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INTERNATIONAL DEVELOPMENT ASSOCIATION

PROJECT APPRAISAL DOCUMENT

ON A

PROPOSED CREDIT

IN THE AMOUNT OF SDR 35.9 MILLION
(US\$50 MILLION EQUIVALENT)

AND A
PROPOSED GRANT

IN THE AMOUNT OF SDR 35.9 MILLION
(US\$50 MILLION EQUIVALENT)

TO THE
KYRGYZ REPUBLIC

FOR A

CLIMATE RESILIENT WATER SERVICES PROJECT

March 25, 2022

Water Global Practice
Europe And Central Asia Region

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CURRENCY EQUIVALENTS

(Exchange Rate Effective February 28, 2022)

Currency Unit = Kyrgyz Som

KGS85 = US\$1

US\$0.71691783 SDR 1

FISCAL YEAR

January 1 - December 31

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ABBREVIATIONS AND ACRONYMS

BCM	Billion cubic meters
BOD	Biological Oxygen Demand
CDWUU	Community Drinking Water Users Union
CPF	Country Partnership Framework
DDWSWD	Department of Drinking Water Supply and Wastewater Disposal
DEM	Department of Environmental Monitoring
DWIS	Digital Water Information System
ECA	Europe and Central Asia
EIRR	Economic Internal Rate of Return
ENPV	Economic Net Present Value
ERR	Economic Rate of Return
E&S	Environmental and Social
ESCP	Environmental and Social Commitment Plan
ESF	Environmental and Social Framework
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
ESS	Environmental and Social Standard
ET	Evapotranspiration
FAO	Food and Agricultural Organization of the United Nations
FM	Financial Management
GDP	Gross Domestic Product
GNI	Gross National Income
GOSSTROY	State Agency for Architecture, Construction and Communal Services
GRM	Grievance Redress Mechanism
ha	Hectare
I&D	Irrigation and Drainage
IDA	International Development Association
ISF	Irrigation Service Fee
IWRM	Integrated Water Resource Management
JMP	Joint Monitoring Program
KSA	Karadarya-Syrdarya-Amudarya
KGS	Kyrgyz Som
m ³	Cubic meters
M&E	Monitoring and Evaluation
MHM	Menstrual Hygiene Management
MNRETS	Ministry of Natural Resources, Ecology and Technical Supervision
NWRMP	National Water Resources Management Project
OHS	Occupational Health and Safety
O&M	Operations and Maintenance
PAD	Project Appraisal Document

PDO	Project Development Objective
PET	Potential Evapotranspiration
PIU	Project Implementation Unit
POM	Project Operations Manual
RF	Resettlement Framework
SDC	Swiss Agency for Development and Cooperation
SDG	Sustainable Development Goal
SECO	Swiss State Secretariat for Economic Affairs
SIASAR	Rural Water and Sanitation Information System
SRWSSDP	Sustainable Rural Water Supply and Sanitation Development Project
SSES	Disease Prevention and Sanitary and Epidemiological Expertise
SWRA	State Water Resources Agency – now Water Resource Service
UNFCCC	United Nations Framework Convention on Climate Change
WASH	Water, Sanitation and Hygiene
WHO	World Health Organization
WB	World Bank
WBG	World Bank Group
WRS	Water Resource Service
WSS	Water Supply and Sanitation
WUA	Water User Association



TABLE OF CONTENTS

DATASHEET	1
I. STRATEGIC CONTEXT	6
A. Country Context.....	6
B. Sector and Institutional Context.....	7
C. Relevance to Higher Level Objectives.....	14
II. PROJECT DESCRIPTION.....	15
A. Project Development Objective	15
B. Project Components	16
C. Project Beneficiaries	21
D. Results Chain	22
E. Rationale for Bank Involvement and Role of Partners	23
F. Lessons Learned and Reflected in the Project Design	24
III. IMPLEMENTATION ARRANGEMENTS	26
A. Institutional and Implementation Arrangements	26
B. Results Monitoring and Evaluation Arrangements.....	27
C. Sustainability.....	27
IV. PROJECT APPRAISAL SUMMARY	29
A. Technical, Economic and Financial Analysis	29
B. Fiduciary.....	31
C. Legal Operational Policies.....	32
D. Environmental and Social.....	33
V. GRIEVANCE REDRESS SERVICES.....	38
VI. KEY RISKS	38
VII. RESULTS FRAMEWORK AND MONITORING	40
ANNEX 1: Detailed Project Description	58
ANNEX 2: Implementation Arrangements and Support Plan	69
ANNEX 3: Economic and Financial Analysis	79
ANNEX 4: Greenhouse Gas Emission Analysis	86
ANNEX 5: Map	89



DATASHEET

BASIC INFORMATION

Country(ies)	Project Name	
Kyrgyz Republic	Climate Resilient Water Services Project	
Project ID	Financing Instrument	Environmental and Social Risk Classification
P173734	Investment Project Financing	Substantial

