activities helped farmers overcome risk aversion toward taking a loan, and several have taken subsequent loans. For example, half of the interviewed farmers had already taken loans, and 17 percent plan to take additional loans to invest in their business further, stating that the RESP-II experience significantly eased the process of applying for another loan. Moreover, according to bank representatives and loan recipients, the ability to borrow in foreign exchange and purchase high-quality inputs or machinery increased agricultural production and the financial strength of farms and agribusinesses. In addition, component 1 built capacity within banks for a rigorous loan application review process, and farmers' capacity to develop viable business plans. IEG asked banks and farmers about their compliance with repayments and was informed that repayments were according to schedule for the vast majority of loan recipients, given the project's focus on rigorous businesses plan development and risk assessments conducted by the banks. However, no specific information was provided regarding loan repayment rates or arrears to assess the financial sustainability of the RESP-II loan investments.

**Objective 3: Increase Environmental Sustainability of Agriculture in the Project Area**

3.45 IEG rates the efficacy of objective 3 as **substantial** because of the strong evidenced improvements regarding water efficiency, reductions in water losses and consumption, and

uptake of water-saving practices. RESP-II intended to increase environmental sustainability in the project area through two activities: (i) I&D infrastructure improvements and provision of O&M equipment to WCAs, and (ii) capacity-building activities in water management and water-saving practices of WCAs and farmers. A detailed list of the most relevant outputs and intermediate outcomes are provided in appendix D.

### Outcomes

3.46 The results framework included the PDO indicator "Irrigated areas with adequate water supply and drainage in the project districts," which is a proxy measure for environmental improvements in terms of fostering efficiency in irrigation water supply and agricultural production, water loss reduction, and improved drainage decreasing waterlogging—all of which improve the quality of arable land. The PDO indicator target was exceeded by 229 percent, and 204,345 hectares received I&D infrastructure rehabilitation works through RESP-II. The other PDO indicator related to objective 3 is "Farmer access to information about and demonstrations of environmentally sustainable practices improved." This indicator is output-based instead of outcome-based, as noted in the M&E design. At project completion, it exceeded its target by 18 percent, with 61,246 farmers participating in the different RESP-II trainings, including on environmentally sustainable production and water use practices.

3.47 Several results attest to the achievements toward objective 3 derived from the combination of the rehabilitation of I&D infrastructure and capacity building in improved on-farm irrigation management. Specifically, the SDC 2015 survey of 20 percent of randomly selected farmers from each WCA found high adoption rates of improved water-saving technologies demonstrated in FFS, including 97 percent of respondent farmers applying irrigation with organic fertilizers, 66 percent applying every-other furrow irrigation, 63 percent applying short-cut furrow irrigation, and 60 percent applying level furrow irrigation. Most commonly mentioned technologies that interviewed farmers plan to apply are water accounting (45 percent), water record keeping (38 percent), polyethylene pipes applied irrigation, and application of perforated black polyethylene film (35 percent). Moreover, 30 percent of neighboring nonbeneficiary farmers across the seven districts (who field staff monitored regularly) implemented water-saving technologies in 2015 "after learning of their benefits and subsequently receiving training" from WCA (World Bank 2017d, 18).

3.48 In addition, according to the end-of-project assessment, saline lands served by the participating WCAs decreased by 28 percent between 2010 and 2016 (from 18 percent of land to 13 percent) given the reduction in waterlogging and improved water resource management by WCAs and farmers. SDC found water productivity increases (measured in yield in kilograms per cubic meter of water) of 70 percent for wheat and 69 percent for cotton between 2010 and 2014 at the 62 FFS plots (SDC 2015, annex 16). The SDC report also showed that the widely promoted use of black perforated film for furrow irrigation for cotton production led to an average decrease of 20 to 25 percent for on-farm water consumption and 25 to 30 percent for

fuel consumption for pumps per hectare, along with yield increases. Moreover, water loss during transportation was reduced by 37 percent between 2010 and 2016 (from 23.7 percent to 15 percent).

**IEG Assessment of Sustainable Agriculture and Water Management Practices**

3.49 IEG interviews with six WCAs, eight farmers, and eight local representatives (including from BISA, ISA, the regional department of agriculture, and local governments) consistently confirmed improvements in water efficiency and consumption, increased adoption of water-saving technologies, and where previously prevalent, a reduction in waterlogging. Specifically, interviewed farmers reported a 43 percent average reduction in water consumed for agricultural production of wheat and cotton. Without prompting, 57 percent of interviewed farmers volunteered enhanced water delivery as a key benefit derived from the installation of gates and valves, which led to a reduction in waterlogging, and thus enhanced soil quality and yields. Similarly, 67 percent of interviewed WCA chairpersons mentioned improved water flow, and enhanced accuracy in irrigation water delivery in terms of requested volume and timing for their member farmers. They also mentioned quicker delivery—one WCA experienced water delivery time savings of 60 percent, and another decreased water lost during transportation by 85 percent.

3.50 However, IEG interviews also revealed obstacles to the uptake of some of the water-saving technologies promoted by RESP-II, in line with the SDC final report statement, "Technologies that do not involve significant up-front expenditures have gained the widest distribution" (SDC 2015, 31). The most common reasons SDC found for low uptake were (i) unfavorable farm conditions, (ii) lack of funds, (iii) lack of information about the technology, and (iv) unavailability of materials to introduce technology. One example is farmers' mixed interest in drip irrigation. Given that it is not considered the best technology for the still-predominant cotton production (pipes would need to be repositioned every season) along with its high cost, it was of greatest interest and importance to horticulture and viticulture farmers. However, IEG interviewee farmers perceived the low-cost technologies that RESP-II promoted as substantially useful, and they used them regularly, particularly black, perforated film or flexible hoses for furrow irrigation and adhering to an irrigation schedule, confirming the findings of the final SDC report based on a representative farmer sample.

**IEG Assessment on WCA Capacity-Building Activities**

3.51 IEG interviewed six WCAs (two in Andijan's Ulugnor district, two in Ferghana's Yazyavan district, and two in Samarkhand's Pasdargom district). All interviewed WCAs highly appreciated the value RESP-II created for their operational capacity through the SDC-led provision of equipment, including tractors and excavators, motorbikes, bicycles, weather-resistant uniforms, and office equipment (such as a computers, printers, and financial planning software). The equipment provided improved WCA management and the ability to provide

services to members. Specifically, WCA chairpersons and WCA member farmers interviewed expressed their satisfaction with the more accurate and regular canal maintenance, including after project closure. The installation of intake gates with water measurement at the demonstration sites led to more efficient and timely water delivery and more accurate fee calculations, benefiting farmers' irrigation planning, soil quality, and yields, and reducing conflicts between WCA and farmers. Moreover, the interviewed WCAs and members highlighted the value of RESP-II's participatory approach to identifying and rehabilitating the most deteriorated parts of on- and inter-farm irrigation canals. Several WCA chairpersons confirmed that neighboring WCAs that IEG did not interview also appreciated the support received. One WCA mentioned that some WCA members invested their own capital to replicate the RESP-II demonstrations through the installation of gates and valves in irrigation canals to benefit from better control and distribution of water supply.

3.52 Furthermore, all WCAs highlighted the usefulness of and their satisfaction with the project-supported trainings on efficient irrigation water distribution and the development of financial, O&M, and irrigation scheduling plans. Only one of the interviewed WCAs already had similar plans before RESP-II, but for the rest, these plans were new. All of the WCAs interviewed stated that they continue using these plans based on the RESP-II templates and trainings. Given the enhanced capacity and services the WCAs provide, all of them reported that member farmers are generally more willing to pay for improved services. IEG interviews revealed a considerable increase in WCA service fees from what they were before RESP-II. The average WCA service fee for the IEG sample was Som 32,000 per hectare for cotton and wheat (Som 37,000 in Andijan, Som 35,000 in Ferghana, and Som 21,000 in Samarkhand) and Som 48,000 per hectare for horticulture (Som 45,000 in Andijan, Som 65,000 in Ferghana, and Som 33,000 in Samarkhand).

3.53 However, WCA service collection rates were low, with a three-year average of 53 percent across the IEG sample for the years 2015 to 2017 (ranging from a minimum of 30 percent to a maximum 90 percent). This leads to WCAs not being able to pay their staff and debt accumulation fully. Moreover, contributions vary considerably across years and types of farmers (horticulture farmers typically pay higher fees), making WCA financial planning highly challenging. During IEG's visit to the Pasdorgham district, it witnessed an innovative approach to ensure reciprocal accountability—since mid-2018, the Agricultural Inspection under the District Prosecutor's Office enforces the contractual obligation between WCAs and their members more strictly, leading to a significantly higher collection rate. Moreover, WCAs there collect farmers' signatures for the fee bank transfer directly on the field after water delivery.

**Objective 4: Increase Profitability of Agribusiness in the Project Area**

3.54 IEG rates the efficacy of objective 4 as **modest** given lack of profitability measurements and insufficient related evidence. RESP-II efforts to increase the profitability of agribusiness in the project area were categorized in two activity types: (i) capacity building of financial

institutions in agricultural risk assessment to incentivize the development and expansion of loan provisions, and (ii) capacity building of farmers and agribusinesses to enhance on-farm and off-farm productivity through modern production, storage, and processing techniques, and switch to higher-value products and markets to generate higher profits. A detailed list of the most relevant outputs and intermediate outcomes is provided in appendix D.

### Intermediate Outcomes

3.55 All participating financial institutions expanded their agricultural loan portfolio significantly, particularly for horticulture and livestock, as evidenced by the PDO indicator, IEG interviews with banks managing 56 percent of all RESP-II loans, and the continued provision of agricultural credit lines in the ongoing Horticulture Support and Livestock Development Projects. Loans were given for higher revenue-generating investments such as greenhouses (typically together with drip irrigation and seedlings), orchards, postharvest processing, and storage (categories of investments were listed under objective 1) that can be expected to increase profitability. The midterm review survey of 70 RESP-II loan recipients reports some findings on profitability, such as average increases of 86 percent for sales and 306 percent for agricultural enterprise profits among those interviewed (World Bank 2011, annex 1). However, the survey sample size is small, there is no detail on baseline information and collection method for enterprise profits presented, and no counterfactual data were available. Another source of information is the financial profitability analysis in the RESP-II ex post EFA, reporting positive incremental profits for investments in greenhouses, cold storage, orchards, and agricultural machinery (World Bank 2017d). Moreover, the end-of-project assessment reports reductions in agricultural production losses because of improved practices and storage facilities, and greenhouse and cold storage owners' ability to extend the growing season and reach new domestic and international markets. Cold storage owners also typically rent part of their space to nearby farmers, providing them with additional income. In addition, farm profitability is positively affected by the 25 to 30 percent reduction in fuel consumption per hectare for cotton and wheat farmers, as evidenced by the SDC reporting (SDC 2015, 14).

### Outcomes

3.56 The results framework did not include a PDO indicator for agribusiness profitability, which was a considerable weakness of the project and M&E design. The PAD principally related profitability to "access to new financial products," diversification, and "entering into new profitable activities" (World Bank 2008b, 9), but it did not provide specific measurable indicators or expected achievements. The ICR provided outcomes related to the profitability concept associated with objectives 1 and 2, measured in yield and incomes (with insufficient evidence for RESP-II overall), farmers' and agribusinesses' capacity in management and accounting, access and uptake of credit for higher-revenue loan investments, reduction in production losses, and financial institutions' capacity in risk assessment, agricultural portfolio, and financial services. However, no direct evidence of increased agribusiness profitability was

provided (such as higher gross sales margins and sales values, profit margins, debt structure and serviceability, or other financial measures).

**IEG Assessment of Agribusiness Profitability**

3.57 Regarding financial institutions, the three banks interviewed during the IEG mission emphasized the importance and uniqueness of the RESP-II agricultural finance for agro-machinery, greenhouses, higher-value crops or breeds, postharvest storage and processing equipment, or off-farm agribusinesses. All interviewed financial institutions significantly increased their sectoral risk assessment capacity and agricultural loan portfolio (from doubled to a maximum tenfold increase), and expanded the number of related staff because of RESP-II at project completion and continued to do so at the time of the PPAR mission. They all expressed the expansion of their loan portfolio to the growing agricultural sector (particularly horticulture and livestock) and the accompanying increase in their client base and related revenues from higher daily transactions (details are provided in annex F).

3.58 Regarding farmers or agribusinesses' profitability, the IEG mission received only anecdotal evidence about increased sales volumes and margins, higher profits from loan investments, and crop diversification based on a small, unrepresentative sample. Despite the importance of the project's investments addressing the businesses needs and shifts toward higher revenue production of private farmers and agribusinesses, IEG did not obtain sufficient evidence on RESP-II's contribution to agribusiness profitability.[7]

## Efficiency

3.59 Efficiency of RESP-II is rated **substantial**. This assessment is based on the traditional measures of efficiency assessed by the PAD and ICR. Table 3.1 provides an overview of these measures from the ex ante, interim, and ex post financial and economic analyses.

**Table 3.1. RESP-II Efficiency Measures**

| Component | Analysis Type | Ex Ante EFA | Additional Finance EFA | Ex Post EFA |
|---|---|---|---|---|
| Component 1 | Economic NPV | 3.8 million | 18 million | $343 million |
| | Financial NPV | 107.8 million | 20 million | $389 million |
| | EIRR | 20 percent | 19 percent | 47 percent |
| | FIRR | n.a. | 21 percent | 73 percent |
| Components 2 and 3 | Economic NPV | $23.4 million | n.a. | $11 million |
| | Financial NPV | $43 million | n.a. | $9.9 million |
| | EIRR | 24 percent | n.a. | 32 percent |
| | FIRR | n.a. | | 25 percent |

*Note:* EFA = economic and financial analysis; EIRR = economic internal rate of return; FIRR = financial internal rate of return; NPV = net present value.

a. For the additional financing, the economic and financial analysis (EFA) was reestimated for component 1 and maintained the appraisal estimates for components 2 and 3. This made sense because the additional financing funds were targeted to component 1 investments. IEG commends that the EFA for the additional financing broadened its assumption of the model farm from investments in a harvester to other "farm machinery, processing and irrigation equipment and storage facilities, crop and livestock production and services and non-agricultural activities" (World Bank 2017d, annex 3). This assumption included a more holistic picture of the actual investments made by loan recipients of component 1. The resulting analysis estimated a financial net present value of $20 million and financial internal rate of return of 21 percent. The economic net present value was $18 million and an economic internal rate of return of 19 percent.

3.60 **Economic efficiency.** At appraisal, RESP-II conducted an ex ante EFA to assess standard efficiency measures separately for component 1 and components 2 and 3: (i) the financial viability in terms of incremental gross margin, net margin, and financial NPV; (ii) the economic viability in terms of economic NPV; (iii) the overall cost recovery ability of WCAs to finance incremental recurrent costs, and (iv) the fiscal impact of the project on the government. The EFA engaged in a with-project versus without-project scenario, assuming a 25-year period and 12 percent discount rate (World Bank 2008b, annex 9).

3.61 The ex ante EFA estimates for component 1 were based on the farm example acquiring a harvester. The RESP-II PAD does not explain why this example is used, but IEG's review of the RESP ICR reveals that 96 percent of the RESP loans had been used for "purchasing farm machinery and spare parts, out of which 77 percent were for purchasing a combine harvester and different kinds of tractors" (World Bank 2009b, 46). Hence, the farm model used in the RESP-II ex ante EFA adequately reflected the majority portion of typical investments expected for component 1. The total project net incremental benefits were estimated to be $107.8 million in terms of financial NPV, or $5 per $1 invested. The economic NPV was estimated at $3.8 million, or $0.18 per $1 invested, with an EIRR of 20 percent. For the fiscal impact analysis, the EFA assumed that RESP-II financial institutions lent at an interest rate of LIBOR +0.5 to +1 percent in U.S. dollars and of 12 to 14 percent in Uzbek som. Based on these assumptions, funds were estimated to be repaid in 15 installments after a five-year grace period. Sensitivity analysis

concluded that the RESP-II had a high sensitivity to credit disbursement delays by the financial institutions and a moderate sensitivity to delays in loan recipients' repayment of the principal (World Bank 2008b, annex 9).

3.62 The ex ante EFA combines its estimates for components 2 and 3 because the training and advisory activities were assumed to complement the I&D component (World Bank 2008b, annex 9). It is unclear how the training and advisory services provided to farmers were considered in the analysis because the PAD does not provide details and focused on the expected effects of the I&D infrastructure works. The EFA was based on a model farm (assuming 9.6 hectares of wheat, 12.9 hectares of cotton, and 1.6 hectares of other crops) and assumed that the cropping patterns would remain constant and the yield increase was 20 percent for major crops. Based on the assumptions, the financial NPV estimated was $43 million, the economic NPV was $23.4 million, and the EIRR was 24 percent. Sensitivity analysis concluded that the RESP-II had a high sensitivity to decreases in crop prices. Regarding WCAs, the EFA estimated that they would need to increase their fees by 212 percent to Som 25,300 per hectare to cover their maintenance and operating costs. During the IEG mission, interviews with WCAs and farmers revealed that the average WCA fees for the IEG sample were Som 32,000 per hectare for cotton and wheat (Som 37,000 in Andijan, Som 35,000 in Ferghana, and Som 21,000 in Samarkhand) and Som 48,000 per hectare for horticulture (Som 45,000 in Andijan, Som 65,000 in Ferghana, and Som 33,000 in Samarkhand). This demonstrates an increase as deemed necessary by the ex ante EFA. However, collection rates are low, with a two to three-year average of 53 percent across the IEG sample. Moreover, rates strongly vary across years and types of farmers, depending on their yield in a given year.

3.63 At project closure, the ex post EFA estimates for component 1 were based on a sample of agricultural enterprises that received loans through the participating financial institutions. The resulting EFA estimates demonstrate high net incremental benefits. The financial NPV estimates were $389 million and the FIRR was 73 percent, and the economic NPV at $343 million and the EIRR at 47 percent were similarly high. IEG questions the representativeness of the sample given that it is based on 14 enterprises (2 percent of the 570 loans), and their average loan amount at $557,243 was significantly higher than the average amount of $126,000 for all 570 RESP-II–supported loans. The sample selection method is not described, further undermining the representativeness of the results. These shortcomings are acknowledged in the ICR (World Bank 2017d, annex 3) and sensitivity analysis applied. The ex post EFA estimates for components 2 and 3 considered the rehabilitation area, changed cropping patterns, and yield increases. The result estimates a financial NPV of $9.9 million and FIRR of 25 percent, and an economic NPV of $11 million and EIRR of 32 percent. The EFA estimates for the total project were subject to sensitivity analysis and were found to be robust in changes to adoption rates and net profits, justifying the RESP-II investments (World Bank 2017d, annex 3).

3.64 **Operational and administrative efficiency**. RESP-II implementation was generally as planned (including the additional financing) despite delays caused by the government's lengthy review processes. The closing date was extended by 21 months to execute the additional financing. Moreover, the project's demand-driven design contributed to allocative efficiency of investments. Specifically, for component 1, loans were based on the investment demand by farmers and agricultural enterprises. For component 2, the participatory approach ensured that the most needed rehabilitation sites for on- and inter-farm I&D infrastructure were selected. This alignment of supported investments with beneficiaries' needs was consistent with IEG observations during site visits. For component 3, the ICR and IEG interviews with different stakeholders confirmed that trainings and advisory services were based on annual farmer preference surveys.