Financing & Implementation Modalities

<input type="checkbox"/> Multiphase Programmatic Approach (MPA)	<input checked="" type="checkbox"/> Contingent Emergency Response Component (CERC)
<input type="checkbox"/> Series of Projects (SOP)	<input type="checkbox"/> Fragile State(s)
<input type="checkbox"/> Performance-Based Conditions (PBCs)	<input type="checkbox"/> Small State(s)
<input type="checkbox"/> Financial Intermediaries (FI)	<input type="checkbox"/> Fragile within a non-fragile Country
<input type="checkbox"/> Project-Based Guarantee	<input type="checkbox"/> Conflict
<input type="checkbox"/> Deferred Drawdown	<input type="checkbox"/> Responding to Natural or Man-made Disaster
<input type="checkbox"/> Alternate Procurement Arrangements (APA)	<input type="checkbox"/> Hands-on Enhanced Implementation Support (HEIS)

Expected Approval Date	Expected Closing Date
29-Apr-2022	31-Dec-2028

Bank/IFC Collaboration

No

Proposed Development Objective(s)

The project development objective is to (i) increase access to climate-resilient water services in selected river basins, and (ii) strengthen institutional capacities for climate-resilient water management at the local and national levels.

**Components**

Component Name	Cost (US\$, millions)
Infrastructure Investments and Service Improvements	90.00
Institutional Strengthening for Climate Resilient Service Delivery, Water Resources Management and Dam Management	7.00
Project Management, M&E and Professional Development	3.00
Contingent Emergency Response Component	0.00

Organizations

Borrower:	Kyrgyz Republic
Implementing Agency:	Water Resource Service (WRS) Department of Drinking Water Supply and Wastewater Disposal (DDWSWD)

PROJECT FINANCING DATA (US\$, Millions)**SUMMARY**

Total Project Cost	100.00
Total Financing	100.00
of which IBRD/IDA	100.00
Financing Gap	0.00

DETAILS**World Bank Group Financing**

International Development Association (IDA)	100.00
IDA Credit	50.00
IDA Grant	50.00

IDA Resources (in US\$, Millions)

	Credit Amount	Grant Amount	Guarantee Amount	Total Amount
Kyrgyz Republic	50.00	50.00	0.00	100.00



National PBA	50.00	50.00	0.00	100.00
Total	50.00	50.00	0.00	100.00

Expected Disbursements (in US\$, Millions)

WB Fiscal Year	2022	2023	2024	2025	2026	2027	2028	2029
Annual	0.00	2.00	10.00	20.00	20.00	20.00	14.00	14.00
Cumulative	0.00	2.00	12.00	32.00	52.00	72.00	86.00	100.00

INSTITUTIONAL DATA

Practice Area (Lead)

Water

Contributing Practice Areas

Environment, Natural Resources & the Blue Economy

Climate Change and Disaster Screening

This operation has been screened for short and long-term climate change and disaster risks

SYSTEMATIC OPERATIONS RISK-RATING TOOL (SORT)

Risk Category	Rating
1. Political and Governance	● Substantial
2. Macroeconomic	● Moderate
3. Sector Strategies and Policies	● Moderate
4. Technical Design of Project or Program	● Moderate
5. Institutional Capacity for Implementation and Sustainability	● Moderate
6. Fiduciary	● Substantial
7. Environment and Social	● Substantial
8. Stakeholders	● Low
9. Other	
10. Overall	● Moderate



COMPLIANCE

Policy

Does the project depart from the CPF in content or in other significant respects?

Yes No

Does the project require any waivers of Bank policies?

Yes No

Environmental and Social Standards Relevance Given its Context at the Time of Appraisal

E & S Standards	Relevance
Assessment and Management of Environmental and Social Risks and Impacts	Relevant
Stakeholder Engagement and Information Disclosure	Relevant
Labor and Working Conditions	Relevant
Resource Efficiency and Pollution Prevention and Management	Relevant
Community Health and Safety	Relevant
Land Acquisition, Restrictions on Land Use and Involuntary Resettlement	Relevant
Biodiversity Conservation and Sustainable Management of Living Natural Resources	Relevant
Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities	Not Currently Relevant
Cultural Heritage	Relevant
Financial Intermediaries	Not Currently Relevant

NOTE: For further information regarding the World Bank’s due diligence assessment of the Project’s potential environmental and social risks and impacts, please refer to the Project’s Appraisal Environmental and Social Review Summary (ESRS).

Legal Covenants

Sections and Description



Financing Agreement, Schedule 2, Section I.A.3

DDWSWD shall maintain DDWSWD PIU and WRS shall maintain WRS PIU during the entire period of the Project implementation, both with the structure, functions, terms of reference, and resources all satisfactory to the Association and adequate for successful implementation of the Project.