## Ratings

### Outcome

3.65 The RESP-II outcome is rated **moderately satisfactory.** The relevance of the PDO is rated **modest** because of the shortcomings in defining a measurable project objective. The relevance of the project design is rated **substantial** based on the components' logical and mutually reinforcing alignment. Efficacy of objective 1 on increased productivity is rated marginally **modest,** given insufficient representative evidence on yield and income increases. Efficacy of objective 2 on financial sustainability is rated **substantial** based on demonstrated strengthened financial capacity of WCAs and farmers. Efficacy of objective 3 on environmental sustainability is rated **substantial** because of the strong evidenced improvements regarding water efficiency, reductions in water losses and consumption, and uptake of water-saving practices. Efficacy of objective 4 on agribusiness profitability is rated **modest**, given the lack of robust profitability measurements and insufficient related evidence. Efficiency is rated **substantial** based on adequate ex ante and ex post estimates for standard efficiency measures for all components.

### Risk to the Development Outcome

3.66 The risk to the development outcome is rated **moderate**. This assessment identified three main risks: (i) rapid institutional change, (ii) sustainability of on-farm I&D microproject investments and capacity built, and (iii) adoption of water-saving practices.

3.67 **Rapid institutional change**. Uzbekistan is going through a rapid transformation process toward a market economy, which has accelerated since the current president took office in December 2016. Several institutional restructurings have taken place, including the split of the MAWR into two separate ministries (Ministry of Agriculture and Ministry of Water Resources). At the time of the PPAR mission, the RESP-II implementation agency RRA was placed directly under the cabinet of ministers (above the ministry level), which has provided it with more decision-making and financial weight. Additionally, the key staff involved with RESP-II within

the RRA and the Ministry of Agriculture was retained, which is considered important for institutional capacity and memory. However, although transformations typically go along with institutional modifications, such in-flux and continuously changing environments witnessed during the IEG mission has created uncertainty among donors, beneficiaries, and local authorities.[8] In this transition process, it is crucial to ensure that the results achieved under RESP-II are not jeopardized. The government is committed to this aspect, as demonstrated by several World Bankthat supported strengthening the sector projects since the RESP-II closing. The Horticulture Support Project and the Livestock Sector Development Project under implementation directly build on and expand the experience of RESP-II and include similar activities, like the provision of credit and training to farmers and agrobusinesses. In addition, the World Bank is preparing the Agriculture Modernization Project in line with Uzbekistan's 2017–21 Development Strategy to promote diversification to more competitive value chains and increase farmer and agribusiness productivity and profitability.

3.68 **Sustainability of on-farm I&D investments and capacity building.** Regarding I&D infrastructure, IEG considers the sustainability of most of the RESP-II–supported investments as likely, given that local authorities, WCAs, and farmers have strong incentives to maintain the infrastructure (on the one hand driven by the state procurement quotas for cotton and wheat, and on the other by the higher profitability investments like horticulture). The government budget covers maintenance for main and large inter-farm I&D infrastructure, and IEG found no issues with budget for those activities based on interviews with various stakeholders at the central and local levels. However, on-farm I&D infrastructure is the responsibility of the farmers or the WCAs, who were found to be constrained by chronic underfunding (low WCA service fee collection of only about 50 percent) and weak support for WCAs within the national irrigation institutional structure. Pilot activities by WCAs to collect water service fees and receive the farmer's signature for bank transfers on the spot when water is delivered have the potential to improve WCA self-funding to execute their maintenance role. Regarding the sustainability of the capacity built under RESP-II, IEG found that since project closure, farmers have not had access to similar trainings to learn about improved irrigation and sustainable production practices. There are no structured, widespread training opportunities for farmers available, though the majority expressed the need for continued training.

3.69 **Adoption of water-saving practices.** When considering the RESP-II activities of incentivizing farmers to adopt water-saving practices and technologies like improved water management practices, the current institutional and funding priorities do not align. Promoting such practices and behavior change in farmers is not a priority of the sector agencies, which instead allocate funding toward physical I&D infrastructure investments. The current policy environment provides weak incentives for farmers to adopt water-saving technologies because the supply of irrigation water is free, not efficiently distributed by a deteriorating infrastructure, and prone to distortions by local authorities. Furthermore, some of the technologies promoted through RESP-II and other government activities, such as drip irrigation for horticulture

production, are expensive considering farmers' financial constraints, and require assured temporal water availability.[9] Farmers have little incentive or the funding capacity to invest in the continued environment of state procurement for cotton and wheat and the lack of land right security. RESP-II partially addressed some of these constraints by increasing farmers' access to credit through improved availability of credit services in rural areas and farmers' trust in banks, and facilitating farmers' capacity to apply for credit. RESP-II also promoted low-cost water-saving practices that experienced high uptake among farmers.[10]

## Bank Performance

3.70 World Bank performance is rated **moderately satisfactory**.

### Quality at Entry

3.71 World Bank performance in ensuring quality at entry is rated **moderately satisfactory.** The task team was largely made up of the same staff that supported RESP (whose outcome and Bank performance were rated satisfactory by IEG). The local presence of the task team leader and several team members was crucial to maintaining the established relationship with the government and implementing agency. It also facilitated timely preparation of the initial procurement plan, credit line manual, and terms of reference for the I&D works, and the project implementation plan at appraisal. Furthermore, the World Bank team ensured that project components were in line with government priorities and World Bank strategies for the rural sector in Uzbekistan. Moreover, it made the design modifications to RESP-II based on the implementation experience of RESP and the changing sector needs. Examples include (i) a larger allocation of funds to I&D works per hectare, (ii) stronger participation of the communities and farmers in selecting I&D work sites, and (iii) the reassessment of eligible financial institutions based on due diligence conditions. However, although the project's overall results chain was consistent and logical, the results framework was weak—several important indicators were missing or not measured at the outcome level. Regarding critical risks and possible controversial aspects, the PAD insufficiently estimated the child and forced labor issues, which were successfully addressed during implementation.

### Quality of Supervision

3.72 Bank performance in ensuring quality of supervision is rated **moderately satisfactory.** IEG interviews with implementing agencies and stakeholders revealed a positive and productive working relationship with World Bank staff during project implementation. This was reinforced through the continuity and local presence of the task team leader and much of the task team throughout the entire project cycle. It was also crucial to respond to challenges swiftly, such as the delays by government internal reviews or the Inspection Panel case on child labor. The World Bank task team proactively interacted with the various stakeholders and beneficiaries involved in RESP-II and was professional in navigating through a changing institutional environment (such as the government's decision to eliminate credit unions, which had been part

of the project design implementation for microloans under component 1). It also did not shy away from restructuring based on changing circumstances, as shown by the four restructurings (one level 1 and three level 2 restructurings). Furthermore, the World Bank RESP-II was crucial in strengthening the capacity and structure of WCAs, an aspect that the donor community in the sector emphasized as crucial. Through the RESP-II, the World Bank played a key role in restructuring WCAs in all seven project districts from administrative boundaries to hydrographic boundaries in accordance with international best practice, a practice that was subsequently applied to all WCAs in the country.

3.73 However, quality of supervision could have been improved if the World Bank team had paid more attention to effectively modifying the results framework, especially by removing income and adding adequate profitability indicators. Another shortcoming is that the World Bank could have advocated more strongly for the inclusion of poorer farmers' access to finance and created an alternative channel for RESP-II microloans. With the provision for microloans reallocated to the main credit line after the elimination of credit unions, the inclusion of such farmers was based entirely on the financial institutions' assessment criteria. Neither the ICR nor the end-of-project assessments reported separately on microloans. Based on interviews with participating financial institutions, the IEG mission found that after the second project restructuring, only a very small proportion of the RESP-II loans were microloans (see paragraph 3.2).

## Borrower Performance

3.74 Based on the assessment of government and implementing agency performance, overall borrower performance is rated **moderately satisfactory.**

### Government Performance

3.75 Government performance is rated **moderately satisfactory.** The IEG assessment distinguishes between the central government in Tashkent and regional government institutions, particularly in Andijan, Ferghana, and Samarkhand, which the PPAR mission visited.

3.76 The central government strongly supported RESP-II based on the experience of its predecessor RESP. The government retained the responsible PIU staff within the MAWR, which smoothed the transition between the projects and maintained adequate fiduciary management. According to the ICR, counterpart financing was complete and timely. Additionally, the state funds for regular I&D system maintenance in the project regions were provided, which IEG confirmed during the PPAR mission with the regional representatives. However, as noted in the ICR and ICRR, the central government's lengthy internal review processes caused several delays in project implementation. Furthermore, the government's support for strengthening the capacity and role of WCAs aspired during project preparation did not materialize and was still insufficient at the time of the PPAR mission. At project closure, significant changes occurred in the central government, accompanied by institutional changes and ministry restructurings that

followed and continued and observed at the time of the PPAR mission. Although these changes did not have significant impact on RESP-II implementation, they are important to the sustainability of results as described under Risk to Development Outcome.

3.77 Regarding regional government institutions, the IEG mission found that the municipalities and regional offices of the MAWR were strongly engaged and enthusiastic about the RESP-II. This was rooted in their concern about agricultural productivity in their respective regions and the potential they saw in the different project components to benefit their local farmers and agribusinesses. Regional government institutions showed continuous ownership and engagement in project activities during implementation. For example, municipalities were forthcoming in finding sites for the farm field schools and demonstration sites to ensure their easy access for a large number of farmers (project beneficiaries and nonbeneficiaries). Moreover, in various interviews with different regional representatives, IEG witnessed the support for RESP-II and continued interest in credit support for farmers and I&D infrastructure improvements. However, expressed support for WCAs in general was mixed because their mandate was not defined clearly within the administrative irrigation system, and their capacities differed considerably among each other.

### Implementing Agency Performance

3.78 Implementing agency performance is rated **satisfactory.** The RESP-II implementing agency was the MAWR, and the PIU was established within the Ministry's RRA. Capacity of the PIU was adequate and strongly benefited from the implementation of RESP, which ensured fiduciary knowledge and familiarity with World Bank project implementation and progress reporting. The engagement of PIU staff with the project objectives and beneficiaries was strong and continuous throughout implementation. For example, the PIU visited all 570 subloan recipients and all I&D rehabilitation works. IEG interviews with various stakeholders revealed that PIU staff conducted their activities with dedication and professionalism, and were responsive to any implementation challenges at both the central and regional levels. Furthermore, staff was also proactive in coordinating with SDC regarding the component 2 implementation and coordination with component 3 training activities.

## Lessons RESP-II

3.79 The IEG performance assessment of RESP-II suggests the following lessons:

3.80 **Coordinated and mutually reinforcing capacity building of financial institutions and farmers is crucial for establishing viable on-farm investments**. For example, RESP-II strengthened banks' business plan appraisal and risk assessment capacities while providing farmers with the ability to develop high-quality business plans and adopt improved production practices. This stimulated an increase in agricultural lending in Uzbekistan.

3.81 **Clear concept, measurement, and disclosure arrangements at project appraisal for sensitive data can ensure the availability of results at project completion**. For example, the RESP-II appraisal document did not provide clarity on which aspects of agribusiness profitability the project was expected to increase as one of its objectives. Although the participating banking financial institutions collected data on aspects of agribusiness profitability, the project's design provided no arrangements to access such confidential information to assess the efficacy of the agribusiness development program.

# 4. Comparison of FVWRMP-I and RESP-II in WCA Capacity Building

4.1 The results of capacity-building and operational strengthening of WCAs in FVWRMP-I and RESP-II reveal several similarities and differences between the two projects. There were similarities in the type of support provided to the WCAs in the two projects. Differences emerged in the results that were strongly influenced by the availability of donor grant financing in RESP-II, which provided structured support and financing for high-quality trainings and equipment essential for WCA operations and maintenance, empowering WCAs for better service delivery. However, such financing was not available in FVWRMP-I. The principal outcomes in WCA capacity building in the two projects are summarized as follows along the following categories (more details are provided in appendix D):

4.2 **WCA operational and managerial capacity**. Both projects provided consistent, practical trainings for beneficiary WCAs in participatory development of financial management plans, irrigation scheduling plans, and O&M plans for each WCA (25 for FVWRMP-I and 62 for RESP-II). The WCAs' satisfaction rates with these trainings were high in both projects. Given the project implementation time overlap, IEG was informed that there was some coordination between the World Bank project task teams (one in the Water Global Practice and one in the Agriculture Global Practice) regarding exchanging information on training content. However, an important difference was that RESP-II provided each of its 62 beneficiary WCAs with a computer (with accounting software) and a printer, given their need for such equipment. WCAs in FVWRMP-I were not provided with such crucial equipment because credit sources were not considered for institutional capacity-building purposes. The IEG mission found that all WCAs interviewed continued preparing annual financial management and regular irrigation scheduling plans based on the project trainings. However, only the RESP-II WCAs also prepared annual O&M plans given their actual capacity to execute them. This finding highlighted a higher utilization of the taught skills when trainings are coupled with equipment provision and clear usage arrangements after project closure.

4.3 **WCA maintenance capacity**. Only RESP-II provided all of its beneficiary WCAs with equipment for canal cleaning and other maintenance services based on their needs and preferences. These included bicycles, motorcycles, tractors with a loading bucket or excavator attachment, and bulldozers, among others. As a result, at RESP-II completion, all 62 WCAs could undertake on average 87 percent of their O&M work compared with 34 percent at baseline. By contrast, none of the 25 WCAs of FVWRMP-I could provide adequate canal maintenance services. These WCAs noted that the main reason for the shortfall was the lack of essential equipment to conduct maintenance.

4.4 **WCA water delivery capacity**. Both projects included rehabilitation works on inter-farm (and RESP-II also on-farm) irrigation canals managed by WCAs. Both FVWRMP-I and RESP-II irrigation rehabilitation works were limited to small sections in urgent need of rehabilitation, and these were identified through participatory selection processes that included local authorities, WCAs, and farmers. For RESP-II, in which completed rehabilitation works enabled WCAs to provide better irrigation water service delivery improving water flow, there was decreased water loss during transportation and enhanced accuracy in requested volume and timing for their member farmers. For example, RESP-II data from WCAs monitoring show that water loss during its distribution through inter-farm canals decreased by 36 percent between 2010 and 2016. By contrast, FVWRMP-I did not finish 32 percent of the planned inter-farm irrigation works and did not complete about half of the on-farm water regulators, outlets, and hydro post, and 77 percent of inter-farm regulators and outlets. Two of the WCAs that IEG interviewed (of nine in FVWRMP-I) stated that they were unable to deliver the required irrigation water to their members because of the incompletion of these works.

4.5 **WCA financial sustainability**. The WCAs of RESP-II faced similar challenges in service fee collection rates and financial sustainability as the WCAs of FVWRMP-I, even though they were equipped to execute I&D maintenance services, and hence were providing better service delivery to their members. The average service fee collection rate for the 62 WCAs of RESP-II was 45 percent in 2014, like the low average collection rate of 43 percent for the 25 WCAs of FVWRMP-I in 2015. However, these rates vary according to factors such as yield levels and commodity prices. Furthermore, WCAs of both projects reported challenges with debt accumulation derived mostly from staff salaries, taxes, and electricity expenditures because the revenues from the service fees did not cover these costs fully, and no other funding sources were provided to WCAs.

4.6 **Farmer satisfaction rating on WCA services.** Water user satisfaction with WCA services between the two projects differs slightly, with 82 percent of member farmers of RESP-II WCAs expressing satisfaction with their performance in 2016. In comparison, in FVWRMP-I districts, on average 70 percent of farmers expressed satisfaction with equitable water distribution, and only 60 percent state that water distribution was adequate in the summer in 2015. This was a surprisingly high proportion given the inability to deliver maintenance services.

# 5. Common Lessons

5.1 IEG's assessment of FVWRMP-I and RESP-II generates the following common lessons:

5.2 **Expanding the uptake of water-efficient agricultural technologies requires policies that provide a strong incentive to adopt those technologies**. Both projects included activities to promote farmers' application of water-saving technologies. However, such use was limited in FVWRMP-I. Despite generally better technology adoption in RESP-II at project completion, the sustainability of those practices is at risk given the current policy environment. An improved incentive structure would include policies encouraging adequate water pricing and/or quotas to avoid water overuse by farmers, promoting less water-intensive crop cultivation, and enhancing land tenure security and access to rural finance.

5.3 **Water consumer associations can deliver efficient irrigation services when backed by a legal framework that clearly specifies their responsibility and accountability within the entire irrigation service delivery institutional system**. The assessment of WCAs in the FVWRMP-I and RESP-II projects revealed deficiencies because of the lack of specific regulation and accountability measures for WCAs in Uzbekistan. Such regulations are crucial to warrant the effective execution of contractual relationships between WCAs and local irrigation and drainage system authorities, and between WCAs and member farmers.

5.4 **Water consumer associations can deliver efficient irrigation services when they have access to continuous and sufficient financial resources. WCAs under FVWRMP-I and RESP-II suffered from persistently low service fees and insufficient collection rates**. One reason for this was their inability to provide the services in delivering irrigation water and maintaining irrigation canals under their responsibilities, as in FVWRMP-I (disincentivizing farmers to pay for services not received). However, WCAs that execute their services often face challenges in collecting service fees owed by all of their member farmers. The lack of sufficient financial resources has led WCAs to accumulate significant debt and develop an inability to pay and retain staff, as evidenced under both projects.

5.5 **Coordination and consistent approaches across World Bank projects in the same sector are crucial to ensure broad and harmonized institutional capacity building**. Both FVWRMP-I and RESP-II aimed at improving the capacity of WCAs and farmers, but they differed in their design and approach partially because of the availability of parallel donor grant financing and engagement under RESP II. Although training issues were similar in both projects, RESP-II also provided WCAs with small-scale equipment to enable them to execute their operational and maintenance needs. Field demonstrations and farmer field schools under RESP-II were designed better than those under FVWRMP-I because they were based on regular needs assessments of farmers and close monitoring, leading to a higher uptake of improved and sustainable practices.

[1] The Project Impact Evaluation Report included the caveat that the Kushtepe district was not an adequate control group for comparing WCA services because farmers in that district have a unique arrangement for water delivery that depends highly on the ISAs to carry out many WCA functions.

[2] The project area has a network of 600 piezometers distributed uniformly, monitored by the Hydrogeology and Ameliorative Expedition Department. Eleven piezometer records for April, July, and October were used for the analysis (MAWR,2016, page 86–87).

[3] For component 1, the project was designed to establish a strong relationship with potential financial institutions to encourage their participation in offering financial services to private farmers and small and medium-size agribusiness across the seven project regions. The regional project implementation units were responsible for informing local banks of the RESP-II credit line details and due diligence requirements, gauging their interest, and, if selected, regularly checking on any issues during implementation (according to IEG interviews). The central project implementation unit and the World Bank task team were responsible for preparing a credit line manual by appraisal, selecting eligible banks, and confirming their fulfilment of due diligence conditions by an international bank assessment consultant (World Bank 2008d, 153). Although the assessment of subprojects and selection of credit line recipients was the participating financial institutions' responsibility, both the Rural Restructuring Agency's (RRA) credit line coordinator and the World Bank team's finance specialist reviewed each of the 570 loans provided during RESP-II (World Bank 2017a, 10). For the training activities for the financial institutions, RRA hired international and local consultants. For component 2, a strong collaboration between RRA's central and local irrigation specialists with the Basin Irrigation System Authority (BISAthe Irrigation Systems Administration (ISA), and the Ministry of Agriculture and Water Resources district authorities was envisioned at design and fostered during implementation. This collaboration was crucial to identify and select the most urgently needed on- and inter-farm irrigation and drainage (I&D) works and coordinate and supervise I&D activities in the seven districts (according to IEG interviews). For the capacity-building and strengthening of WCAs, the project closely worked with the Swiss Agency for Development and Cooperation (SDC), which provided parallel grant financing for this purpose in two phases (between March 2009 to February 2012 and March 2012 to June 2015). SDC implemented the related activities of setting up farmer field schools and demonstration plots, and provided equipment to the WCAs (SDC 2015). For component 3, the RRA contracted private consulting companies and experts on a competitive basis to provide training in farm management, such as accounting, taxes, legal matters, and business management, and advisory services in agronomy, pest, and water management. According to the PAD, these trainings were designed to address the lack of such skills by the newly independent farmers, given the recent sector reform. For example, before the reform farmers never had to file their own taxes or handle legal matters themselves. For the trainings on farming practices and water-saving techniques, the project conducted an annual survey among beneficiary farmers to respond to their preference and needs for training topics. Furthermore, the RRA coordinated closely with capacity-building activities of component 2 led by SDC and occasionally used the facilities of the farm field schools

[4] The task team shared with the PPAR mission the report on the appraisal of participating national financial institutions for the follow-on Livestock Sector Development Project, which found no problems related to repayments and nonperforming loans. However, the report does not include all financial institutions active in RESP-II and does not specifically assess RESP-II loans, but rather the financial institutions' overall compliance with due diligence criteria The assessment was primarily based on the audited financial statements for the year ended December 31, 2016 (World Bank 2017f).