Sections and Description

Financing Agreement, Schedule 2, Section I.A.6

The Recipient shall maintain, during the entire period of the Project implementation, the Project Advisory Committee with the structure, functions and composition satisfactory to the Association with the purpose of providing strategic guidance, oversight and coordination of the Project, as further may be specified in the POM.

Sections and Description

Financing Agreement, Schedule 2, Section I.A.7

The WRS and DDWSWD shall each cause the WRS PIU and DDWSWD PIU, respectively, to hire not later than thirty (30) days from the Effective Date: one environmental specialist and one social specialist, all specialists with the qualifications and terms of reference acceptable to the Association.

Sections and Description

Financing Agreement, Schedule 2, Section I.D.1

The Recipient shall, and shall cause the Project Implementing Entities to, ensure that the Project is carried out in accordance with the Environmental and Social Standards, in a manner acceptable to the Association.

Conditions

Type	Financing source	Description
Effectiveness	IBRD/IDA	The Project Operations Manual has been prepared and adopted by the Project Implementing Entities satisfactory to the Association.
Effectiveness	IBRD/IDA	The Subsidiary Agreement has been executed on behalf of the Recipient and the WRS.
Effectiveness	IBRD/IDA	The Subsidiary Agreement has been executed on behalf of the Recipient and the DDWSWD.
Effectiveness	IBRD/IDA	The ESMF, RF and LMP have been finalized, consulted upon, accepted by the Association, adopted and redisclosed.



I. STRATEGIC CONTEXT

A. Country Context

- 1. Despite solid economic growth, the Kyrgyz Republic is one of the poorest countries in Central Asia.** The country has experienced solid but volatile economic growth over the past decade, averaging 4% per year since 2010 (ranging from -0.5% in 2010 to 10.9% in 2013 and 4.5% in 2019, just before the onset of the COVID-19 pandemic¹). The Kyrgyz economy remained in a deep recession following a contraction of 8.6% in 2020 due to the COVID-19 pandemic and policies to limit its spread, however, 3.6% growth was registered in 2021. In 2020 the Gross National Income per capita was US\$1,160, which is slightly above the threshold for Lower Middle-Income Country status². The country has a population of about 6.6 million with over 60% living in rural areas³.
- 2. The government has introduced measures to combat the pandemic, such as quarantine and trade and travel restrictions, and to mitigate its socio-economic impacts, but additional support is required.** Global economic factors and especially the economic slowdown in Kazakhstan and Russia will exacerbate the economic shock from COVID-19 to the Kyrgyz economy. The pandemic has affected food prices, the availability of medicines and medical supplies, employment, and the remittances flow. This latter point is particularly important given the economy's dependence on remittances (27% of Gross Domestic Product (GDP)⁴).
- 3. The COVID-19 crisis threatens to undo the gains in poverty reduction achieved over the past few years, and a high proportion of the population risks falling back into poverty.** The COVID-19 crisis has adversely affected labor income and remittances, and this, combined with inflation, leaves large segments of the population exposed to the economic consequences of the pandemic. In 2020, the poverty rate is estimated to have increased to over 25%, from 20.1% in 2019, pushing an additional 700,000 people into poverty – a very large absolute increase for a population of 6.6 million⁵. In absolute terms, Jalal-Abad and Osh oblasts host the greatest number of people living below the national poverty line⁶, reaching almost half of the country's total number of the poor.⁷ Batken oblast has the highest poverty rate in relative terms, with more than 30% of the population living below the poverty line⁸.
- 4. Beyond the COVID-19 pandemic, climate change is one of the most critical risks to the Kyrgyz Republic's development and stability.** The Kyrgyz Republic is one of the most vulnerable countries to climate change in the Europe and Central Asia region. Temperatures in the Kyrgyz Republic have increased consistently over the past 80 years, at an average rate of 0.1°C/decade⁹. Low socio-economic development, inadequate infrastructure, and a high dependency on climate-sensitive sectors (agriculture and hydropower) result in greater vulnerability to climate-related water shocks. For example, the intensification and expansion of drought-related land degradation may severely affect labor productivity. In addition, loss of hydropower capacity due to climate variability may be supplemented with fossil fuels which would lead to increased greenhouse gas (GHG) emissions in the country's currently low-carbon electricity matrix. The water

¹ GDP growth (annual %) – Kyrgyz Republic. Available from: data.worldbank.org

² Atlas method (current US\$) - Kyrgyz Republic. Available from: data.worldbank.org

³ Population statistics from data.worldbank.org

⁴ 2020 data from data.worldbank.org.

⁵ World Bank. 2021. One Year Later in the Kyrgyz Republic's Battle Against COVID-19.

⁶ 391,232 and 198,309 people respectively.

⁷ National Statistical Committee of the Kyrgyz Republic. 2020. Monitoring of the Sustainable Development Goal Indicators in the Kyrgyz Republic.

⁸ <http://www.stat.kg/en/opendata/category/120/>

⁹ Third National Communication of the Kyrgyz Republic under the UN Framework Convention on Climate Change. 2016.



sector is the primary medium through which the negative impacts of climate change are felt, as well as a key sector to ensure effective adaptation and build resilience.

5. **Water-related risks are on the rise especially because of climate change.** Flood and drought risks are expected to exacerbate under climate change. Exposure to floods and mudflows in the spring is high. The Global Facility for Risk Reduction and Recovery (GFDRR) estimates that the annual average population affected by flooding in the Kyrgyz Republic is about 80,000, with an annual average directly and indirectly affected GDP of US\$ 70 million¹⁰. Droughts in summer as well as the severe cold spells in winter have major impacts on rural livelihoods and national food security. Droughts are common, and under climate change the annual probability of severe drought is expected to more than double from 14% in 2020–2039 to 31% in 2040–2059¹¹. This is expected to increase demand for irrigation, leading to water deficits and potential yield declines. Beyond drought and floods, rainfall-induced mudflows expected to intensify especially in the country's southern oblasts. In the whole country there are 5,000 zones susceptible to mudflows, of which 3,500 are in the south¹². Further climate change risks include increased variability and changed timing of reservoir inflows (thus affecting hydropower production), reduced water storage in glaciers, increased water and energy demands because of climate warming potentially leading to increased GHG emissions, and disruption to economic production and livelihoods, especially in rural areas. Climate change may also exacerbate tensions on water resources shared with downstream countries (Kazakhstan, Tajikistan, Turkmenistan, and Uzbekistan).

6. **While water is a source of risk, it is also a resource critical to and embedded within many key sectors of the Kyrgyz economy, notably agriculture, energy and tourism.** Irrigated agriculture is a major livelihood activity, contributing to about 13-15% of GDP and employing about one-fourth of the population¹³. Nearly 90% of water for irrigation is supplied by gravity flow from surface water sources, with lands irrigated by furrows or by free flow¹⁴. Pumped irrigation water supply is not more than 10%, varying from 1 to 17% of the total volume of supplied water in different regions¹⁵. Pumping is based on electricity generated from renewable sources (hydropower) and, to a lesser extent, on fossil fuels, thus offering opportunities to shift to lower-carbon options. Most of the agricultural production takes place in small individual farms, many of which have low capacity to adapt to climate change. Healthy aquatic ecosystems underpin the country's tourism sector (with more than 8 million international arrivals in 2019 before COVID-19¹⁶), with tourists attracted by the country's landscapes and lakes¹⁷, notably the unique Issyk-Kul lake. Hydropower production contributes to around 90% of total electricity generation¹⁸. Integrated water resources management solutions and investments and policies that focus on harnessing water's productive potential underpin the country's prospects of green, resilient, inclusive, and sustainable development.

B. Sector and Institutional Context

Sector Context

¹⁰ See page 58, in GFDRR (2017) Kyrgyz Republic Risk Profile. Available from: <https://www.gfdrr.org/sites/default/files/Kyrgyz%20Republic.pdf>

¹¹ Climate Risk Profile: Kyrgyz Republic (2021). The World Bank Group and Asian Development Bank.

¹² GFDRR (2011). Kyrgyz Republic. *Climate Risk and Adaptation Country Profile*. Washington, D.C.: World Bank.

¹³ Climate-smart agriculture profile for the Kyrgyz Republic. https://climateknowledgeportal.worldbank.org/sites/default/files/2019-06/CSA%20_Profile_The%20Kyrgyz%20Republic.pdf

¹⁴ Ministry of Agriculture and Melioration of the Kyrgyz Republic (2015). Modern irrigation technologies and possibility of their application in Kyrgyzstan. Report produced for the National Dialogue on Integrated Water Resources Management in Kyrgyzstan. https://www.oecd.org/env/outreach/KG_study_irrigation.pdf

¹⁵ *ibid.*

¹⁶ International tourism, number of arrivals - Kyrgyz Republic. Available from: data.worldbank.org

¹⁷ World Bank (2020). Feasibility of Measuring Tourism Sustainability in the Kyrgyz Republic: A Technical Report (English). Washington, D.C.: World Bank Group

¹⁸ International Energy Agency. Kyrgyzstan energy profile. Country Report 2020. <https://www.iea.org/reports/kyrgyzstan-energy-profile>



7. **The Kyrgyz Republic is well-endowed with water resources.** However, they are spatially and seasonally variable, a situation exacerbated by climate change. Of the 8-9 billion cubic meters (BCM) consumed, close to 93% is used for irrigated agriculture, 4% for industry and 3% for domestic water supply uses¹⁹. Many efforts are underway to modernize the water sector and improve water management.