[5] The final audit management letter for the period January 1, 2016 to April 30, 2017 stated that the RRA addressed minor shortcoming and inaccuracies promptly and accordingly.

[6] Child and forced labor was a widespread practice during cotton harvests for decades in Uzbekistan. However, in recent years the government took measures to eliminate the practice. A December 2017 International Labour Organization (ILO) report based on 3,000 unaccompanied interviews with cotton pickers and 1,000 random phone interviews found, "The systematic use of child labour in Uzbekistan's cotton harvest has come to an end over the past few years and that concrete measures to completely end the use of forced labour are being implemented." For more information, visit http://www.ilo.org/global/about-the-ilo/newsroom/news/WCMS_613562/lang--en/index.htm.

[7] An issue related to profitability that the IEG fieldwork raised concerns about is the shared prosperity aspect of RESP-II loans. Specifically, the selection process for providing credit to farmers and agribusinesses was led by the financial institutions' criteria, with close supervision by RRA. Although this makes sense from a financial standpoint, from a social inclusion perspective, the design lacked an ensured (partial) participation of disadvantaged farmers who do not possess assets accepted as collateral. This is critical, especially in the Uzbek context, where land is leased and cannot be used as collateral for loans. At project design, RESP-II included a $5 million provision for microloans to be allocated through credit unions to allow smaller loan investments (maximum of $10,000). However, during project implementation, the government eliminated credit unions, which were expected to be the main financial intermediaries for this project. The allocated funds were redistributed among participating financial institutions, and based on project evidence and IEG interviews with banks, very few microloans near the top amount of $10,000 were provided, and no effective, alternative channel for microcredit loans developed.

[8] For example, in the irrigation sector, the role of the BISA was altered just before the IEG mission, ISA was eliminated, and new district-level irrigation departments were created instead (IEG was informed that much of the ISA staff was integrated there), and the role of WCAs was not strengthened (in relation to budget allocation or development of the water code). This change in the sector caused (at least temporary) confusion and inefficiencies.

[9] For example, farmers who adopt drip irrigation receive a property tax release for three years, which is only a fraction of the investment cost, and most farmers still face credit constraints in access, loan size, and loan length.

[10] SDC reported high uptake of these technologies, as described in the Efficacy section. In addition, during IEG field visits, the majority of farmers interviewed continue using the farming practices taught, such as using black perforated film for furrow irrigation, flexible hoses for furrow irrigation, and adhering to irrigation scheduling, among others.

# Bibliography


Expert Info LLC. 2016. *Impact Assessment Report for the Rural Enterprises Support Project Phase II*." Tashkent, Uzbekistan: [publisher].

MAWR (Ministry of Agriculture and Water Resources, Uzbekistan). 2016. *Project Impact Evaluation Report.* MAWR, Uzbekistan.

MWR (Ministry of Water Resources, Uzbekistan). 2018. *Statistical Information about Water Consumer Association Activities in the Regions of Uzbekistan and the Republic of Karakalpakstan*. MWR, Uzbekistan.

SDC (Swiss Agency for Development and Cooperation). 2015. *Second Phase of Swiss Government Parallel Non-Reimbursable Financing for Sub-Components 2b and 2c Rural Enterprise Support Project Phase II – Irrigation and Drainage Component, Final Report.* Tashkent, Uzbekistan.

Sutton, William R., Jitendra P. Srivastava, James E. Neumann, Peter Droogers, and Brent B. Boehlert. 2013. *Reducing the Vulnerability of Uzbekistan's Agricultural Systems to Climate Change: Impact Assessment and Adaptation Options.* Washington, DC: World Bank.

Swinkels, Rob, Ekaterina Romanova, and Evgeny Kochkin. 2016. *Exploratory Assessment of Factors that Influence Quality of Local Irrigation Water Governance in Uzbekistan.* Washington, DC: World Bank.

UNFCCC. 2008.. "*Second National Communication of the Republic of Uzbekistan to the UNFCC*, 2008"

Uzbekistan (government of). 2008. *Welfare Improvement Strategy 2008-2010.* Tashkent, Uzbekistan: Government of Uzbekistan.

———. 2013. *Welfare Improvement Strategy 2013-2015.* Tashkent, Uzbekistan: Government of Uzbekistan.

Veldwisch, Gert Jan A., and Bettina Bock. 2011. "Dehkans, Diversification, and Dependencies: Rural Transformation in Post-Soviet Uzbekistan." *Journal of Agrarian Change* 11 (4): 581–597.

World Bank. 2001a. "Uzbekistan—Rural Enterprise Support Project." Project Appraisal Document 21075-UZ, World Bank, Washington, DC.

———. 2008a. Conformed Copy - Credit Number 4433 UZ - Second Rural Enterprise Support Project - International Development Association. Washington, DC: World Bank.

———. 2008b. "Uzbekistan—Rural Enterprise Support Project Phase II." Project Appraisal Document 43479-UZ, World Bank, Washington, DC.

———. 2008c. *Uzbekistan—Country Assistance Strategy.* Washington, DC: World Bank.

———. 2008d. "Uzbekistan—Rural Enterprise Support Project Phase II." Project Implementation Plan, World Bank, Washington, DC.

———. 2009a. "Uzbekistan—Ferghana Valley Water Resources Management Phase I Project." Project Appraisal Document 49393-UZ, World Bank, Washington DC.

———. 2009b. "Uzbekistan—Rural Enterprise Support Project." Implementation Completion and Results Report ICR711, World Bank, Washington, DC.

———. 2009c. "Uzbekistan—Rural Enterprise Support Project." Independent Evaluation Group, Implementation Completion and Results Report Review, ICRR13112, World Bank, Washington, DC.

———. 2010. *Uzbekistan—IDA Credit 4648-UZ Financing Agreement*. Washington, DC: World Bank.

———. 2011. "Uzbekistan—Rural Enterprise Support Project Phase II." Midterm Review Mission and Aide Memoire, World Bank, Washington, DC.

———. 2012. Uzbekistan—Rural Enterprise Support Project Phase II: Additional Financing." Project Paper Report 67598-UZ, World Bank, Washington, DC.

———. 2016. *Uzbekistan—Country Partnership Framework FY16–20.* Washington, DC: World Bank.

———. 2017a. "Uzbekistan—Ferghana Valley Water Resources Management Project Phase II." Project Appraisal Document PAD1054, World Bank, Washington, DC.

———. 2017b. "Uzbekistan—Ferghana Valley Water Resources Management Project Phase II." Implementation Completion and Results Report ICR3584, World Bank, Washington, DC.

———. 2017c. "Uzbekistan—Ferghana Valley Water Resources Management Project Phase II." Independent Evaluation Group, Implementation Completion and Results Report Review ICRR0020791, World Bank, Washington, DC.

———. 2017d. "Uzbekistan—Rural Enterprise Support Project Phase II." Implementation Completion and Results Report ICR4167, World Bank, Washington, DC.

———. 2017e. "Uzbekistan—Rural Enterprise Support Project Phase II." Independent Evaluation Group, Implementation Completion Report Review, ICRR0020843, World Bank, Washington, DC.

———. 2017f. "Uzbekistan—Livestock Sector Development Project." Project Appraisal Document PAD2275, World Bank, Washington, DC.

———. 2018. Concept Note - *Strengthening irrigation management models for sustainable service*

———. 2009-2016. Implementation Status Reports for Uzbekistan Rural Enterprise Support Project Phase II. Washington, DC: World Bank.

World Bank Institute. 2007. Water Users Associations in Uzbekistan: Review of Conditions for Sustainable Development.

# Appendix A. Basic Data Sheet

## Ferghana Valley Water Resources Management (IDA-46480, P110538)

**Table A.1. Key Project Data**

| Financing | Appraisal Estimate *($, millions)* | Actual or Current Estimate *($, millions)* | Actual as Percent of Appraisal Estimate |
|---|---|---|---|
| Total project costs | 65.54 | 48.82 | 74.49 |
| Credit amount | | | |
| Cofinancing | | | |
| Cancellation | | | |

**Table A.2. Cumulative Estimated and Actual Disbursements**

| Disbursements | FY10 | FY11 | FY12 | FY13 | FY14 | FY15 | FY16 | FY17 |
|---|---|---|---|---|---|---|---|---|
| Appraisal estimate *($, millions)* | 2.36 | 10.97 | 28.02 | 43.76 | 55.93 | 63.31 | 65.54 | 65.54 |
| Actual *($, millions)* | 0.4 | 2.7 | 13.5 | 24.82 | 34.08 | 45.57 | 49.71 | 48.82 |
| Actual as percent of appraisal | 16.94 | 24.61 | 48.17 | 5671 | 60.89 | 71.93 | 75.8 | 74.49 |

**Table A.3. Project Dates**

| Event | Original | Actual |
|---|---|---|
| Concept review | – | 01/24/2006 |
| Board approval | – | 09/24/2009 |
| Signing | – | 02/09/2010 |
| Effectiveness | 03/03/2010 | 03/03/2010 |
| Closing date | 07/31/2016 | 12/31/2016 |

**Table A.4. Staff Time and Cost**

| | World Bank Budget Only | |
|---|---|---|
| Stage of Project Cycle | Staff time *(no. weeks)* | Cost[a] *($, thousands)* |
| **Lending** | | |
| FY08 | 9.59 | 55.96 |
| **Supervision or ICR** | | |
| FY09 | 31.95 | 187.18 |
| FY10 | 8.26 | 41.50 |
| FY11 | 31.78 | 117.69 |

| | | |
|---|---|---|
| FY12 | 32.22 | 109.43 |
| FY13 | 21.17 | 76.91 |
| FY14 | 25.00 | 106.51 |
| FY15 | 38.25 | 189.80 |
| FY16 | 29.25 | 150.53 |
| FY17 | 28.35 | 104.03 |
| Total | | 1,083.22 |

*Note:* ICR = Implementation Completion and Results Report.
a. Including travel and consultant costs.

## Table A.5. Task Team Members

| Name | Title[a] | Unit | Responsibility or Specialty |
|---|---|---|---|
| **Lending** | | | |
| Mahwash Wasiq | Senior Water Resources and Agricultural Economist | ECSSD | Task Team Leader |
| Janis Bernstein | Senior Social and Environment Specialist | ECSSD | |
| Ohn Mynt | Irrigation and Drainage Engineer | | Consultant |
| Yuling Zhou | Senior Procurement Specialist | ECSPS | |
| David Colbert | Senior Environment Officer | FAO | |
| John Ogallo | Senior Financial Management Specialist | ECSPS | |
| Wolfhart Pohl | Senior Environment Specialist | ECSSD | |
| Walter Klemm | Senior Water Resources Engineer | FAO | |
| Thomas Muenzel | Senior Economist | FAO | |
| Kseniia Malenko | Financial Analyst | LOADM | |
| Liudmila Mazai | Program Assistant | ECSSD | |
| **Supervision/ICR** | | | |
| IJsbrand de Jong | Lead Irrigation Specialist | GWA06 | Task Team Leader |
| Jeren Kabayeva | Agriculture Specialist | GFA03 | |

| | | | |
|---|---|---|---|
| Blaga Djourdjin | Procurement Specialist | GGOGI | Procurement |
| Djamshid Iriskulov | Consultant | GG021 | Financial Management |
| Antonia Cristian D'Amelj | Senior Counsel | LEGLE | |
| Dilshod Khidirov | Senior Agricultural Specialist | GFA03 | |
| Ekaterina Romanova | Social Development Specialist | GSU03 | Safeguards |
| Gulana Enar Hajiyeva | Senior Environmental Specialist | GEN03 | Safeguards |
| Javaid Afzal | Senior Environmental Specialist | GEN03 | Safeguards |
| Jasna Mestnik | Finance Officer | WFALN | Disbursement |
| Ma Dessirie Kalinski | Finance Analyst | WFALN | Disbursement |
| Nikolai Soubbotin | Lead Counsel | LEGLE | |
| Olivier Durand | Senior Agriculture Economist | GFA03 | |
| Giovanni Munoz | Land and Water Development Engineer | FAO | |
| Oydin Dyusebaeva | Program Assistance | ECCUZ | |
| Valencia Copeland | Program Assistance | GFA03 | |
| Talimjan Urazov | Senior Agricultural Specialist | GFA03 | ICR |

*Note:* ICR = Implementation Completion and Results Report.
a. At time of appraisal and closure, respectively.

## Rural Enterprise Support Project Phase II (IDA-44330 and 51520; P109126)

### Table A.6. Key Project Data

| Financing | Appraisal Estimate *($, millions)* | Actual or Current Estimate *($, millions)* | Actual as Percent of Appraisal Estimate |
|---|---|---|---|
| Total project costs | – | – | |
| Loan amount (IDA) | 67.96 | 96.84 | 142 |
| Cofinancing | | | |
| Cancellation | | | |

### Table A.7. Cumulative Estimated and Actual Disbursements

| Disbursements | FY09 | FY10 | FY11 | FY12 | FY13 | FY14 | FY15 | FY16 | FY17 |
|---|---|---|---|---|---|---|---|---|---|
| Appraisal estimate *($, millions)* | 3.095 | 13.23 | 30.21 | 46.71 | 59.57 | 67.96 | 67.96 | 67.96 | 67.96 |
| Actual *($, millions)* | 2.00 | 10.365 | 24.729 | 33.299 | 41.773 | 50.491 | 74.026 | 96.646 | 96.848 |
| Actual as percent of appraisal | 51 | 78 | 81 | 71 | 70 | 74 | 108 | 142 | 142 |
| Date of final disbursement | June 2017 | | | | | | | | |

## Table A.8. Project Dates

| Event | Original | Actual |
|---|---|---|
| Concept review | 12/30/2008 | 12/12/2007 |
| Board approval | 12/05/2011 | 06/12/2008 |
| Signing | | |
| Effectiveness | | 12/30/2008 |
| Closing date | 03/31/2015 | 12/31/2016 |

## Table A.9. Staff Time and Cost

| | World Bank Budget Only | |
|---|---|---|
| Stage of Project Cycle | Staff time *(no. weeks)* | Cost[a] *($, thousands)* |
| Lending | | |
| FY08 | 48.88 | 129,199.97 |
| FY09 | 1.04 | 3,042.88 |
| Total | 49.92 | 132242.9 |
| Supervision or ICR | | |
| FY09 | 27.12 | 36,635.83 |
| FY10 | 43.32 | 65,103.30 |
| FY11 | 35.87 | 56,328.87 |
| FY12 | 23.24 | 51,867.37 |
| FY13 | 21.48 | 46,451.57 |
| FY14 | 14.27 | 30,590.94 |
| FY15 | 17.56 | 47,646.45 |
| FY16 | 19.65 | 61,589.08 |
| FY17 | 13.71 | 47,005.91 |
| Total | 216.22 | 443219.30 |

*Note:* ICR = Implementation Completion and Results Report.
a. Including travel and consultant costs.

## Table A.10. Task Team Members

| Name | Title[a] | Unit | Responsibility or Specialty |
|---|---|---|---|
| **Lending/Supervision** | | | |
| Dilshod Khidirov | Sr. Agricultural Spec. | GFA03 | Task Team Leader |
| Pieter David Meerbach | Sr. Water Resources Spec. | GWA09 | |
| Sandra Broka | Senior Agriculture Economist | GFA03 | |
| Maurizio Guadagni | Sr. Agriculture Spec. | GFA04 | |
| Naushad A. Khan | Consultant | GGO03 | |
| John Otieno Ogallo | Sr. Financial Management Specialist | OPSPF | |
| Fasliddin Rakhimov | Procurement Specialist | GGO03 | |
| Janna Ryssakova | Social Development Specialist | ECSSO | |
| Galina Alagardova | Sr. Financial Management Specialist | GG021 | |
| Oydin Dyusebaeva | Program Assistant | ECCUZ | |
| Ama Esson | Program Assistant | GFA03 | |
| Pieter David Meerback | Sr. water Resources Specialist | GWA09 | |
| John Otieno Ogallo | Sr. Financial Management Specialist | OPSPF | |
| Fasliddin Rakhimov | Procurement Specialist | GG03 | |
| Sari K. Soderstrom | Director | GSURR | |
| Nikolai Soubbotin | Lead Counsel | LEGLE | |
| Ijsbrand Harko de Jong | Lead Irrigation Specialist | GWA06 | |

## Table A.11. Other Project Data

**Borrower or Executing Agency**

**Follow-on Operations**

| Operation . | Amount *($, millions)* | Board Date |
|---|---|---|
| Horticulture Support Project (P133703) | 150 | June 12, 2014 |
| Livestock Development Project (P153613) | 150 | June 23, 2017 |

# Appendix B. Fieldwork Methodology

The Project Performance Assessment Report of FVWRMP-I and RESP-II employed a mix of different methods to address the evaluation questions, comprised of pre-mission desk-based document reviews, field-based semistructured group and individual interviews, and infrastructure verification site visits.

The Independent Evaluation Group (IEG) conducted a field mission to Uzbekistan for two weeks during October and November 2018, which included five days at local sites per project assessed. The objective of the field mission was to directly obtain stakeholder and beneficiary perceptions about the design and execution of the respective project activities, selectivity criteria, and sustainability of results. It also included visits to project infrastructure to assess condition and use. IEG applied the following validation tools at each field visit site for both FVWRMP-I and RESP-II:

- Semistructured group interviews with water consumer associations (WCAs) representatives and at least two members or farmers, and local irrigation agency officials (for FVWRMP-I) were conducted at all site visits.
- Semistructured individual interviews with project beneficiaries (mostly farmers) were held at farm and farm field school site visits to allow for face-to-face conversations using a semistructured questionnaire and inspection of project-supported equipment and infrastructure. Similarly, IEG interviewed former project implementation unit (PIU) staff and other stakeholders from the government, financial institutions, research institutes, and donors separately from project beneficiaries during the mission. Appendix C provides information on the people interviewed for FVWRMP-I and RESP-II.
- Asset inspections were done at all site visits to physically verify the existence, condition, and use of project-supported equipment and infrastructure (mostly on-farm, inter-farm and main irrigation and drainage canals). IEG used visual verification in most cases (taking photographs where possible), or verbal confirmation by the beneficiary if the equipment was not on-site during the visit. Appendix E contains an asset verification summary table for all sites visited.

## Sampling of site visits FVWRMP-I

IEG selected a sample of farms (leaseholder farmers, dehkan farms, demonstration plots, and drip irrigation pilots), WCAs, and irrigation and drainage works based on the following criteria.

**Geographic coverage:** IEG visited all of the three districts included in the project, namely Rishtan, Bagdat and Altiarik. Figure B.1 shows a map with the FVWRMP-I sample sites visited by IEG during the mission.