8. **Access to and quality of water and sanitation services (WSS) remains a significant challenge.** According to the World Health Organization (WHO)/United Nations Children's Fund (UNICEF) Joint Monitoring Program (JMP), urban access to safely managed drinking water supplies²⁰ is around 93.5%, while rural access is around 53.9% (2020).²¹ However, based on the most recent data of the Kyrgyz Republic's rural water and sanitation information system (SIASAR)²², the access to safely managed water in rural areas is as low as 18.79%.²³ In most schools and health care facilities in rural areas, the WASH situation is poor: around 38% of rural schools and 58% of rural health centers do not have access to improved water sources and lack adequate hygiene²⁴. Access to at least basic sanitation is reported to be 34% in rural areas²⁵. Most people (about 66%) have access to unimproved or shared facilities and some (0.7%) still practice open defecation²⁶.

9. **WSS infrastructure is outdated and not designed for climate change, operation and maintenance (O&M) costs are relatively high, and the institutions' capacity is low.** Outdated pumps and distribution networks with excessive energy consumption²⁷ and high non-revenue water losses affect the financial performance of WSS service providers as energy costs represent a large share of O&M costs, with latest available estimates suggesting that energy costs account for more than 20% of operational expenses²⁸. Optimizing energy use for water service provision will simultaneously improve financial performance and reduce GHG emissions, which is significant considering that the energy sector represents more than half of total national GHG emissions²⁹. Public expenditure, while increasing in recent years, has not kept pace with requirements for asset replacement, maintenance and system expansion, and water supply and sewerage infrastructure has deteriorated substantially. According to SIASAR, around one third of the existing WSS infrastructure in rural areas was commissioned over the last two decades and 80% of such systems are already in poor condition and require additional investments. The services sector revenues are too low to cover sustainable operations. Maintenance is limited to quick fixes of apparent system breakdowns, affecting operational performance in the long term. These infrastructure issues, combined with institutional capacity constraints, resulted in a stagnation or decline in water service

¹⁹ FAO AQUASTAT data [accessed on December 29, 2021]

²⁰ Safely managed drinking water includes three dimensions: (a) available on premises, (b) reliably available when needed, and (c) free of key pollutants (chemical and bacteriological).

²¹ JMP data from <https://washdata.org/data>. Data is based on trend extrapolation of national surveys where definitions may be differently defined. For example, all private piped connections from individual wells may be interpreted as safely managed without being provided as a public service. As such it is difficult to compare these data with SIASAR data that provides more accurate and detailed data on service levels.

²² SIASAR, introduced in the country in 2018 under the World Bank-financed SRWSSDP, provides data collected in rural areas across the country over 2019-2021.

²³ SIASAR data (January 2022). <http://data.globalsiasar.org/sdgs>.

²⁴ SIASAR data (January 2022). <http://data.globalsiasar.org/schools> and <http://data.globalsiasar.org/health-centers>. Only 10% of rural schools and 16% of rural health centers were reported to have soap at the time of the surveys.

²⁵ JMP data state 99% basic sanitation in rural areas; however, estimates are assuming that all pit latrines are improved, which in reality is not the case.

²⁶ Basic sanitation refers to an improved facility that is not shared with other households. Safely managed sanitation means three dimensions are fulfilled i) improved facility that separates excreta from human contact, ii) is not shared with other households, and iii) excreta produced to be treated and disposed in situ, stored, emptied and transported to treatment off-site, or collected by sewer and then treated and used/disposed.

²⁷ SIASAR indicates that around 60% of rural WSS systems use pumps to produce water.

²⁸ The IBNET Water Supply and Sanitation Blue Book (2014). The International Benchmarking Network for Water and Sanitation Utilities Databook.

²⁹ The Kyrgyz Republic Updated Nationally Determined Contribution (2021) and Third National Communication of the Kyrgyz Republic under the UNFCCC (2016).



quality acutely affecting rural areas, and district towns (or small and medium-sized cities), where most of the population resides.

10. **Batken oblast lags behind country averages for WSS coverage.** The population (548,247 as of 2021) of Batken oblast suffers from very poor and limited WSS services. The oblast comprises 6 urban centers and 218 villages (as of 2021). Safe drinking water supply coverage ranges from nearly 90% of the population in the city of Batken to 70-80% in other urban centers. In rural areas, the share of the population with access to safely managed drinking water services ranges from 0 to 70%³⁰; however, these statistics mask severe gaps in service quality. The wastewater collection and treatment situation is particularly concerning, with low coverage of sewage systems and discharge of untreated wastewater into the environment. In the cities of Batken and Kyzyl Kyia, up to 40% of the population is connected to centralized sewer systems, which mainly cover apartment buildings and some administrative and social infrastructure buildings. In rural areas, there is no centralized sewerage and people rely on pit latrines and cesspits for sanitation.