**Investment type:** IEG divided activities and beneficiaries in each district into five categories: (i) works, at least one of each type (main irrigation and main drainage canals, collectors, inter-farm irrigation canals, inter-farm drainage canals, pressure relief wells, vertical drainage wells, and collectors); (ii) demonstration plots, at least one in each district; (iii) drip irrigation pilots, at least one in each district; (iv) other leaseholder or dehkan farms benefited from the project, at least one in each district; and (v) WCAs, at least one in each district. IEG's sample selection for district (Rishtan, Bagdad, Altiarik) was based on a random selection from a list of all beneficiaries by under component 2, stratified by type of training (to cover demonstration plots, drip irrigation pilots, and farmer field schools) and type of farm (to cover leaseholder and dehkan farms). All WCAs were invited by the local PIU, and IEG interviewed those who attended. Regarding works, IEG randomly selected from the list of works completed under the project. Based on these criteria, and depending on the availability of the selected beneficiaries, and the proximity of selections, IEG visited and interviewed a total of 26 direct project beneficiaries and assets (of which two leasehold farmers, one dehkan farm, three drip irrigation farms, two demonstration plots, nine WCSs, and nine irrigation and drainage (I&D) works of various kinds). Table B.1 summarizes the IEG sample composition.

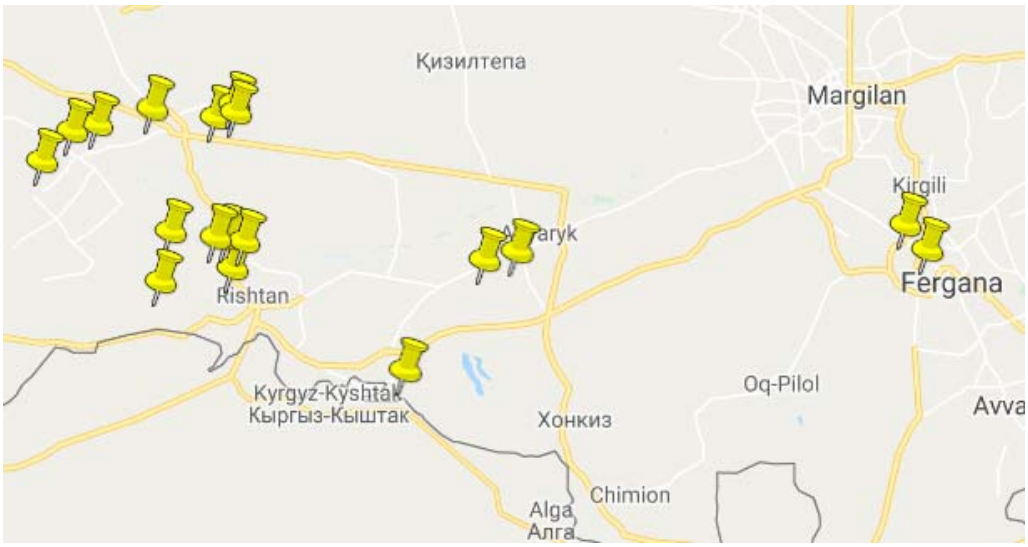
**Table B.1. IEG Sample Composition FVWRMP-I**

| | | | |
|---|---|---|---|
| **Rishtan** | | | |
| Works | | | Component 1 |
| | 1 | Inter-farm drainage canal | |
| | 2 | Vertical drainage well | |
| | 3 | Collector | |
| | 4 | Pressure relief well | |
| Farmer beneficiaries | | | Component 1 and 2 |
| | 5 | Leasehold farm Imkoniyat | |
| | 6 | Demonstration plot farm Fazilatkhon Bakhodirjon Zamini | |
| | 7 | Drip irrigation pilot farm Kholinso 2002 | |
| WCAs | | | Component 2 |
| | 8 | Tuda Zilol Sharsharasi | |
| **Bagdad** | | | |
| Works | | | Component 1 |
| | 9 | Pressure relief well | |
| | 10 | Inter-farm irrigation system | |
| | 11 | Main drainage canal | |
| | 12 | Main irrigation canal | |
| Farmer beneficiaries | | | Component 1 and 2 |
| | 13 | Leasehold farm Ganiota | |

| | | | |
|---|---|---|---|
| | 14 | Demonstration plot Nurmuhammad Bogi | |
| | 15 | Drip irrigation pilot: Khursand | |
| WCAs | | | Component 2 |
| | 16 | Sabibullo Hoji Muhiddinov | |
| | 17 | Irrigator Bagdad | |
| | 18 | Mirzaomon Ismoilov | |
| | 19 | Kushtegirmon Gidrotekhnigi | |
| | 20 | Dustlik Ravon Yuli | |
| **Altiarik** | | | |
| Farmer beneficiaries | | | Component 1 and 2 |
| | 21 | Demonstration plot Ergashboy Hujamov | |
| | 22 | Dehkan farm Adhamjon Askarov | |
| | 23 | Drip irrigation Ahadjon Ismatov Orzusi | |
| WCAs | | | Component 2 |
| | 24 | Povulgon Abdusalom | |
| | 25 | Burbonlik Suv Yullari | |
| | 26 | Katput Zilol Suvi | |

**Figure B.1. Map of IEG Field Visit Sites FVWRMP-I**


**Figure B.2. Ferghana Region**




## Sampling of Site Visits RESP-II

IEG selected a sample of farms, both private and limited liability companies (LLC),[11] water consumer associations (WCAs), and financial institutions that directly benefited from subproject investments of components 1, 2 and 3 based on the following criteria:

**Geographic coverage.** IEG visited four project regions in Uzbekistan, including the capital city of Tashkent, two regions in the east (Andijan and Ferghana) and one in the southwest (Samarkhand). RESP-II was active in seven of the country's thirteen regions, in which seven districts received activities from both component 1 (rural enterprise finance) and component 2 (irrigation and drainage) in addition to activities of component 3 (rural training and advisory services). Andijan Region, Ferghana Region, and Samarkhand Region had the largest number of approved subloans of component 1, and Ulugnor district (in Andijan Region), Yazyavan district (in Ferghana Region) and Pasdargom district (in Samarkhand Region) had significant I&D rehabilitation works, which were the main reasons for IEG to select them for the RESP-II field mission. Beneficiaries in two additional adjacent districts were visited (Oltinkol in Andijan and Toshloq in Ferghana) to cover more beneficiaries of component 1 and based on logistical considerations. The diverse geographical coverage of the IEG sample allowed IEG to detect any major differences in project implementation between regions. In addition, visiting the Ferghana Region was of key interest for a comparative analysis of the RESP-II with the Ferghana Valley Water Resource Management Project-I, as site conditions and beneficiary types were similar. Figure B.2 shows a map with the RESP-II sample sites visited by IEG during the mission.

**Investment type.** IEG divided activities and beneficiaries in each district into four categories: (i) farms that received a credit line through component 1, (ii) banks that received financing and training through component 1, (iii) WCAs and farmers who received irrigation infrastructure (on-farm or inter-farm) through component 2, and (iv) WCAs and farmers who received farmer field school (FFS), demonstrations, and trainings through components 2 and 3. To capture these

different types of activities and beneficiaries, IEG aimed to meet with at least one beneficiary per investment type category for each of the regions visited (except for Tashkent, where meetings focused on government implementing agencies, contractors of project feasibility and impact studies, bank representatives, donors, and research institutes).

IEG's sample selection for each region (Andijan, Ferghana and Samarkhand) was based on a random selection from a list of all beneficiaries and sites by component 1 and 2, stratified by type of supported farm production (to cover cotton and wheat, orchard, and livestock farmers) and type of farm or agribusiness (to cover private farms and limited liability companies). Based on these criteria, IEG visited and interviewed a total of 19 direct project beneficiaries and assets (of which six were farms or LLCs that received a credit line, three were banks that received training and financing, six were WCAs or farmers who received irrigation infrastructure and FFS/demonstrations, eight farmers who received training and advisory services, and one inter-farm irrigation canal). Table B.2 summarizes the IEG sample composition.

**Table B.2. IEG Sample Composition RESP-II**

| Region/District | | Beneficiary/Site | Investment Type | Production/Activity |
|---|---|---|---|---|
| Andijan/Andijan City | 1 | Hamkorbank | Component 1 | Financial services |
| Andijan/Ulugnor | 2 | Farm Begijon | Component 1:<br>• seedlings orchard<br>• drip irrigation<br>Component 2:<br>Farmer field school<br>Component 3:<br>Trainings | Cotton/Wheat<br>Apples |
| | 3 | WCA Ulugnor | Component 2:<br>• I&D rehabilitation<br>• WCA capacity<br>• Farmer Field School/demo | WCA services |
| | 4 | WCA Andijon | Component 2:<br>• I&D rehabilitation<br>• WCA capacity | WCA services |
| | 5 | Canal 35-X | Component 2:<br>I&D rehabilitation | Inter-farm irrigation |
| Andijan/Oltinkol | 6 | Farm Argumon Oltikol Orchard | Component 1:<br>• seedlings orchard<br>• cold storage<br>Component 3:<br>Trainings | Apples<br>Storage services |

| | | | | |
|---|---|---|---|---|
| | 7 | LLC FarmBaht Imkon Rivoj Chorvasi | Component 1:<br>93 livestock heads<br>Component 3:<br>Trainings | Livestock |
| Ferghana/Yazyavan | 8 | WCA Khonobod | Component 2:<br>• I&D rehabilitation<br>• WCA capacity<br>• Farmer Field School/demo | WCA services |
| | 9 | WCA Qoratepa | Component 2:<br>• I&D rehabilitation<br>• WCA capacity<br>• Farmer Field School/demo | WCA services |
| | 10 | Farm Gar Galaba 2002 | Component 2:<br>Farmer Field School<br>Component 3:<br>Trainings | Cotton/Wheat<br>Apples |
| Ferghana/Toshloq | 11 | LLC Sarvinoz Mashkhura Shod Dil | Component 1:<br>Bakery equipment | Bakery |
| Samarkhand/ Pasdargom | 12 | Turon Bank | Component 1 | Financial services |
| | 13 | LLC Farm Kriral Biznes | Component 1:<br>• seedlings orchard<br>• cold storage<br>Component 3:<br>Trainings | Apples<br>Storage services |
| | 14 | Farm Rasul Ota | Component 1:<br>Tractor/agro-machinery<br>Component 3:<br>Trainings | Cotton/Wheat |
| | 15 | Farm Nigina | Component 2:<br>Farmer Field School<br>Component 3:<br>Trainings | Cotton/Wheat |
| | 16 | Farm Zamin Kurki | Component 2:<br>Farmer Field School<br>Component 3:<br>Trainings | Cotton/Wheat |
| | 17 | WCA Pastdargom | Component 2:<br>• I&D rehabilitation<br>• WCA capacity | WCA services |

| | | | | |
|---|---|---|---|---|
| | 18 | WCA Pastdargom Anhor Suvchilari | Component 2:<br>• I&D rehabilitation<br>• WCA capacity<br>• Demonstrations | WCA services |
| Tashkent/Tashkent | 19 | Agro Bank | Component 1 | Financial services |

**Figure B.3. Map of IEG Field Visit Sites RESP-II**

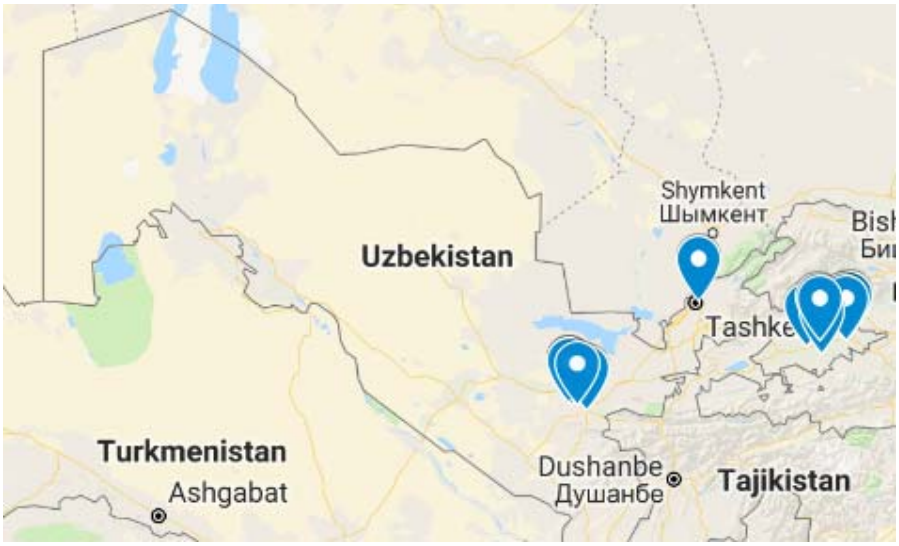



**Figure B.4. Andijan and Ferghana Region**


**Figure B.5. Samarkand Region**


[11] Limited liability companies (LLCs) are a flexible company type. According to Deloitte (2016), "The minimum capital requirement for an LLC is 40 times the minimal wage (~$ 2,000). In general, owners' equity participation is determined based on their capital contribution, unless otherwise agreed by them. The main features of an LLC are as follows: it may engage in any activity not prohibited by domestic law and, accordingly, may obtain a license to do so when required; participants' liability is limited to their contribution to the company; it does not issue shares; instead participants contribute to charter capital. Participants may contribute by providing assets; it is managed through meetings of participants; participants elect an executive body (sole or collective); participants are entitled to leave the company and receive their share of net assets without the consent of other participants; participants enjoy pre-emptive rights to acquire fellow participants' contributions; an LLC with one participant may not act as the sole participant of another LLC; the number of participants may not exceed 50." Deloitte. 2016. *Doing Business in Uzbekistan*. Tashkent, Uzbekistan: Deloitte Uzbekistan.

# Appendix C. List of Persons Met

| Institution/Name | Title |
|---|---|
| **World Bank** | |
| Hideki Mori | Country Manager |
| IJsbrand Harko de Jong | Lead Water Resource Management Specialist (TTL FVWRMP-I) |
| Mr. Dilshod Khidirov | Sr. Agricultural Specialist (TTL RESP-II) |
| Mr. Sergiy Zorya | Lead Agriculture Economist (Sector Coordinator for Central Asia) |
| Mr. Shavkat Rakhmatullaev | Water Resources Management Specialist |
| Ms. Jeren Kabayeva | Agricultural Specialist |
| **Agency for the Implementation of the Projects in the Field of Agro Industry and Food Security (former Rural Restructuring Agency)** | |
| Mr. Kamalov Bakhtiyor | Deputy to General Director |
| Mr. Lee Oleg | Deputy Project Manager |
| Mr. Utaev Nasriddin | Irrigation Engineer Central PIU RESP-II |
| Mr. Usmanov Rawshan | Monitoring and Evaluation Coordinator GEF Project |
| **Ministry of Water Resources** | |
| Mr. Khamraev Shavkat | Minister |
| Mr. Botirov Shavkat | Head of Department for Investments |
| Mr. Toshmatov Bakhodir | Head of Department for foreign economic relations |
| Mr. Azgarov Dilshod | Manager of PIU Ferghana WRMP Phase II |
| Mr. Bakhodir Yusupov | Manager of PIU Ferghana WRMP Phase II |
| Ms. Sablina Valentina | Specialist on finance, Ferghana WRMP Phase I PIU office |
| Ms. Irina Zubareva | Chief accountant, Ferghana WRMP Phase I PIU office |
| Maratbek Narbaev | Irrigation and drainage engineer, Ferghana WRMP Phase I PIU office |
| **Ministry of Agriculture** | |
| Mr. Abdumalik Namozov | Head of Department for Investments |
| **Fund for Amelioration and Irrigation Improvement** | |
| Mr. Babayev Maksud | Deputy Director |
| Mr. Fayziev Zafar | Head of Department |
| Mr. Shoniyzov Nuriddin | Head of Department |
| **Council of Farmers for Dehkan Farms and Owners of Household Lands** | |
| Mr. Kushanov Fakhriddin | Deputy Chairman in charge of Innovation, Investments and Export Support |
| **Swiss Agency for Development and Cooperation** | |
| Mr. Akramov Sohib | Regional Water Sector Program Officer |
| Ms. Islamova Amina | Consultant |
| **International Water Management Institute** | |
| Mr. Djumaboev Kahramon | Water Management Researcher |
| Mr. Akramov Bekzod | Monitoring, Evaluation and Socioeconomic Assessment Specialist |
| Mr. Yuldashev Tulkun | Consultant on Irrigation and Water Management |

| | |
|---|---|
| Mr. Gafurov Zafar | Remote Sensing and GIS Research Officer |
| **International Labour Organization** | |
| Jonas Astrup | Chief Technical Adviser |
| Oxana Kipcanu | Technical Officer |
| **Consulting Companies RESP II** | |
| Mr. Ruziev Makhmudbek | Head of Agriculture and Water Resources IKS Group of Companies ((Feasibility studies RESP-II) |
| Mr. Ibraimov Ilkom | Director, Expert Info LLC (Impact assessment RESP-II) |
| **United Nations Development Program Uzbekistan (UNDP)** | |
| Ulugbek Islamov | Project manager, UNDP |
| Malika Ikramova | Project national adviser, UNDP |
| Gaukhar Kudaybergenova | Project associate on environment, sustainable development cluster, UNDP |
| **UzNature -State Committee on Ecology and Environmental Protection** | |
| Nomanjon Shakirov | Head of department on water, land resources and soil protection, UzNature |
| Saidolim Sahipov | Head of international relations department, UzNature |
| **Consulting Companies FVWRMP-I** | |
| Ms. Madina Khalmirzayeva | NBT Director, Monitoring and Evaluation Consulting Company |
| Mr. Bahadir Boz | Team Leader Temelsu Company, Supervision Consultant |
| **Field Visits FVWRMP-I** | |
| Jurabek Saymatov | First deputy head of Syrdarya-Soh BISA |
| Komiljon Urinbaev | Deputy head of HGAE under Syrdarya-Soh BISA, former PIU for World Bank–financed Ferghana WRM Phase I Project |
| Rahmonali Yakubov | Specialist, UNS under Syrdarya-Soh BISA |
| Feruzbek Tuhtasinov | Head of WCA control department, Syrdarya-Soh BISA |
| Elyorbek Hakimov | Chief specialist, Introduction of new innovative technologies department under Syrdarya-Soh BISA |
| Toyirjon Kasymov | Head of irrigation system department, Rishtan district |
| Ulugbek Khaydarov | Head of irrigation system department, Bagdad district |
| Nuriddin Khaydarov | Chief hydro-technician under irrigation system department, Bagdad district |
| Bakhrom Kholmatov | Head of HGAE, Rishtan district |
| Usmon Abdurahim | Head of HGAE, Bagdad district |
| Akmaljon Hamrokulov | Head of HGAE, Altyarik district |
| Khusniddin Kayumov | Head of UNS, Rishtan district |
| Ulmas Akhmadaliyev | Head of UNS, Bagdad district |
| Soyibjon Mirzayev | Chairman of WCA Tuda Zilol Sharsharasi, Rishtan district |
| Davlatjon Mirzaev | Chairman of WCA Sabibullo Hoji Muhiddinov, Bagdad district |
| Maksudali Yuldashev | Chairman of WCA Irrigator Bagdad, Bagdad district |
| Khizrali Ergashev | Chairman of WCA Mirzaomon Ismoilov, Bagdad district |
| Akromjon Yuldashev | Chairman of WCA Kushtegirmon Gidrotekhnigi, Bagdad district |
| Adhamjon Sotvoldiyev | Chairman of WCA Dustlik Ravon Yuli, Bagdad district |
| Abdusalom Abdurahmanov | Chairman of WCA Povulgon Abdusalom, Altyarik district |

| | |
|---|---|
| Dadayodgor Yodgorov | Chairman of WCA Burbonlik Suv Yullari, Altyarik district |
| Bokijon Sheraliyev | Chairman of WCA Katput Zilol Suvi, Altyarik district |
| Aktamjon Kadyrov | Head of leasehold farm Imkoniyat, Rishtan district |
| Rustamjon Madaminov | Head of leasehold farm Fazilatkhon Bakhodirjon Zamini, Rishtan district |
| Khoshimjon Azimov | Head of leasehold farm Kholinso 2002, Rishtan district |
| Khoshimjon Sarimsakov | Head of leasehold farm Ganiota, Bagdad district |
| Odiljon Yangiboyev | Head of leasehold farm Khursand, Bagdad district |
| Shavkatjon Yunusov | Head of leasehold farm Nurmuhammad Bogi, Bagdad district |
| Ismatjon Hujamov | Head of leasehold farm Ergashboy Hujamov, Altyarik district |
| Samandar Ismatov | Head of leasehold farm Ahadjon Ismatov Orzusi, Altyarik district |
| Adhamjon Askarov | Head of dehkan farm Adhamjon Askarov, Altyarik district |
| **Field Visits RESP-II** | |
| **Tashkent Region** | |
| **Agro Bank Headquarters, Tashkent City** | |
| Mr. Uchkun Namozov | Director of the Department for Project Financing, Agro Bank |
| Mr. Inomjon Juraboev | Deputy Director of the Department on Coordination and Monitoring Investment Activities, Agro Bank |
| Mr. Inomkhuja Yunuskhodjaev | Director of the Department for Foreign Economic Activities and Currency Operations, Agro Bank |
| **Andijan Region** | |
| Mr. Nodir Askarov | RESP-II PIU Coordinator Andijan Region |
| Mr. Niyazov Abdulkhamid | Andijan Regional Department of Agriculture |
| Mr. Ahmedov Bakhodir | Head of Ulugnor District Irrigation Department |
| Mr. Kholdarov Sh | Head of Ulugnor District Agricultural Department |
| Mr. Egamberdiev Iqboljon | Lead Specialist Basin Administration of Irrigation System Norin Qoradaryo |
| Mr. Abdumalikov Shukhratbek | Chief Hydro-technician |
| Mr. Muzaffar Kalandarov | Deputy governor of Oltinkol district |
| Mr. Azizbek Umarov | Deputy governor of Ulugnor district |
| **Hamkor Bank Headquarters Andijan City** | |
| Mr. Gofurjon Ahmedov, | Head of Department for Micro and Agro Crediting |
| Mr. Qosimov Shukhratbek | Loan Officer at Credit Department |
| Mr. Turobov Anvar | Deputy Head of the Department for Micro and Agro Crediting |
| **Baht Imkon Rivoj Chorvasi diversified livestock farm, Oltinkol District, Andijan Region** | |
| Mr. Bektashev Jahongir | Farm Manager |
| **Argumon Oltikol orchard farm, Oltinkol District** | |
| Mr. Ahmadali Hamraqulov | Farmer, Argumon Oltikol farm |
| **WCA Ulugnor, Ulugnor District, Andijan Region** | |
| Mr. Boltaboev Yoqubjon | Chairman WCA Ulugnor |
| Mr. Rakhmonov V. | Farmer, Beginov farm |
| Mr. Sheraliev Abdurakhim | Farmer, Ulugnorda Muniskhon farm |

| | |
|---|---|
| **Farm Field School/Demonstration site Begijon Farm, Ulugnor District** | |
| Mr. Rahmonov Umidjon | Farmer, Begijon farm |
| **Ferghana Region** | |
| Mr. Kamoliddin Karimov | RESP-II PIU Coordinator Ferghana Region |
| Mr. Fozilov Arabboy | Head of Yazyavon District Irrigation Department |
| **LLC Bakery Sarvinoz Mashkhura Shod Dil, Toshloq District** | |
| Ms. Gaffarova Mashkhura | Co-owner bakery Sarvinoz Mashkhura Shod Dil |
| Ms. Gaffarova Sarvinoz | Co-owner bakery Sarvinoz Mashkhura Shod Dil |
| **WCA Khonobod, Yazyavon District** | |
| Mr. Holmatov Nasibjon | Chairman of WCA Khonobod |
| **WCA Qoratepa, Yazyavon District** | |
| Mr. **Chairman of WCA** | Chairman of WCA Qoratepa |
| **Farm Field School/Demo site Far Galaba 2002 farm, Yazyavon District** | |
| Mr. Ergashev Ynusali | Farmer, Far Galaba 2002 farm |
| **Samarkhand Region** | |
| Mr. Ulugbek Pulatov | RESP-II PIU Coordinator Samarkhand Region |
| **Turon Bank Samarkhand Regional Office** | |
| Mr. Ochilov Khasan | Deputy Chairman of Turon Bank Regional Office |
| Mr. Dusmatov Alisher | Credit Officer |
| **LLC Agribusiness Krisral Biznes, Pasdargom District** | |
| Mr. Habib Tashtemirov | Owner, Krisral Biznes |
| **Rasul Ota Farm, Pasdargom District** | |
| Mr. Erkinov Avaz | Farmer, Rasul Ota Farm |
| **WCA Pasdargom, Pasdargom District** | |
| Mr. Raimov Sherali | Chairman of WCA Pasdargom |
| **Farm Field School/Demonstration site Nigina farm** | |
| Mr. Olim Mirzaev | Farmer, Nigina farm |
| **WCA Pastdargomlik Anhor Suvchilari, Pasdargom District** | |
| Mr. Khalilov Qilich | Chairman of WCA Pastdargomlik Anhor Suvchilari |
| **Farmer Field School/Demonstration site Zamin Kurki farm** | |
| Mr. Sharipov Pardaboy | Farmer, Zamin Kurki farm |

# Appendix D. Outputs

## FVWRMP-I

The project completed the planned works on improvement of drainage works. However, works on improvement of irrigation network including rehabilitation of inter-farm irrigation canals, regulators, outlets, and hydro-posts were partially completed. Additionally, the planned laser leveling works for 3,200 hectares were not conducted because of the problem with the contractor for international competitive bidding (ICB) 3 (See Implementation Experience) In addition, the planned activity (on-farm irrigation canal rehabilitation work) that was identified by the feasibility study as 2,065 kilometers) was reduced to 38.8 kilometers during the restructuring. The Implementation Completion and Results Report (ICR) reported (para 14) that that these works were reduced because a substantial number of the canals that were proposed in the feasibility study were in satisfactory condition (World Bank 2017b). See appendix D for detailed outputs.

Regarding the quality of vertical pump works, some beneficiaries that the Independent Evaluation Group (IEG) interviewed mentioned that polyethylene plastic material used for the pipes of vertical pumps were broken frequently on their connection points, causing water leakage. The project replaced the old metal pipes with polyethylene pipes, but according to IEG interviews, the old pipes did not have these problems. These pipes need to be connected using a welding machine.

Under the institutional strengthening component, the project accomplished the following:

- Various drainage, farm and office equipment (office equipment, conductometer, leveling equipment, drain flushing equipment, laboratory equipment, laser leveler (8), agriculture tractors (8), deep ripping ploughs (6), and software purchased for the public water and drainage institutions (Irrigation System Authority, Basin Irrigation System Authority, and Hydrogeology and Amelioration Expedition)
- Trainings in organizational, legal, and technical issues delivered to public water and drainage institutions and WCAs (total participants 1,141—90.1 percent participation)
- Dissemination of modern agricultural and water management practices to members of the WCA and small-scale dehkan farms through provision of training and establishment and operation of field DPs:
    - Nine demonstration plots were established (fields prepared for cropping with surface layout and deep ripping), local fertilizer was provided, and phenological observations conducted.

- Two-hundred farmer field school trainings were offered, and 723 people were trained through farmer field schools on soil structure, crop rotation and application of fertilizers, plant protection, drip irrigation and production of intensive orchards, efficient water usage, child and forced labor, and gender issues.

- The technical assistance on drafting a new water code and the legislation and regulations for WCAs were dropped in 2010, as the United Nations Development Program (UNDP) provided technical assistance to support the government in improving the national water legislation and the WCA regulation.

**Table D.1. Planned versus Actual Outputs on Irrigation and Drainage Works**

| Activities | Feasibility Study | Contracted | Completed | Completed *(percent)* |
|---|---|---|---|---|
| (a) Improvement of irrigation network: Rehabilitation of on-farm, inter-farm irrigation canals, and pilot drip irrigation | | | | |
| On-farm irrigation canal rehabilitation (earth and concrete canals) (km) | 2,065 | 38.8 | 38.2 | 95.8[a] |
| On-farm regulators and outlets (number) | 995 | | 487 | 48.9 |
| On-farm hydro posts (number) | 1,159 | 545 | 303 | 56 |
| Inter-farm irrigation canal rehabilitation (km) | 140 | 25.4 | 17.3 | 68.1 |
| Inter-farm regulators and outlets (Number) | 192 | 178 | 41 | 23 |
| Inter-farm hydro posts | 535 | 0 | 0 | |
| Laser Leveling (hectares) | 3,200 | 3,200 | 0 | 0 |
| Drip Irrigation (hectares) | 301.4 | 301.4 | 301.4 | 100 |
| Improvement of drainage network | | | | |
| Rehabilitation of open on-farm drainages (kilometers) | 870 | 778.1 | 778.1 | 100 |
| On-farm collector structures (number) | 169 | 266 | 266 | 100 |
| Closed horizontal drainage (kilometers) | 100 | 101.5 | 101.9 | 100 |
| Inter-farm collectors (kilometers) | 170 | 170 | 170 | 100 |
| Inter-farm collector structures (number) | 107 | 66 | 66 | 100 |
| Intercepted drainages (kilometers) | 25 | 25 | 25.2 | 100 |
| Structures on intercepted drainages (number) | 46 | 30 | 30 | 100 |
| Observation wells (piezometers; number) | 34 | 34 | 34 | 100 |
| Vertical drainage wells (number) | 242 | 242 | 242 | 100 |
| Pressure relief wells (number) | 1,411 | 1,411 | 1,414 | 100 |
| Conjugation structures | | 760 | 760 | 100 |
| Deep ripping (hectares) | 6,000 | 6,000 | 6,000 | 100 |

*Source:* ICR and Project Impact Evaluation Report.

a. Based on revised plan and contracted amount.

## RESP-II

### Objective 1: Increase Productivity of Agriculture in the Project Area

#### Outputs

**Rehabilitation of I&D Works and Improvement of On-Farm Irrigation Water Supply Services**

- 204,345 hectares with rehabilitated I&D infrastructure selected through a participatory process for inter-farm systems and a WCA and farmer-driven process for on-farm systems (103,730 hectares International Development Association–financed, 26,351 hectares Swiss Agency for Development and Cooperation (SDC)-financed, and 74,264 hectares government contribution).
- 62 WCAs in the seven project districts were reorganized based on hydrographic boundaries and reregistered as nongovernmental or noncommercial entities, in line with international best practice. WCAs were provided with small equipment for operation and maintenance based on needs, including 62 computers and printers, 130 bicycles, 18 cargo motorbikes, 41 scooter-type trucks, 39 tractors with loading bucket, bulldozer, excavator attachments, and 8 laser-leveling equipment.
- 288 trainings on institutional, legal, financial, and technical issues for WCA operations were conducted for WCAs under component 2. In addition, 1,184 trainings on farm productivity improvement practices and water-saving technologies were conducted for farmers under component 2. Ninety-five percent of farmers rated the training and materials provided as high quality, and 77 percent confirmed that the training contents could be applied successfully in practice.

Provision of technical assistance and advisory services:

- 2,938 workshops were held for farmers and agro-processors under component 3 across all seven project regions (88 districts) on soil fertility improvement, pest management, organic farming, and water management. These workshops were additional and designed as complementary to the farmer field school training contents under component 2.
- 61,426 farmers were trained in total (of which 9,185 are women), and a satisfactory survey showed that 87 percent of farmers rated the training as good or very good.

**Access to Credit**

Under the project, 570 loans were provided to farmers and agribusinesses (the total amount was $72 million and average loan amount was $126,000). Loan investments included agricultural machinery like tractors and harvesters (31 percent); storage, processing, and packaging equipment (36 percent); greenhouse facility construction (12 percent); development or expansion of horticulture and viticulture farms through the purchase of seedlings, irrigation equipment, and others (9 percent); development or expansion of livestock farming through the purchase of cattle, milking equipment, and others (6 percent); and development or expansion of poultry farming (5 percent), among others.

### Intermediate Outcomes

**Rehabilitation of I&D Works and Improvement of On-Farm Irrigation Water Supply Services**

- All 62 WCAs operate based on project-promoted operation and maintenance plans, manuals, procedures, and irrigation schedules, and undertook 87 percent of the maintenance work for their I&D infrastructure at project completion compared with the baseline of 34 percent. Eighty-two percent of water users expressed satisfaction with WCA performance at project completion.
- Water loss during transportation decreased by 37 percent, from 24 percent in 2010 to 15 percent in 2016, because of the rehabilitated I&D infrastructure. This also reduced waterlogging, groundwater levels, soil salinity, and hence the quality of arable land.
- Adoption rates of water-saving technologies promoted listed under objective 3.

**Provision of Technical Assistance and Advisory Services**

The end-of-project assessment does not provide information on adoption rates of practices taught in the workshops of component 3. IEG interviews with farmers confirmed that trainings were generally beneficial and practical. All farmers particularly emphasized the usefulness of the farm accounting and tax fundamentals training for their farm management. Also, all confirmed that they continued to regularly apply at least one of the practices taught in the workshops (especially pest and disease verification and control, ameliorative land improvements, or practices related to horticulture, viticulture, or livestock farming).

**Access to Credit**

The different types of farm and postharvest investments by farmers and agribusinesses can be assumed to have contributed to yield increases described above at varying degrees. A financial profitability analysis of 14 RESP-II loan recipients for the ex post economic and financial analysis estimated the average incremental net profit for the four most common (88 percent of all) types of investments. The results were an average incremental net profit of $3,500 for agricultural machinery, $218,000 for cold storage, $250,000 for greenhouses, and $178,000 for orchards for the assumed time period of 25 years.

**Objective 2: Increase Financial Sustainability of Agriculture in the Project Area**

### Outputs

Outputs for objective 2 are the same as for objective 1. As part of the capacity-building activities under components 2 and 3, specific trainings were held on accounting, financial planning, farm management, WCA operations and related software, business plan development, financial sustainability, and linked topics for WCAs and farmers, respectively.

### Intermediate Outcomes

**Agricultural Loan Investments and Capacity-Building Activities**

- Yield increases described under objective 1, improving financial sustainability of farmers
- Loss reduction in agricultural production, especially for fruits, vegetables, milk, and dairy products as a result of loan investments, particularly in postharvest infrastructure and modern technologies. The ICR does not quantify the reduction of production losses.
- Farmers and agribusinesses who invested in greenhouses (12 percent of loans) were enabled to extend their growing season and reach domestic and international markets earlier than they could before the project. The ICR does not provide more detailed data, but interviews with IEG revealed that investments in greenhouses and storage facilities allowed for market expansion and reduced farmers' necessity to engage in ad hoc low-price sales during harvest time.

**Provision of I&D Infrastructure, Equipment, and Training to WCAs**

- Water productivity, measured by yields per cubic meter of water used, went up from 0.68 kilograms to 1.15 kilograms for wheat and from 0.51 kilograms to 0.86 kilograms for cotton between 2010 and 2014.
- WCAs partially apply legal procedures to enforce compliance with contracts on water use and service fee payments as well as conflict resolution with nonpaying farmers, based on the training provided by the project. IEG corroborated an increased legal support to WCAs which has increased the fee collection rates for some WCAs.

**Objective 3: Increase Environmental Sustainability of Agriculture in the Project Area**

### Outputs

All outputs and intermediate outcomes listed under the achievements of objective 1 through the rehabilitation of I&D works and improvement of on-farm irrigation water supply services are also relevant to the achievement of objective 3, but not repeated below.

**I&D Infrastructure Rehabilitation and Maintenance Services**

- 113,471 hectares of rehabilitated irrigation infrastructure and 90,874 hectares with rehabilitated drainage infrastructure was completed. Infrastructure was handed over to respective institutions responsible for O&M services.
- 62 WCAs received O&M equipment and water measurement and control structures, including portable weirs, metal gates, and piezometers for groundwater level monitoring to improve irrigation water use and transport efficiency, as described under objective 1.

**Capacity-Building in Water Resource Management and Water-Savings Technologies**

Sixty-two farmer field schools provided trainings and demonstrations to more than 20,000 farmers on water-saving technologies as listed under objective 1 in a total area of more than 751 hectares. Farmers demonstrated interest and commitment to the topic by bearing 35 percent of training. Ninety-six percent of participating farmers rate training quality as high, and 77 percent confirm that training content could be applied successfully in practice.

### Intermediate Outcomes

**I&D Infrastructure Rehabilitation and Maintenance Services**

Reduction in saline lands and increases in water productivity as described above and under Objectives 1 and 2.

**Capacity-Building in Water Resource Management and Water-Savings Technologies**

High adoption rates of water-saving technologies and spillovers described above.

**Objective 4: Increase Profitability of Agribusiness in the Project Area**

### Outputs

**Capacity-Building of Financial Institutions to Support Viable Agricultural Business Plans**

- 573 staff of participating financial institutions received training on agriculture-specific project appraisal, risk assessment, and monitoring, exceeding the target by 186 percent.
- 570 loan investments listed under objective 1.

**Capacity-Building of Farmers to Foster Productivity and Diversification**

- Trainings for farmers on high-quality business plan development to improve credit access and sustainability of loan investments
- Finance and accounting-related trainings for farmers and agribusinesses under objective 2

### Intermediate Outcomes

**Capacity-Building of Financial Institutions to Support Viable Agricultural Business Plans**

Fifty-seven percent of participating banks increased their agricultural portfolio by at least 10 percent, exceeding the end-of-project target by 43 percent.