11. **Concerns of surface and groundwater pollution are most pressing for urban areas and for the Issyk-Kul lake.** Water quality issues are predominantly driven by pollution of water resources from point sources, including by industries, mining and landfill sites, and discharge of untreated municipal sewage, and diffuse sources (agricultural pesticides and fertilizers). Sewerage systems cover no more than 37.1% of the population in cities and no more than 0.2% in the rural areas.³¹ Only about 30% of municipal wastewater collected is being treated. There are reportedly 350 wastewater systems and treatment plants, but only 30% comply with established design standards and compliance with wastewater quality effluent standards is low. Lack of operational and capital funds, ageing of the facilities and limited capabilities in wastewater management are key sector bottlenecks. Increased discharges of polluted or untreated wastewater facilitate the spread of pathogens in water bodies, open drains and directly within urban areas, posing a severe public health risk. Poor sanitation contributes to stunting and also limits the tourism opportunities in rural areas and towns where tourists expect higher service levels than outdoor shared pit latrines typically found at guesthouses.

12. **Climate change will exacerbate sanitation-related risks to public health and the economy.** Sanitation-related public health risks tend to be higher during/after the occurrence of extreme weather events such as floods and droughts. Floods and droughts are expected to become more intense and frequent, and this will further exacerbate the spread and transmission of water-related diseases. The impact of climate change on the incidence, transmission season duration and spread of diseases represents a major threat.³² The economic impact of poor WSS is estimated to cost the country about US\$120 million per year or 1.64% of GDP (2017).³³

13. **Irrigation and drainage (I&D) infrastructure is key to incomes and food security; however, it is largely underperforming and it was not designed to account for climate change.** Rainfall patterns in the country are variable and generally inadequate to support anything other than extensive subsistence cultivation of a few drought-resistant crops. For example, during the main cropping season between April and October, the water deficit in Osh oblast varies from 70% of crop water requirements for wheat to 90% for certain vegetables. Similar water deficits are found in other parts of the country and irrigation is a key input to crop production and national food security. Funding remains the most significant challenge for all 362 irrigation schemes nationwide (1.1 million ha), including 27,000 km of irrigation canals including pipelines and associated pumping stations. Water User Associations (WUAs) are well-established and 80% of the on-farm irrigation systems has been transferred from the state to WUAs. The most common irrigation methods are gravity furrow irrigation (80%) and basin irrigation (20%). The main advantage of furrow irrigation is that no

³⁰ According to SIASAR, the access to improved water sources in rural areas is around 29% in Batken oblast.

³¹ JMP data from <https://washdata.org/data>.

³² <https://www.nature.com/articles/s41590-020-0648-y>

³³ The World Bank (2019). Central Asia: Regional Water Security (internal report). Washington, DC: World Bank.



electricity/fuel is needed. Water consumption varies from 1,200 to 8,000 m³ per hectare (ha) for different crops. The average national irrigation norm has decreased to 7,400 m³/ha (lowest in Central Asia where the irrigation norm elsewhere ranges from 15,500 in Turkmenistan to 9,700 in South Kazakhstan). Due to low investments in drainage infrastructure, inadequate maintenance and poor water management, some irrigated areas are affected by salinization and waterlogging. On average, about 27% of the harvest is lost on saline land and up to 38% where the groundwater table is too high. Overall estimates put the losses due to poor management of irrigation systems and resulting water logging and salinization at US\$81 million per year.³⁴ Overall, underperformance of the I&D infrastructure has increased the vulnerability of the Kyrgyz Republic's population to climate change.

14. **Multi-purpose dams are very important assets in the battle against climatic variability.** River flows are regulated through 17 dams (22 BCM of storage). The primary challenge is to maintain the existing dams so they remain safe and serviceable. In the face of increasing hydrologic uncertainty and competing demands of different user groups, the use of safe multipurpose dam infrastructure will increasingly play an important role in the country's quest towards improved water management, climate resilience and carbon-neutral energy production. Dam management is the responsibility of dam operators, the Water Resource Service (WRS³⁵) and the State Inspection for Ecology Control under the Ministry of Natural Resources, Ecology and Technical Supervision (MNRETS). The main challenge relates to staffing, with lack of training opportunities and staff qualified in relevant technical and operational aspects including inadequate capacity for dam management. In some cases, the operational regimes adopted in the original design need to be reviewed in light of (a) the current international best practice and (b) expected impacts of climate change.

Institutional and Policy Context

15. **The National Development Strategy 2018-2040 is guiding efforts to modernize the Kyrgyz economy.** The aim is to move towards a competitive digital economy and promote green growth through application of innovative and environmentally friendly technologies³⁶. The development of energy and water efficient irrigation networks and the construction of WSS systems are key pillars in this strategy. One of the priorities is to achieve food security and modernization of irrigation schemes; this is recognized as an important element for improving agricultural production. This includes transferring 9,500 ha from pump to gravity irrigation to reduce GHG emission linked to pumping³⁷. The Strategy also identifies public administration reform as one of the top priorities. It states that previous reforms of the public sector did not produce desired results and did not markedly improve governance processes. Higher standards in public accountability, better enforcement of control over the budget, and stronger management of public assets continue to be important goals of the governance reform program.