**Capacity-Building of Farmers to Foster Productivity and Diversification**

- Yield and income increases described under objective 1
- Loss reduction in agricultural production and ability of farmers and agribusinesses to extend growing season and reach markets earlier, as described under objective 2

## Table D.2. Comparison of FVWRMP-I and RESP-II in WCA Capacity Building

### Outputs

| Activity Types | FVWRMP-I (n=25, 3 districts) | RESP-II (n=62, 7 districts) |
|---|---|---|
| Trainings | - Consistent hands-on training for each individual WCA to develop i) financial management plan, ii) irrigation scheduling plan, and iii) O&M plan | - Consistent hands-on training for each individual WCA to develop i) financial management plan, ii) irrigation scheduling plan, and iii) O&M plan |
| Operational management | - No computers or printers<br>- Software for operational plans | - Computer, printer, generators for each WCA<br>- Software on financial planning and accounting |
| Maintenance capacity | - No provision of equipment for maintenance | - Provision of bicycles, motorbikes, scooter type trucks, tractors with loading bucker, bulldozer, excavator attachments |
| Water delivery capacity | - Only about 50 percent of planned on-farm and 23 percent of the inter-farm regulators, outlets, and hydro-posts to control water flow were provided<br>- Significant reduction in planned inter-/on-farm irrigation rehabilitation works (32 percent of inter-farm irrigation works not finished) | - Planned regulators, outlets, and hydro-posts to control water flow were provided<br>- Completion of planned inter-/on-farm irrigation rehabilitation works |
| On-farm land improvement works | -Laser levelling contract works was cancelled | - Provision of laser levelling equipment to 8 WCAs |

## Intermediate Outcomes

| Outcome Types | FVWRMP-I (n=25, 3 districts, 9 interviewed by IEG) | RESP-II (n=62, 7 districts, 6 interviewed by IEG) |
|---|---|---|
| Training satisfaction | - All 25 satisfied | - IEG interviews with 6 WCA revealed satisfaction by all 6 |
| Use of operational management plans | - All 9 interviewed prepare annual financial management, irrigation scheduling, but do not develop maintenance plan (as they don't provide maintenance services) | - All 6 interviewed prepare annual financial management, irrigation scheduling, and O&M plans and SDC reports corroborates continued use of plans |
| Execution of maintenance services | - None of the 9 interviewed WCA provide maintenance services (due to lack of maintenance equipment) | - All of the 6 interviewed WCA provide maintenance services (using maintenance equipment provided by project)<br>-2015 Swiss Agency for Development and Cooperation assessment found that all 62 WCAs undertook 87 percent of the maintenance work for their I&D infrastructure compared to the baseline of 34 percent. |
| Execution of water delivery service | - Two of the WCAs interviewed by IEG (out of nine) stated that they are not able to deliver the required water to their members due to incompletion of these works. | - Swiss Agency for Development and Cooperation report finds that water loss during transportation decreased by 36 percent (from 24 percent in 2010 to 15 percent in 2016) due rehabilitated I&D infrastructure (esp. lining of canals). IEG interviews revealed that this led to reductions in water logging, groundwater levels, salinity and improved soil quality.<br>- IEG interviews showed significant reduction in time to deliver water |
| Financial sustainability | Irrigation service fee collection rate of 43 percent on average for the 25 WCAs I in 2015. | The average irrigation service fee collection rate for the 62 WCAs of RESP-II 45 percent in 2014. |
| Water user satisfaction with WCA services | According to the beneficiary survey on average 70 percent of farmers state satisfaction in terms of equitable water distribution and only 60 percent of farmers state that water distribution was adequate in summer time in 2015. | According to the results of the Farmer Satisfaction Survey in 2014, farmers' satisfaction is 75.5 percent, an increase of 9.7 percent from the Year 2011 baseline. Water user satisfaction in 2016 was high, as 82 percent expressed satisfaction with WCA performance at project completion. |

# Appendix E. Site Visits and Asset Verification

## FVWRMP-I

### Table E.1. Summary of Interviews and Site Visits with Farmers and Water Consumer Associations

| District | Rishtan |
|---|---|
| Date visited | November 2, 2018 |
| Total Number of Farmers in the District | Leasehold (807), Household (196,400) and Dehkan (240) |
| Main Crops Produced in the District | Cotton: 7,295 ha<br>Wheat: 7,902 ha<br>Orchards: 3,133 ha<br>Vegetables: 478 ha<br>Melons: 131 ha<br>Maize: 58 ha<br>Other: 1,107 ha |
| Total Number of Farmers Benefited from the Project in the District | Leasehold (807), Household (196,400) and Dehkan (240) |
| Total Crop Area Benefited from the Project | Cotton: 7,295 Ha<br>Wheat: 7,902 Ha<br>Orchards: 3,133 Ha<br>Etc.: 1,654 Ha |
| Types of Project Infrastructure Investments | Rehabilitation of inter-farm collectors – 80.81 km; Inter-farm collector structures – 217 pieces<br>Rehabilitation of on-farm drainages – 330.79 km; On-farm collector structures – 123 pieces<br>On-farm irrigation canal rehabilitation – 19.3 km; Regulators and outlets – 173 pieces; Hydroposts – 93 pieces<br>Intercepted drainages – 3.34 km; Structures on intercepted drainages – 8 pieces<br>Deep ripping – 1,826.9 ha<br>Vertical drainage wells – 150 pieces<br>Closed horizontal drainage – 21.03 km<br>Pressure relief wells – 592 pieces<br>Artesian wells – 10 pieces<br>Observation wells (piezometers) – 17 pieces |
| Number of Farmers who Benefited from the Project Training/Demonstrations | Leasehold: 807<br>Household: 196,400<br>Dehkan: 240 |
| **Summary of Interviews** | |
| ISA, Amelioration Unit, Pump Station | As part of the World Bank financed Ferghana Valley Water Resources Management Phase I Project, 146 drainage wells were rehabilitated, irrigation |

| | |
|---|---|
| | canals were rehabilitated, and modern water gates were built in the Rishtan district. The project provided the Rayvodhoz with current meter and land leveling equipment. Moreover, the project organized trainings for WCA and Village Citizens' Assembly (VCA) members (VCA is a self-governance organization to represent the interests of its inhabitants. The resident citizens over the age of 18 are entitled to participate in the assembly. VCAs have a legal status and are registered in the local governor's office) and distributed brochures about water management, infrastructure use, water limits, drip irrigation use, and fertilizer application limits. As a result, productivity has increased by 250-300 kg/ha in the district.<br>As for the relationship between the Rayvodhoz and the WCAs, the former provides water to the latter on the basis of contracts, provides service on water measurement and supports preparing business plans.<br>According to the respondents, unfortunately, the ICB-2 was not completed since the contractor selected could not deliver the tasks. Under ICB-2, the project had planned to rehabilitate 38.8 km of irrigation canals. About 37.6 km were done (98 percent). 995 on-farm regulators and outlets were planned for rehabilitation; 600 were done but only 487 were accepted by the expert commission. Furthermore, under ICB 3-1-1 inter-farm irrigation canals were not rehabilitated properly. Only 35 percent of works were completed. Finally, under ICB 3-1-2 a laser leveling system was supposed to be installed for 3,200 ha. Contractor levelled only 110 ha but it did not fulfill the criteria and thus, the experts did not accept any work. It was unsuccessful.<br>Presently, about two km of non-project irrigation canals need to be rehabilitated and made in concrete. As a result, nine additional farmers would receive water in due time. There are also three villages in non-project sites, which have uncleaned and earthen on-farm irrigation canals. As a result, 20-30 percent of water is lost in those areas. |
| WCA (Name) and Member Size | WCA Tuda Zilol Sharsharasi<br><br>The WCA has 43 members oriented to cotton-wheat production, 16 orchards, two vegetable and one livestock farmer, as well as 12 dehkan farms with an average 0.35 ha farm size. The WCA has 7 staff: a chairman (man), an accountant (woman), 4 irrigators (all men), 1 guard (man), and 1 cleaner (woman). In the WCA territory, "Tuda 1" irrigation canal was cleaned, hydroposts were installed, waterlogging was improved, and groundwater level was reduced. As a result, crop yields have risen.<br>The project organized seminars organized on canal cleaning, how to use water demand and supply notebooks, apply request to WCA five days prior to irrigation, make a business plan (no O&M included, only salary and tax), plan water schedule, and identify water limits. This WCA has no water scarcity problem because they receive from the Ferghana canal directly. They are at the head of watercourse. Still, about 60 percent water is received from drainage canals.<br>The WCA has no agricultural machinery for cleaning on-farm irrigation canals and accordingly, farmers do not contribute for irrigation service fees (ISFs). A farmer cleans canals in his territories on his own and thus, doesn't contribute for ISFs. When needed, WCA can ask local Rayvodhoz for machinery support. The Rayvodhoz normally contacts local State Unitary Enterprises for carrying out machinery cleaning. Farmers provide diesel and pay driver's cost. Nevertheless, after introducing cotton cluster system in 2018, the ISF collection rate has |

| | |
|---|---|
| | increased to 65 percent. The previous years the rate would not exceed 50 percent. |
| Farmer 1 (Demonstration pilot) | Leasehold farm Fazilatkhon Bakhodirjon Zamini<br><br>This farmer has 43 ha land of irrigated land, of which 23 ha is devoted to wheat production and 20 ha to cultivating cotton. Of these, 5 ha of land were under wheat plantation as a demonstration pilot (DP). The project team came and selected the site. The project applied local fertilizers, conducted deep ripping and different agro-technical measures. During the implementation, the farmer learned that the field soils had limited humus and phosphorous contents. Thus, the farmer now applies more contents than before. As a result, crop productivity has increased by 1,500-2,000 kg/ha.<br>According to the farmer, crop rotation should be done every three years. At the moment, it is not possible to introduce the rotation system due to the state's cotton-wheat production quota policy. |
| Farmer 2 (Drip Irrigation Pilot) | Leasehold farm Kholinso 2002<br><br>The total land of this farmer is 20 ha, of these 10 ha for orchards (persimmon, apricot, cherry, and peach) and 10 ha for livestock production. The project installed drip irrigation for 4 ha land. The farmer is a member of local WCA and pays about 50,000 Uzbek om per hectare per year (the exchange rate is approximately Som 8,000 to 1 USD).<br>The project provided drip irrigation pipes to the farmer for free and organized several seminars on the use of this technique, where neighboring farmers attended as well. The Rayvodhoz approached the farmer to include his field for drip irrigation because of water shortage in the area. The Rayvodhoz installed a well to lift water. The well also provides water to other neighboring seven orchard farmers, located downstream of this farmer. Additional 40 households benefit from the well. However, there was an alternative water flow from an irrigation canal to this farmer, which puts in doubt of the necessity of drip irrigation. The farmer claimed that water from the canal flows in June only and thus, drip irrigation is useful.<br>The IEG field visit observed that drip irrigation pipes were removed from the field to a warehouse. According to the farmer, the pipes are normally used during March-September and in winter the pipes freeze. However, the pipes looked dusty and not used for an extended period. |
| Farmer 3 (Leasehold Farm) | Leasehold farm Imkoniyat<br><br>The farmer has 20 ha of irrigated land and cultivates wheat, maize and soybeans. The farmer is a member of Rishtansoy Shalolasi WCA and pays ISF based on contracts on a quarterly basis through local banks. He was aware of the project because drainage canals were rehabilitated around his farm. The project carried out deep ripping at his farm with depths of up to 80 cm. As a result, soil compaction was minimized, and the productivity was increased by 1,000 kg/ha.<br>The farmer participated in several trainings on identifying water limits, planning water scheduling, carrying out proper agro-technical measures, applying local fertilizers (manures), and saving water.<br>During summer, farmers use drainage water for irrigation. In the past, pumps in drainage canals were under the control of a farmer/WCA, including electricity cost of using them. Now, the state covers all costs. |

| Works or Assets Visited | |
|---|---|
| Work or asset type | Pressure Relief Well, Drip Irrigation Pipes, Vertical Drainage Well, Inter-farm Irrigation Canal |
| Location | Rishtan district |
| Year built or purchased | 2011-2015 |
| Functionality of assets | Functioning and in use |
| Main benefits according to beneficiaries | Improved drainage, reduced water logging, better water availability, more efficient water use, improved water management, etc. |
| Maintenance | Regular maintenance in place, or will be maintained in 2019 according to the budget program |
| Issues Mentioned by Beneficiaries | Through the project 160 vertical drainage wells were rehabilitated/newly installed. Unfortunately, these pipes were installed with polyethylene plastic material. They operate using pumps. When pumps function, pipe connection-points break and water leakage starts. These need to be connected using a welding machine. Chinese contractors did not leave this machine. The machine is in the customs of Uzbekistan requiring customs clearance. The machine costs around 15,000 USD and it was not foreseen to leave the machine under the project. In 2019, the government plans to buy the new ones. |
| Pictures Taken during the IEG Field Visit | |

| | |
|---|---|
| Work or asset type, from left to right | Pressure Relief Well, Drip Irrigation Pipes, Vertical Drainage Well, Inter-farm Irrigation Canal |

**Pictures Provided by the Project Team in Ferghana**



26/05/2012


26/05/2012

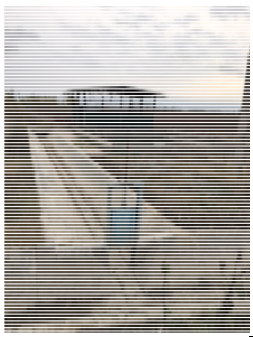
## RESP-II

### Table E.2. Summary of Interviews and Site Visits with Farmers and Water Consumer Associations

| **Region** | **Andijan** |
|---|---|
| District | Ulugnor |
| Date visited | November 1 and 2, 2018 |
| Total Number of Farmers in District | Leasehold: 673 |

| Leasehold production types | |
|---|---|
| Cotton and Wheat | 332 |
| Fish farming | 125 |
| Orchard | 117 |
| Livestock | 34 |
| Mulberry | 26 |
| Vegetable | 14 |
| Bee farming | 6 |
| Poultry | 5 |

<table>
<tr><td></td><td>
<table>
<tr><td>Other</td><td>14</td></tr>
</table>
Household: 10,865<br>Dehkan: 26
</td></tr>
<tr><td>Total number of farmers benefited from project in district</td><td>Component 1: 10 leasehold farms: 8 tractor and machinery (800 hectares), 1 livestock farm (60 hectares), 1 orchard farm (1 hectare); Components 2 and 3: 279 farms, 8 WCAs, and 8 Farmer Field Schools</td></tr>
<tr><td>Total crop area benefited from the project in district</td><td>Component 1: Cotton 400 hectares cotton/wheat, 60 hectares fodder crops, 20 hectares orchard; Components 2 and 3,:626 hectares</td></tr>
<tr><td>Types of project irrigation and drainage infrastructure investments in district</td><td>
Inter-farm irrigation canal rehabilitation
<table>
<tr><td></td><td>Works</td><td>Total</td></tr>
<tr><td>1</td><td>Rehabilitation of inter-farm irrigation network (kilometers)</td><td>5.55</td></tr>
<tr><td>2</td><td>Rehabilitation of structures on the inter-farm irrigation network (units)</td><td>93</td></tr>
<tr><td>3</td><td>Improvement of irrigation in the fields (0 hectares)</td><td>1.,6</td></tr>
</table>
On-farm irrigation canal rehabilitation
<table>
<tr><td></td><td>Works</td><td>Total</td></tr>
<tr><td>1</td><td>Rehabilitation of inter-farm irrigation network (km)</td><td>10</td></tr>
<tr><td>2</td><td>Rehabilitation of structures on the inter-farm irrigation network (units)</td><td>94</td></tr>
<tr><td>3</td><td>Improvement of irrigation in the fields (000 ha)</td><td>3,1</td></tr>
</table>
Demonstration sites for irrigation gates/valves
<table>
<tr><td>1</td><td>Spillways</td><td>7</td></tr>
<tr><td>2</td><td>Polyethylene pipes of diameter 40 and 50 mm (meters)</td><td>240</td></tr>
<tr><td>3</td><td>Piezometers</td><td>7</td></tr>
<tr><td>4</td><td>Irrigation kits for 4 hectares</td><td>1</td></tr>
<tr><td>5</td><td>Black polyethylene films in kg</td><td>455</td></tr>
<tr><td>6</td><td>Soil drill</td><td>1</td></tr>
<tr><td>7</td><td>Water metering and regulating structures</td><td>4</td></tr>
<tr><td>8</td><td>Smartphones</td><td>1</td></tr>
</table>
Demonstration sites for drip irrigation for orchards, Farmer Field School
<table>
<tr><td>1</td><td>Demonstration fields (ha)</td><td>11,60</td></tr>
<tr><td>2</td><td>Drip irrigation system (ha)</td><td>5,23</td></tr>
<tr><td>3</td><td>Farrow irrigation (ha)</td><td>6,37</td></tr>
</table>
</td></tr>
<tr><td colspan="2">Summary of Interviews and Works or Assets Visited</td></tr>
<tr><td>Work or asset</td><td>Component 1: Som 2,121,370 loan ($1,336 equivalent) for local seedlings for 11 ha orchards and drip irrigation equipment for 5 ha; Component 2: Farm Field School; Component 3: Trainings</td></tr>
<tr><td>Location</td><td>Farm Begijon, Ulugnor District</td></tr>
</table>

<table>
<tr><td>Year built or purchased</td><td>2010</td></tr>
<tr><td>Functionality or maintenance</td><td>Functioning. Drip/furrow irrigation used by farmer</td></tr>
<tr><td>Main issues beneficiaries mentioned</td><td>Basic facts farm (hectares)
<table>
<tr><td>Total Farm Size</td><td>Cotton</td><td>Apples, Demo field</td><td>Drip Irrigation</td><td>Furrow Irrigation</td></tr>
<tr><td>55</td><td>43.5</td><td>11.5</td><td>5</td><td>6.5</td></tr>
</table>
Change in production and yields: Yields for cotton production have increased between 1015 percent because of a reduction in waterlogging based on the piped irrigation and farming practices taught by RESP-II. Moreover, the diversification to apple production has increased profits per hectare by about 33 percent compared with cotton production (2018 was the first apple harvest).<br>Main benefits: The farmer expects future apple production and profit margins to increase and hopes to expand his orchard. He has experienced an improved soil structure due to reduced water logging, which was a considerable problem before. The farm was selected as demonstration site and for Farmer Field School, so the farmer participated in all trainings and highlights their usefulness. He continues to use practices taught, particularly drip/furrow irrigation, pest management.<br>Main challenges: Since RESP-II ended, there are no capacity trainings or extension service provided. The demonstration site/drip irrigation equipment is visited by interested farmers, but he is not aware of uptake by the farmers due to high investment costs.</td></tr>
<tr><td colspan="2">    </td></tr>
<tr><td>Work/Asset</td><td>Component 1: $297,135 loan in U.S. dollars used to import 93 heifers (cows ready to deliver calves); Component 3: Trainings</td></tr>
<tr><td>Location</td><td>Farm Diversified Livestock LLC Baht Imkon Rivoj Chorvasi, Oltinkol District</td></tr>
<tr><td>Year built or purchased</td><td>2011</td></tr>
<tr><td>Functionality/Maintenance</td><td>Functioning. Milk cows increased from 32 heads (2010) to 125 (2011 through RESP-II) to 3000 heads (2018).</td></tr>
<tr><td>Main issues mentioned by beneficiaries</td><td><u>Basic facts farm:</u>
<table>
<tr><td>Total Farm size (ha)</td><td>Milk cows (heads)</td><td>Goats (heads)</td><td>Walnuts (ha)</td></tr>
<tr><td>>2000</td><td>3000</td><td>2000</td><td>400</td></tr>
</table>
Change in production/yields: Before the foreign cattle breed acquired through RESP-II, average milk production per cow per day was 7 liters. With the new cattle it increased to 20-25 liters (185 percent to 257 percent increase). At time</td></tr>
</table>

<table>
<tr><td></td><td>of IEG mission, the farm has become a major supplier of milk in the region to Nestlé.<br>Main benefits: Key benefits were the experience gained in loan applications and business plan development, the loan conditions provided, and the learned practices in improved feeding for animal and mechanization in feed delivery/milking to meet buyers' quality standards. RESP-II was the first loan of the farm, and at time of IEG mission the farm had taken several other loans. The farmer describes the experience with RESP-II as transformative. To strengthen and diversify its businesses, after RESP-II the farmer bought 2000 heads of foreign breed goats, a modern milking machine, and is planning to buy milk-processing equipment for cheese production. Since 2018 it produces walnuts on 400 ha of land using drip irrigation. Moreover, the farm obtained GEF-support for a biogas system currently under the installation on the farm to generate 150 kW per day, out of which 100 kW is planned for farm use and 50 kW for neighboring households.<br>Main challenges: Initial hesitation to take up loan and knowledge on importing foreign cattle.</td></tr>
<tr><td colspan="2">   </td></tr>
<tr><td>Work/Asset</td><td>Component 1: $499,768 loan in U.S. dollars for cold storage with capacity for 1200 tons and seedlings for 20 ha orchards; Component 3: Trainings</td></tr>
<tr><td>Location</td><td>Farm Argumon Oltikol Orchard, Oltinkol District</td></tr>
<tr><td>Year built or purchased</td><td>2012</td></tr>
<tr><td>Functionality/maintenance</td><td>Functioning: orchards in good condition, cold storage working and well maintained.</td></tr>
<tr><td>Main issues mentioned by beneficiaries</td><td>Basic facts farm:
<table>
<tr><th>Total Farm size (ha)</th><th>Apples (ha)</th><th>Cherries (ha)</th><th>Table grapes (ha)</th></tr>
<tr><td>30</td><td>20</td><td>5</td><td>5</td></tr>
</table>
Change in production/yields: Diversification to initially 20 ha apples, and later additional 5 ha of cherries and 5 hectare of table grapes. Income from these products is higher than the former cotton/wheat production. The project-supported cold storage helps farmer to sell the perishable throughout the year (not only at harvest) and allows to gain income from providing cooling services to neighboring farmers.<br>Main benefits: RESP-II was the first loan of the farm and helped overcome risk aversion towards applying for credit. Access to loan to diversify production. RESP-II training taught farmer about benefits of drip irrigation for orchard production. Farmer enjoys continuous demand for his produce from buyers, who come to his farm for pick-up.</td></tr>
</table>

<table>
<tr><td></td><td>Main challenges: Since RESP-II ended, farmer receives no capacity training or extension service on farm skills, and marketing of produce.</td></tr>
<tr><td colspan="2">    </td></tr>
<tr><td>Work/Asset</td><td>Component 2: I&D Investments, WCA Capacity Building, Farmer Field School/Demonstrations</td></tr>
<tr><td>Location</td><td>WCA Ulugnor, Ulugnor District</td></tr>
<tr><td>Year built or purchased</td><td>2014</td></tr>
<tr><td>Functionality/maintenance</td><td>Functioning and maintained by WCA.</td></tr>
<tr><td>Main issues mentioned by beneficiaries</td><td>Basic facts WCA:
<table>
<tr><td colspan="2">Year of WCA establishment: 2010</td></tr>
<tr><td colspan="2">Member Size: 98 Farmers<br>(70 percent cotton/wheat farmers, 30 percent horticulture farmers)</td></tr>
<tr><td>Staff number: 13 (1 woman)</td><td>Service area: 4045 ha</td></tr>
<tr><td>
<table>
<tr><td>Manager</td><td>1</td></tr>
<tr><td>Accountant</td><td>1</td></tr>
<tr><td>Hydro Technician</td><td>1</td></tr>
<tr><td>Machine operator</td><td>1</td></tr>
<tr><td>Cleaner</td><td>1</td></tr>
<tr><td>Chief Mirob</td><td>1</td></tr>
<tr><td>Security</td><td>1</td></tr>
</table>
</td><td>
<table>
<tr><td>Cotton</td><td>2 483</td></tr>
<tr><td>Wheat</td><td>1 024</td></tr>
<tr><td>Vegetables and Melon</td><td>35</td></tr>
<tr><td>Orchards and Grapes</td><td>86</td></tr>
<tr><td>Household plots</td><td>215</td></tr>
</table>
</td></tr>
</table>
Change in WCA service fee collection:
<table>
<tr><td>Before RESP-II</td><td>IEG mission 2018</td></tr>
<tr><td>WCA service fee/ha:<br>Som 12,000 for cotton<br>no horticulture production</td><td>WCA service fee/ha:<br>Som 42,000 for cotton<br>Som 38,000 for wheat<br>Som 45,000 for horticulture</td></tr>
<tr><td>Fee collection rate: ~35 percent</td><td>Fee collection rate: 62 percent (was 42 percent in 2016 and 54 percent in 2017)</td></tr>
</table>
The WCA mentioned that the RESP-II works and capacity-building activities have supported a shortening in time of water delivery to the farms. Both WCA staff and farmers confirm that the rehabilitation works and installation of gates for water distribution has led to improvements in soil conditions and achieving higher yields per hectare both in cotton and wheat production.</td></tr>
</table>

<table>
<tr><td></td><td>Main benefits: The WCA values the provision of equipment including a tractor, motorbike, PC and bicycle, which has improved operational management and ability to fulfil services to its members. Farmers appreciate the improved and more regular maintenance of canals, including after the closure of the project, and hence are more willing to pay for these services. The WCA and its members highlight the value of the participatory approach of RESP-II to identify and rehabilitate the most need parts of the irrigation canal. The installment of intake gates with water measuring has led to more accurate delivery and fee calculating, benefiting both farmers and the WCA.<br>Main challenges: Disputes between farmers and WCA dispatchers continue regarding actual and/or timely payment of service fees, putting the financial situation of the WCA at risk.</td></tr>
<tr><td colspan="2">   </td></tr>
<tr><td>Work/Asset</td><td>Component 2: I&D Investments, WCA Capacity-Building</td></tr>
<tr><td>Location</td><td>WCA Andijon, Ulugnor District</td></tr>
<tr><td>Year built or purchased</td><td>2014</td></tr>
<tr><td>Functionality/maintenance</td><td>Functioning and maintained by WCA (verbal confirmation by WCA chairman, not visited by IEG).</td></tr>
<tr><td>Main issues mentioned by beneficiaries</td><td>Basic facts WCA:
<table>
<tr><td colspan="2">Year of Establishment: 2002</td></tr>
<tr><td colspan="2">Member Size: 34 Farmers<br>(91 percent cotton/wheat farmers, 9 percent horticulture farmers)</td></tr>
<tr><td>Staff number: 13 (1 woman)</td><td>Service area: 1870 ha</td></tr>
</table>
Change in WCA service fee collection:
<table>
<tr><td>Before RESP-II</td><td>IEG mission 2018</td></tr>
<tr><td>WCA service fee/ha:<br>~ Som 12,000 for cotton</td><td>WCA service fee/ha:<br>Som 30,000 for cotton</td></tr>
<tr><td>Fee collection rate: ~30 percent</td><td>Fee collection rate: 90 percent (due to good yields, in 2017 was 50 percent)</td></tr>
</table>
Main benefits: The WCA benefited from trainings and development of financial, O&M, and water scheduling plans. The provision of a PC, printer, a bicycle and uniforms has improved service delivery capacity. Also, valves were installed by the project, increasing the efficiency in managing irrigation water. The latter have led to more even and timely distribution of water and hence improved the soil quality.<br>Main challenges: WCA has high fluctuation in service fee collection rates, making it difficult to plan.</td></tr>
</table>

<table>
<tr><td colspan="2">WCA I&D investments not visited by IEG mission (based on interview with WCA chairman)</td></tr>
<tr><td>Work/Asset</td><td>Component 2: I&D Rehabilitation</td></tr>
<tr><td>Location</td><td>Inter-Farm Irrigation Canal 35-X, Ulugnor District</td></tr>
<tr><td>Year built or purchased</td><td>2012</td></tr>
<tr><td>Functionality/maintenance</td><td>Maintained by BISA</td></tr>
<tr><td>Main issues mentioned by beneficiaries</td><td>Basic facts canal:
<table>
<tr><td>Year of Reconstruction: 2012</td></tr>
<tr><td>Length of reconstruction: 4,3 km of canal and 11km of feeder channel</td></tr>
<tr><td>Investments: rehabilitation of canal, installment of 15 intake gates to farms, acquisition of tractor for canal excavation and cleaning.</td></tr>
</table>
Change in water flow and irrigated area:
<table>
<tr><td>Before RESP-II</td><td>IEG mission 2018</td></tr>
<tr><td>Water flow: 1m$^3$/sec</td><td>Water flow: 4m$^3$/sec</td></tr>
<tr><td>Farm area reached: 1000 ha</td><td>Farm area reached: 2392 ha</td></tr>
</table>
Main benefits: Reconstruction of inter-farm and feeder canal, leading to increased water flow and more efficient water supply. Farm-level intake gates improved more even and better timed distribution of water to a larger area. Provision of excavator tractor has facilitated maintenance work.<br>Main challenges: Part of the canal is not rehabilitated, leading to sub-optimal water flow.</td></tr>
<tr><td colspan="2">       </td></tr>
<tr><td>Region</td><td>Ferghana</td></tr>
<tr><td>District</td><td>Yazyavan</td></tr>
<tr><td>Date visited</td><td>November 1 and 2, 2018</td></tr>
<tr><td>Total Number of Farmers in the District</td><td>Leasehold: 594
<table>
<tr><td>Leasehold production types</td></tr>
</table></td></tr>
</table>

<table>
<tr><td></td><td>
<table>
<tr><td>Cotton and Wheat</td><td>316</td></tr>
<tr><td>Fish farming</td><td>31</td></tr>
<tr><td>Orchard</td><td>135</td></tr>
<tr><td>Livestock</td><td>36</td></tr>
<tr><td>Mulberry</td><td>15</td></tr>
<tr><td>Vegetable</td><td>47</td></tr>
<tr><td>Bee farming</td><td>5</td></tr>
<tr><td>Poultry</td><td>6</td></tr>
<tr><td>Other</td><td>3</td></tr>
</table>
Household: 20, 777<br>Dehkan: 67
</td></tr>
<tr><td>Total Number of Farmers Benefited from the Project in the District</td><td>Component 1: 2 Leasehold Farms: 2 Livestock farms (30 ha each); Components 2 and 3: 414 Farms, 7 WCAs, 7 FFS.</td></tr>
<tr><td>Total Crop Area Benefited from the Project in the District</td><td>Component 1: 60 ha; Component 2/3: 21, 689 ha</td></tr>
<tr><td>Types of Project I&D Infrastructure Investments in the District</td><td>
Inter-farm irrigation canal rehabilitation
<table>
<tr><td></td><td>Works</td><td>Total</td></tr>
<tr><td>1</td><td>Rehabilitation of inter-farm irrigation network (km)</td><td>11,72</td></tr>
<tr><td>2</td><td>Rehabilitation of structures on the inter-farm irrigation network, units</td><td>52</td></tr>
<tr><td>3</td><td>Improvement of irrigation in the fields, (000 ha)</td><td>2,39</td></tr>
<tr><td>4</td><td>Rehabilitation of drainage system, km</td><td>1,00</td></tr>
<tr><td>5</td><td>Rehabilitation of structures of drainage system</td><td>11</td></tr>
<tr><td>6</td><td>Amelioration improvement of the soil, (000 ha)</td><td>0,16</td></tr>
</table>
On-farm irrigation canal rehabilitation,
<table>
<tr><td></td><td>Works</td><td>Total</td></tr>
<tr><td>1</td><td>Rehabilitation of inter-farm irrigation network (km)</td><td>10,26</td></tr>
<tr><td>2</td><td>Rehabilitation of structures on the inter-farm irrigation network, units</td><td>61</td></tr>
<tr><td>3</td><td>Improvement of irrigation in the fields, (000 ha)</td><td>1,21</td></tr>
</table>
Demonstration sites for irrigation gates/valves
<table>
<tr><td>1</td><td>Spillways</td><td>8</td></tr>
<tr><td>2</td><td>Polyethylene pipes<br>(diameter 40 and 50 mm) meters</td><td>720</td></tr>
<tr><td>3</td><td>Piezometers</td><td>8</td></tr>
<tr><td>4</td><td>Irrigation kits for 4 hectares</td><td>1</td></tr>
<tr><td>5</td><td>Black polyethylene films in kg</td><td>520</td></tr>
</table>
</td></tr>
</table>

| | | |
|---|---|---|
| 6 | Soil drill | 1 |
| 7 | Water metering and regulating structures | 9 |
| 8 | Smartphones | 1 |

Demonstration sites for drip irrigation for orchards, Farmer Field School

| | | |
|---|---|---|
| 1 | Demonstration field (ha) | 11,62 |
| 2 | Drip irrigation system (ha) | 3,00 |
| 3 | Farrow irrigation (ha) | 8,62 |

**Summary of Interviews and Works/Assets Visited**

| | |
|---|---|
| Work/Asset | Component 2: I&D Investments, WCA Capacity-Building, Farmer Field School/Demonstrations |
| Location | WCA Khonobod, Yazyavan District |
| Functionality/maintenance | Functioning and maintained by WCA |
| Main issues mentioned by beneficiaries | Basic facts WCA: |

Year of WCA establishment: 2010

Member Size: 49 Farmers and 2 Rural Citizens Councils
(48 percent cotton/wheat farmers, 52 percent horticulture farmers)

Staff number: 11 (1 woman)

| | |
|---|---|
| Manager | 1 |
| Accountant | 1 |
| Hydro Technician | 1 |
| Machine operator | 1 |
| Computer operator | 1 |
| Security | 1 |
| Supervisors | 5 |

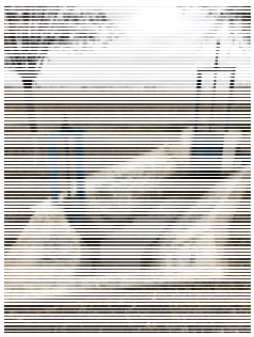
Service area: 2113 ha

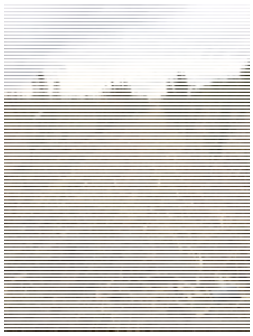
| | |
|---|---|
| Cotton | 691 |
| Wheat | 554 |
| Vegetables and Melon | 31 |
| Orchards and Grapes | 135 |
| Household plots | 702 |

Change in water efficiency and WCA fee collection:

| Before RESP-II | IEG mission 2018 |
|---|---|
| WCA service fee/ha:<br>Som 12,000 for cotton<br>no horticulture production | WCA service fee/ha:<br>Som 35,000 for cotton<br>Som 65,000 for horticulture |
| Fee collection rate: ~20 percent | Fee collection rate: 35 percent |
| Water efficiency: 35 percent | Water efficiency: 90 percent |

Main benefits: RESP-II rehabilitation works of cementing earth canal and installing gates reduced time of water delivery. Rehabilitation was done in the most needed parts based on consultation with the WCA and local authorities to address the infiltration and in some places blockage by sediment. Gates with water measuring/leveling were installed facilitating the work of the WCA and resolved conflicts existing between ditch riders and water consumers. Water logging problems have reduced, and farmers ceased poor practices to block

<table>
<tr><td></td><td>water current in canals. Fee collection has increased since RESP-II investments but remains low at 35 percent. WCA now works with water distribution plans for more efficient and even delivery, and develops an annual business plan, unlike before RESP-II. WCA benefited from the capacity trainings and procurement of a tractor, motorbike, PC, bicycle, electric power generator and uniforms. WCA staff and members highlight improvements in soil and achieving higher yields per hectare both for cotton and wheat. Also, machinery and materials obtained has been useful to improve WCA services to members.<br>Main challenges: WCA continues to face challenges in service fee collection, especially from cotton farmers.</td></tr>
<tr><td colspan="2">    </td></tr>
<tr><td>Work/Asset</td><td>Component 2: I&D Investments, WCA Capacity-Building, Farmer Field School/Demonstrations</td></tr>
<tr><td>Location</td><td>WCA Qoratepa, Yazyavan District</td></tr>
<tr><td>Year built or purchased</td><td>2010</td></tr>
<tr><td>Functionality/maintenance</td><td>Functioning and maintained by WCA (verbal confirmation by WCA chairman, not visited by IEG).</td></tr>
<tr><td>Main issues mentioned by beneficiaries</td><td>Basic facts WCA:
<table>
<tr><td colspan="2">Year of Establishment: 2002</td></tr>
<tr><td colspan="2">Member Size: 65 Farmers<br>(70 percent cotton/wheat farmers, 30 percent horticulture farmers)</td></tr>
<tr><td>Staff number: 10 (1 woman)</td><td>Service area: 5211 ha</td></tr>
</table>
Change in WCA service fee collection:
<table>
<tr><th>Before RESP-II</th><th>IEG mission 2018</th></tr>
<tr><td>WCA service fee/ha:<br>Som 12,000 for cotton<br>n/a</td><td>WCA service fee/ha:<br>Som 35,000 for cotton<br>Som 65,000 for horticulture</td></tr>
<tr><td>Fee collection rate: ~30 percent</td><td>Fee collection rate: 65 percent<br>(80 percent from horticulture farmers)</td></tr>
</table>
Main benefits: RESP-II rehabilitation works irrigation canal and installing hydropost was key benefit to reduce time and increase accuracy of water delivery. Fee collection has increased significantly to 65 percent but is mostly paid by horticulture farmers. Before RESP-II, the WCA had no O&M, financial or water scheduling plan, all mentioned to be of continued high advantage to the WCA. WCA obtained an excavator, motorbike, and PC, improving service efficiency and thereby willingness to members to pay for services. Member farmers report an average increase in cotton yields of about 10 percent</td></tr>
</table>

<table>
<tr><td></td><td>compared to before RESP-II works. WCA staff and their members consider trainings on techniques for efficient irrigation water distribution as crucial, as the area experienced three water shortages since 2009.<br>Main challenges: WCA continues to face challenges in financing their operations and low service fee collection, especially from cotton farmers.</td></tr>
<tr><td colspan="2">WCA I&D investments not visited by IEG mission (based on interview with WCA chairman)</td></tr>
<tr><td>Work/Asset</td><td>Component 2: Farm Field School; Component 3: Trainings</td></tr>
<tr><td>Location</td><td>Farm Far Galaba 2002, Yazyavan District</td></tr>
<tr><td>Year built or purchased</td><td>2010</td></tr>
<tr><td>Functionality/maintenance</td><td>Functioning. Drip irrigation still used by farmer.</td></tr>
<tr><td>Main issues mentioned by beneficiaries</td><td>Basic facts farm:
<table>
<tr><td>Total Farm size (ha)</td><td>Cotton (ha)</td><td>Apples, demo field (ha)</td><td>Drip Irrigation (ha)</td><td>Furrow Irrigation (ha)</td></tr>
<tr><td>146</td><td>134</td><td>12</td><td>3</td><td>9</td></tr>
</table>
Change in production/yields: RESP-II taught improved irrigation and efficient fertilizer use have led to an average increase from 2.8t/ha to 3.2t/ha (14 percent increase) for cotton.<br>Main benefits: The farmer mentioned water savings and more efficient application of fertilizers as main benefit from RESP-II technical assistance and Farm Field School trainings. Also, the orchards and drip and furrow irrigation were introduced with RESP-II and have led to higher incomes/ha for farmer than cotton production. The Farmer Field School is still occasionally used by farmers to exchange knowledge.<br>Main challenges: Since RESP-II ended, farmer receives no capacity training or extension service on farm skills or marketing of produce. The demonstration site/drip irrigation equipment is still used for farmers in the interested technology. Although farmers are interested in drip irrigation, there is little uptake in neighboring areas by the farmers due to is high costs.</td></tr>
<tr><td colspan="2">    </td></tr>
<tr><td>Region</td><td>Ferghana</td></tr>
<tr><td>District</td><td>Toshloq</td></tr>
<tr><td>Date visited</td><td>November 2, 2018</td></tr>
<tr><td>Work/Asset</td><td>Component 1: $14,970 loan in U.S. dollars used to import bakery equipment (bread ovens and dough mixer).</td></tr>
<tr><td>Location</td><td>Bakery LLC Sarvinoz Mashkhura Shod Dil, Toshloq District</td></tr>
<tr><td>Year built or purchased</td><td>2012</td></tr>
</table>