16. **The Water Code is a central element of the country's water policy and institutional framework.** Implementation of the Water Code³⁸, issued in 2005, is ongoing, including through the National Water Resources Management Project (NWRMP) financed by the Swiss Agency for Development and Cooperation (SDC) and administered by the World Bank³⁹. The Water Code has created a legal basis for pursuing the key principles of integrated water resource management

³⁴ Swiss Agency for Development and Cooperation (2017). Rethinking water in Central Asia. Swiss Agency for Development and Cooperation (SDC).

³⁵ Former State Water Resources Agency (SWRA). The SWRA was renamed by resolution No.242 of the Cabinet of Ministers of the Kyrgyz Republic dated November 6, 2021.

³⁶ National Development Strategy 2018-2040.

[https://policy.thinkbluedata.com/sites/default/files/National%20Development%20Strategy%20of%20the%20Kyrgyz%20Republic%20for%202018-2040%20\(EN\).pdf](https://policy.thinkbluedata.com/sites/default/files/National%20Development%20Strategy%20of%20the%20Kyrgyz%20Republic%20for%202018-2040%20(EN).pdf)

³⁷ *ibid.*

³⁸ Water Code of the Kyrgyz Republic dated January 12, 2005 (as amended). The English version is available at:

<http://extwprlegs1.fao.org/docs/pdf/kyr49854E.pdf>

³⁹ <https://nwrmp.water.gov.kg/>



(IWRM) and the management of resources at the level of river basin, through multi-stakeholder councils and supported by basin administrations. The nodal agency responsible for the implementation of the Water Code is the WRS, under the Ministry of Agriculture⁴⁰. The National Land and Water Council is the advisory body providing coordination between the activities of ministries, state committees/agencies, and other administrative bodies such as local administrations, as well as self-governance bodies⁴¹ involved in water resources management, protection, and service delivery (e.g., water user associations).

17. **The mandate for drinking water supply, wastewater, and sanitation services in terms of policy making and planning is anchored within the Department of Drinking Water Supply and Wastewater Disposal (DDWSWD), under the State Agency for Architecture, Construction and Communal Services (GOSSTROY)⁴².** Service provision is decentralized to urban WSS utilities in the major cities and oblast/district capitals through municipal *vodokanals* as well as in rural areas through smaller municipal water enterprises and community drinking water user unions (CDWUU). The sector's economic regulation is a responsibility of the State Agency on Anti-Monopoly Regulation, now under the Ministry of Finance. Tariffs are agreed with the State Agency on Anti-monopoly Regulation and approved by local Keneshes.⁴³ The existing legal framework, based on the Law No 33 on Drinking Water of 1999, is under review, with support of the World Bank-funded Sustainable Rural Water Supply and Sanitation Development Project (SRWSSDP). This support aims to address bottlenecks in the sector pertaining to management arrangements, sustainability of services, regulatory aspects, and the weak legislation in support of wastewater services and environmental regulation. The quality of potable water is monitored by the Department for Disease Prevention and Sanitary and Epidemiological Expertise under the Ministry of Health. MNRETS is responsible for the development and implementation of policies related to the environment protection, ecology, and protection of natural resources including the effluent standards for wastewater discharge and enforcement.

18. **The Community Drinking Water Supply and Wastewater Disposal National Development Program⁴⁴ set out ambitious targets for increasing access to potable water and improved sanitation.** The goal is to reach 90% coverage for water services and 70% coverage for wastewater services by 2026 at national level⁴⁵. The national program reports that around 10% of the rural population obtains water from a public water supply system, with 67.9% collecting water from standposts, and 22.1% use water obtained from irrigation canals, rivers, channels, springs, water trucks, as well as private wells among others. SIASAR reports that around 13% of the water quality tests in rural areas do not comply with the national standards⁴⁶. The national program indicates that out of 1,905 villages, some 715 villages require new water supply systems, while some 448 villages require substantial investments for system rehabilitation and expansion.

19. **Costs estimates by the DWSWDD far exceed resources, that are mostly dependent on external transfers, with needs estimated in excess of US\$600 million for water supply alone.** Capital investments required to achieve sanitation coverage expansion targets have not yet been reliably estimated and will depend largely on the adopted approach for promoting rural sanitation development. The strategy calls for “clean energy – clean water” and articulates general principles for sector development such as: (a) a clear separation of function (policy, operation and regulation),

⁴⁰ Renamed on November 6, 2021 from the Ministry of Agriculture, Water Resources and Regional Development.

⁴¹ Aiyl Okmotus, mayors of towns, local Keneshes.

⁴² The State Agency (GOSSTROY) directly reports to the Cabinet of Ministers; this departs a recent change from the previous situation where it was for a short period of time moved under the SWRA. Before 2018, the DDWSWD was also housed under GOSSTROY,

⁴³ Law on Self-Governance Bodies of July 15, 2011.