<table>
<tr><td>Functionality/maintenance</td><td>Functioning. Below capacity as bought to expand production volume in the future.</td></tr>
<tr><td>Main issues mentioned by beneficiaries</td><td>Basic facts agribusiness:<table><tr><td>Loaf production per day</td><td>Number of employees</td></tr><tr><td>3000-4000</td><td>12</td></tr></table>Change in production/yields: Before the RESP-II, the two women beneficiaries ran a small grocery store with six employees. With the loan obtained through the project they built a bakery that runs a profit higher than the previous grocery store and employs 12 staff (10 women for production, 2 men for delivery services). The bakery produces 3000-4000 loaves bread per day.<br>Main benefits: The RESP-II loan was the first loan for the beneficiaries, who states they had previously been hesitant to apply for loans. The RESP-II loan offered the advantage of being able to borrow in foreign exchange and was of longer term (4 years). They also received technical assistance for the loan application and business plan development. The choice of the bakery location was strategic given the significant number of nearby factories demanding bread for their employee cafeterias. At the time of the IEG mission, the beneficiaries planned to apply for another loan to buy the production line for pastry and confectionary for higher value products and exports to Kirgizstan (the bakers already obtained an international pastry certificate).<br>Main challenges: At time of the loan, not all works of connecting to utilities and power supply had been finished, posing a challenge given the loan repayment requirements.</td></tr>
<tr><td colspan="2">    </td></tr>
<tr><td>Region</td><td>Samarkhand</td></tr>
<tr><td>District</td><td>Pasdargom</td></tr>
<tr><td>Date visited</td><td>November 5, 2018</td></tr>
<tr><td>Total Number of Farmers Benefited from the Project in the District</td><td>Component 1: X; Components 2 and 3: 1,221 Farms, 7 WCAs, 7 FFS.</td></tr>
<tr><td>Total Crop Area Benefited from the Project in the District</td><td>Component 1: 2 and 3: 53,992</td></tr>
<tr><td>Work/Asset</td><td>Component 1: $ 218,100 loan in U.S. dollars used to purchase seedling for 26 ha apple orchard and cold storage; Component 3: Trainings</td></tr>
<tr><td>Location</td><td>Farm LLC Krisral Biznes, Pasdarom District</td></tr>
<tr><td>Year built or purchased</td><td>2014</td></tr>
<tr><td>Functionality/Maintenance:</td><td>Functioning</td></tr>
</table>

<table>
<tr><td>Main issues mentioned by beneficiaries</td><td>Basic facts farm<table><tr><td>Total Farm size (ha)</td><td>Apples (ha)</td><td>Tomatoes/ cucumbers (ha)</td></tr><tr><td>28</td><td>26</td><td>2</td></tr></table>Change in production/yields: RESP-II was the first loan of the farm. The farmer used the RESP-II loan to diversify his businesses to agriculture with the purchase of seedlings for a 26ha apple orchard and a cold storage of 1200 tons capacity. He states to have increased his net income, also from renting out cold storage space to neighboring farmers. He later took an additional non-project loan for a 2ha greenhouse to grow tomatoes and cucumbers. Agricultural production makes up about 20 percent of his business in 2018 (compared to no agricultural activity in 2014).<br>Main benefits: The RESP-II financed cold storage helps farmer to sell the perishable throughout the year (not only at harvest), and also allows to gain income from providing cooling services to neighboring farmers. The project training taught farmer about benefits of drip irrigation for orchard production and greenhouses, in which he subsequently invested through RESP-II loan. He states that he would not have been able to develop the business plan for the greenhouse expansion without the knowledge he received from the project trainings.<br>Main challenges: Increasing seasonal shortages in water supply, as area is not irrigated.</td></tr>
<tr><td colspan="2">  </td></tr>
<tr><td>Work/Asset</td><td>Component 1: $ 40,633 loan in U.S. dollars used to purchase high-capacity tractor; Component 3: Trainings</td></tr>
<tr><td>Location</td><td>Farm Rasul Ota, Pasdarom District</td></tr>
<tr><td>Year built or purchased</td><td>2011</td></tr>
<tr><td>Functionality/maintenance</td><td>Functioning (tractor viewed on field by IEG, as harvesting)</td></tr>
<tr><td>Main issues mentioned by beneficiaries</td><td>Basic facts farm:<table><tr><td>Total Farm size (ha)</td><td>Cotton/Wheat (ha)</td><td>Apples (ha)</td><td>Livestock (heads)</td></tr><tr><td>55</td><td>52</td><td>3</td><td>15 milk cows, 25 beef cows</td></tr></table>Change in production/yields: The farmer states that cotton yields increased from 2.2tons/ha to 2.8tons/ha (27 percent) and wheat yields from 2.3tons/ha to 4tons/ha (131 percent) in 2018 compared to before he applied the RESP-II financed tractor for proper plowing, land leveling, and farming practices.</td></tr>
</table>

<table>
<tr><td></td><td>Main benefits: RESP-II provided the first loan to the farmer, who was previously hesitant and did not know how to develop a business plan. At time of IEG mission, he had taken an additional loan to purchase livestock and more machinery. The farmer highlights the usefulness of RESP-II trainings in farm management practices and piped irrigation techniques, which he continues to apply given the positive results. These practices have reduced his consumption of water (from 100m$^3$/10ha to 50m$^3$/10ha) and helped with a more evenly distributed water supply. He was able to eliminate water logging and improve soil conditions. To his knowledge, the other nearby farmers who participated in RESP-II training also continue to apply the practices.<br>Main challenges: Lack of training or extension services for farmers.</td></tr>
<tr><td colspan="2">  </td></tr>
<tr><td>Work/Asset</td><td>Component 2: Farm Field School; Component 3: Trainings</td></tr>
<tr><td>Location</td><td>Farm Nigina, Pasdarom District</td></tr>
<tr><td>Year built or purchased</td><td>2010</td></tr>
<tr><td>Functionality/maintenance</td><td>Functioning</td></tr>
<tr><td>Main issues mentioned by beneficiaries</td><td>Basic facts farm:<table><tr><td>Total Farm size (ha)</td><td>Cotton/Wheat (ha)</td><td>Mulberry (ha)</td></tr><tr><td>30</td><td>28</td><td>2</td></tr></table>Change in production/yields: Farmer reports yield increases for cotton from 2.5 ton/ha to 3.3 ton/ha (32 percent) and for wheat from 4.5 ton/ha to 5.8 tons/ha (28 percent) due to improved irrigation water supply and practices like flexible pipes.<br>Main benefits: The farmer highlights the increased knowledge from RESP-II trainings in farming practices, like proper plowing and timely input application. He has reduced his water consumption by about 1/3, which has improved soil quality. Another benefit is that with the measurement of water, WCA service fees are more accurate and hence less disputes. He knows that other farmers who participated in trainings continue to apply practices and had a “change in attitude” towards water consumption, also because of increasing water supply challenges the last three years. Non-beneficiaries of RESP-II came to demonstration site on his farm and have themselves invested in valves.<br>Main challenges: The farmer mentions an increase in water shortages over the last three years in the area, affecting the ability for timely irrigation.</td></tr>
</table>

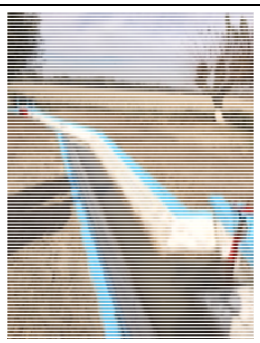
| | |
|---|---|
| Work/Asset | Component 2: Farm Field School; Component 3: Trainings |
| Location | Farm Zamin Kurki, Pasdarom District |
| Year built or purchased | 2010 |
| Functionality/maintenance | Functioning. |
| Main issues mentioned by beneficiaries | Basic facts farm: |

| Total Farm size (ha) | Cotton, demo field (ha) | Drip Irrigation (ha) | Furrow Irrigation (ha) | Laser Levelling (ha) |
|---|---|---|---|---|
| 29 | 28 | 2.9 | 25.1 | 25.1 |

Change in production/yields: Farmer reports yield increases for cotton from 2.3 ton/ha to 3 ton/ha (30 percent) and for wheat from 3.5 ton/ha to 5 tons/ha (43 percent) based on the laser levelling and improved soil resulting from project-taught practices. He estimates a 12 percent net increase in his farm income.

Main benefits: The main benefit to the farmer is that water, which is increasingly scarce, is used more purposefully through the I&D works, installment of gates/valves, and promotion of water-saving practices. His water consumption has about halved from 50 to 23 liters/second, as he applies technologies taught by RESP-II such as perforated cover. Previously prevalent waterlogging issues have disappeared in the area. He also continues to apply pest management and deep furrowing practices he acquired from project trainings. He is aware that most RESP-II beneficiary farmers still use practices taught by the project to avoid water logging, and that non-beneficiaries also adopted those practices.

Main challenges: Farmers in the areas are increasingly dealing with water shortages, affecting their irrigation practices and yields. Another challenge is the lack of trainings for farmers since RESP-II ended despite the need for continuous training given increased resistance of pests.

<table>
<tr><td>Work/Asset</td><td>Component 2: I&D Investments, WCA Capacity-Building</td></tr>
<tr><td>Location</td><td>WCA Pastdargom, Pasdargam District</td></tr>
<tr><td>Year built or purchased</td><td>2010</td></tr>
<tr><td>Functionality/maintenance</td><td>Functioning and maintained by WCA</td></tr>
<tr><td>Main issues mentioned by beneficiaries</td><td>Basic facts WCA:
<table>
<tr><td colspan="2">Year of WCA establishment: 2002</td></tr>
<tr><td colspan="2">Member Size: 283 Farmers<br>(88 percent cotton/wheat farmers, 2 percent horticulture and vegetable farmers)</td></tr>
<tr><td>Staff number: 8 (no women)</td><td>Service area: 10 648 ha</td></tr>
<tr><td>
<table>
<tr><td>Manager</td><td>1</td></tr>
<tr><td>Accountant</td><td>1</td></tr>
<tr><td>Hydro Technician</td><td>1</td></tr>
<tr><td>Supervisors</td><td>5</td></tr>
</table>
</td><td>
<table>
<tr><td>Cotton/Wheat</td><td>10468</td></tr>
<tr><td>Vegetables and Melons</td><td>100</td></tr>
<tr><td>Orchards and Grapes</td><td>80</td></tr>
</table>
</td></tr>
</table>
Change in water efficiency and WCA fee collection:
<table>
<tr><td>Before RESP-II</td><td>IEG mission 2018</td></tr>
<tr><td>WCA service fee/ha:<br>Som 12,000 for cotton<br>no horticulture production</td><td>WCA service fee/ha:<br>Som 21,000 for cotton<br>Som 35,000 for horticulture</td></tr>
<tr><td>Fee collection rate: ~20 percent</td><td>Fee collection rate: 60 percent (30 percent in 2017)</td></tr>
<tr><td>Time water delivery: >2hrs</td><td>Time water delivery: ~45mins</td></tr>
</table>
Main benefits: The WCA is highly satisfied with the I&D rehabilitation works and states that water delivery time and accuracy has increased significantly. They also reduced water consumption, because of the valve/control gates given by the project (water use declined from $10m^3$ to $6m^3$ -40 percent). Water distribution is more even as well. Member farmers report yield increases from 3.8 to 5.5 ton/ha (45 percent) for cotton and 2.4 to 2.7 ton/ha (12 percent) for wheat. This WCA also benefited from the capacity trainings and procurement of tractor, motorbike, PC, bicycle that have enhanced its service capacity.<br>Main challenges: The WCA fee collection rate has been a continuous problem. The higher rate for 2018 is based on the closer monitoring of the contractual obligation by the Agricultural Inspection under the District Prosecutor's Office, which was established in the summer of 2018.</td></tr>
<tr><td colspan="2">   </td></tr>
</table>

<table>
<tr><td>Work/Asset</td><td>Component 2: I&D Investments, WCA Capacity-Building, Demonstrations</td></tr>
<tr><td>Location</td><td>WCA Pastdargomlik Anhor Suvchilari, Pasdargam District</td></tr>
<tr><td>Year built or purchased</td><td>2014</td></tr>
<tr><td>Functionality/maintenance</td><td>Functioning and maintained by WCA (verbal confirmation by WCA chairman, not visited by IEG)</td></tr>
<tr><td>Main issues mentioned by beneficiaries</td><td>Basic facts WCA:
<table>
<tr><td colspan="2">Year of WCA establishment: 2002</td></tr>
<tr><td colspan="2">Member Size: 178 Farmers<br>(48 percent cotton/wheat farmers, 52 percent horticulture farmers)</td></tr>
<tr><td>Staff number: 9 (1 woman)</td><td>Service area: ~8200 ha</td></tr>
<tr><td>
<table>
<tr><td>Manager</td><td>1</td></tr>
<tr><td>Accountant</td><td>1</td></tr>
<tr><td>Hydro Technician</td><td>1</td></tr>
<tr><td>Machine operator</td><td>1</td></tr>
<tr><td>Computer operator</td><td>1</td></tr>
<tr><td>Supervisors</td><td>4</td></tr>
</table>
</td><td>
<table>
<tr><td>Cotton/Wheat</td><td>6500</td></tr>
<tr><td>Vegetables and Melon</td><td>60</td></tr>
<tr><td>Orchards and Grapes</td><td>200</td></tr>
<tr><td>Livestock</td><td>600</td></tr>
<tr><td>Household plots</td><td>840</td></tr>
</table>
</td></tr>
</table>
Change in water efficiency and WCA fee collection:
<table>
<tr><td>Before RESP-II</td><td>IEG mission 2018</td></tr>
<tr><td>WCA service fee/ha:<br>Som 12,000 for cotton<br>no horticulture production</td><td>WCA service fee/ha:<br>Som 21,000 for cotton<br>Som 31,000 for horticulture</td></tr>
<tr><td>Fee collection rate: ~20 percent</td><td>Fee collection rate: 50 percent (45 percent in 2017)</td></tr>
</table>
Main benefits: The WCA highlights the importance of Farmer Field School and demonstrations, as it not only created capacity and increased uptake of water-saving practices among direct beneficiaries but also neighboring farmers. Some invested themselves to replicate the installation of gates and valves in irrigation canals to benefit from better control and distribution of water supply. WCA services improved due to equipment provided by RESP-II.<br>Main challenges: Since RESP-II ended, farmers have no access to relevant trainings despite demand. Similar to the other WCAs in the district, improvement in WCA service fee collection rates in 2018 was achieved given the obligation by the Agricultural Inspection under the District Prosecutor's Office.</td></tr>
<tr><td colspan="2">WCA I&D investments not visited by IEG mission (based on interview with WCA chairman)</td></tr>
</table>

## Summary of Interviews with Financial Institutions

<table>
<tr><td colspan="2">Region: Tashkent</td></tr>
<tr><td colspan="2">District: Tashkent City</td></tr>
<tr><td colspan="2">Date visited: November 3</td></tr>
<tr><td>Agro Bank Headquarters in Tashkent</td><td>Loans provided: Agro Bank provided in total 218 loans (38 percent of all 570 RESP-II loans). It had already been part of RESP, as it was the designated bank to serve farmers - Agro Bank was established on the basis</td></tr>
</table>

| | |
|---|---|
| | of two former state commercial banks (Galla Bank for wheat and Pakhta Bank for cotton). In 2009, by government decree, all farmers became Agro Bank clients. Currently its clients base is about 60,000 farmers.<br>Change in loan portfolio: RESP-II enabled Agrobank to provide more loans for horticulture and livestock investments. Overall, the agricultural loan portfolio about doubled since 2009, partially driven by RESP-II loans.<br>Main benefits: For Agro Bank, the key benefit of RESP-IIs was the increased confidence and knowledge of their clients to take the initiative for credit applications and business plan development, including the importing of machinery, equipment and inputs. RESP-II increased farmers' access to hard currency/foreign exchange, low interest rates, and longer loan durations. It also increased the bank's client base and their number of transactions. Overall, RESP-II created a competitive environment among banks to attract farmer and agribusiness clients. Moreover, the RESP-II regional trainings to loan officers enhanced their capacity and accelerated disbursements in the agricultural loan portfolio. Most loan officers trained through RESP-II have remained with Agro Bank. Compared to RESP, RESP-II expanded to more diversified types of loans from mostly machinery to horticulture (seedlings, drip irrigation, cold storage), poultry and livestock (import of breeds, milking machines, processing equipment).<br>Main challenges: As RRA reviewed applications for larger loans, there were delays in the approval process, creating inefficiencies and problems to compete with other banks. |
| **Region: Andijan** | |
| **District: Andijan City** | |
| Date visited: November 1 | |
| JSC Hamkor Bank Headquarters in Andijan City | Loans provided: Hamkor Bank provided in total 59 loans (11 percent of all 570 RESP-II loans), of which 27 loans in Andijan (about 23 percent of all RESP-II loans in the region). In 2009 before its participation in RESP-II, it provided agricultural loans only to livestock, fisheries and poultry production. Its agricultural loan portfolio was small and there was one loan officer in charge of the agricultural credit portfolio.<br>Change in loan portfolio: The credit and training support provided by RESP-II capacitated the agricultural loan officer to also assess risk of horticulture applications and allowed Hamkor Bank to expand their portfolio to the horticulture sector. By 2013 it had a continuously growing and diversifying agricultural portfolio (especially loans for horticulture investments, cold storage, beekeeping, green houses). As a result, Hamkor Bank created a credit department for agricultural financing, which includes a sector expert agronomist. Between 2013 and 2018 the agricultural loan portfolio of the bank has grown about 10-fold. Also, between 2012 and 2018 the number of branch locations increased from 32 in to 42 and the number of agricultural loan approvers from 15 to 80.<br>Main benefits: For Hamkor Bank, the biggest benefit of RESP-II was its clients' access to loans in foreign exchange (enabling importing of high quality equipment/inputs, not possible with other loans), the low interest rates (5.5 percent versus about 12 percent market rate) and the long loan duration (up to 10 compared to 3 years of non-RESP-II loans). Especially the latter two conditions allowed Hamkor Bank to reach new clients and smaller farmers to access credit compared to usual market conditions. Also, the image and exposure of the bank improved, increasing its capacity through RESP-II supported seminars and conferences, including with IFC. |

| | |
|---|---|
| | Moreover, Hamkor Bank states to have benefited strongly from RESP-II capacity-building of a total of 68 staff. At the time of the IEG mission, the majority of these staff continued to work in Hamkor Bank, and several have been promoted or become branch managers. Also, the RESP-II training material is used today in the recently established internal training program on agricultural loan risk assessment.<br>Main challenges: There were no major challenges except the initial hesitance and reluctance of farmers to apply for loans. |
| **Region: Samarkhand** | |
| **District: Samarkhand City** | |
| Date visited: November 5 | |
| Turon Bank Samarkhand Regional Office | Loans provided: Turon Bank provided in total 38 loans (7 percent of all 570 RESP-II loans). 33 percent of all RESP-II loans in Samarkhand region were from Turon Bank.<br>Change in loan portfolio: Before participating in RESP-II, Turon Bank had no agricultural loan portfolio, as it focused on the trade and construction sectors. With RESP-II, the bank started the sector and agricultural loans in its total portfolio have grown from 1-2 percent in 2014, to 8 percent in 2015, and 20 percent in 2018. Compared to the first year with RESP-II, loan applications have increased by about 70 percent. The most common type of investments have been in cool storage, processing equipment's for tomatoes and dried fruits, as well as orchard investments in seedlings and drip irrigation.<br>Main benefits: For Turon Bank, the biggest benefit of RESP-II was the expansion of the loan portfolio to the growing agricultural sector (particularly horticulture and livestock) and thereby increase its client base. Both the financial and training support by RESP-II was crucial for this. About 70 percent of the agricultural loan clients are limited liability companies, providing the bank with significant daily transitions. Given the strong increase in its agricultural loan portfolio, the regional office now employs two full-time agricultural loan officers and plans to hire one more.<br>Main challenges: No major issues mentioned. |