⁴⁴ Adopted by Government Resolution #330 dated June 12, 2020.

⁴⁵ The National program definitions are not yet fully aligned with the definitions of safely managed services by JMP to monitor progress against the SDGs.

⁴⁶ SIASAR data (May 2021).



(b) autonomy, accountability and efficiency in service delivery, (c) principles of cost-recovery and financial sustainability, and (d) environmental sustainability and climate resilience. A comprehensive national program that operationalizes these principles and includes comprehensive sanitation development and investments has not yet been developed.

20. **The government has adopted the National Irrigation Program for 2017-2026.** According to this program, climate-resilient irrigation infrastructure should be modernized and built with a view to (a) create new jobs, improve socio-economic conditions, and reduce migration, (b) develop crop farming; and (c) increase tax revenues and the country's GDP. To implement this program, US\$860 million is estimated to be required. Furthermore, the Water Code provides options to finance I&D improvement through variable irrigation service fees set for each system. WUAs responsible for management, operation, and maintenance of on-farm systems, have successfully used this opportunity over the last several years to increase the funding for O&M by 250%. While this is a major achievement, in part supported by World Bank-financed projects, the financing of capital costs for rehabilitating irrigation structures requires public funds. At the level of the river basins, five River Basin Management Plans have been developed and endorsed and will continue to be updated with support of the NWRMP. Under NWRMP, the government is developing an Integrated Water Sector Strategy 2040.

21. **The establishment of water quantity monitoring systems is underway, though gaps remain.** As a part of the implementation of the Water Code, monitoring systems are being established in each river basin. Databases have been established for main and secondary canals. Flow measurements are done at all irrigation headworks sites and are used to determine water volumes supplied and the irrigation service fees (ISF) to be paid by the users (WUAs). Flows are measured hourly, and the information is passed on to the oblasts' water authorities on a daily basis. River flow monitoring is done by the Kyrgyzhydromet. There are 78 hydrological posts, 3 of them have automatic hydrological complexes, and 23 hydro-chemical posts on rivers, lakes, and reservoirs⁴⁷.

22. **Despite these advances, the country lacks a unified water quality monitoring system.** Monitoring services have been limited and the number of hydro-chemical monitoring stations has reduced in the last decades by more than 5 times compared to 1990. Monitoring of Karadarya-Syrdarya-Amudarya (KSA) basin has not been carried out from 1995 due to lack of financing. The State Ecological Laboratory under the Department of Environmental Monitoring (DEM) of MNRETS in Bishkek is yet to be accredited (ISO17025) and needs to meet requirements on facilities, equipment, and qualifications. Branch laboratories in Batken, Osh, Jalal-Abad, Talas and Naryn oblasts are not functioning. On drinking water supply quality monitoring system, the ongoing SRWSSDP is working closely with the Sanitary and Epidemiological Expertise under the Ministry of Health to strengthen the capacity of its laboratories though the necessary equipment and staff training. Soil salinization and water logging are monitored partially. Strengthening capacity of DEM will enable monitoring of soil quality.

23. **There are significant opportunities to strengthen the capacity of water sector professionals.** There is a strong academic research community in water management. However, water authorities need more young and trained staff, especially the WRS. Training is required in leadership, project management and monitoring, and financial management. Links between academia and government need to be strengthened. Training needs in the WSS sector are being assessed in 2021 under the ongoing SRWSSDP, and a professional development program for rural WSS operators and private sector players will be launched in 2022. In the urban WSS sector, extensive capacity building and corporate development programs have been implemented with support from various Development Partners to *vodokanals* in Bishkek, Osh, and

⁴⁷Country Hydromet Diagnostics: Kyrgyz Hydromet Peer Review Report (2021). <https://documents.worldbank.org/en/publication/documents-reports/documentdetail/201341626098692283/country-hydromet-diagnostic-kyrgyzhydromet-peer-review-report> .



other towns⁴⁸. With respect to water quality monitoring, the technical capacity of laboratory staff and financial viability of the laboratories are critical to ensure sustainability of the monitoring system. There is an issue of retaining laboratory staff mainly due to low salaries.

24. **With respect to gender inequality in the water sector, challenges remain reflecting gender gaps in male and female labor force participation.** Within the WSS sector, no comprehensive statistics exists in terms of female staff in utilities, but anecdotal evidence suggests that women have less access to jobs and careers within the WSS utility sector. SIASAR data reports that around 30% of staff in rural service providers are women. In the management of irrigation systems, both within the oblast water authorities, as well as within WUA management committees, women are underrepresented at all levels. Only 20% of staff in WRS oblast and rayon departments are women (14% of staff in technical positions and 11 % of staff in managerial positions). In WUAs, about 8% of individual members are women (11% in Batken oblast, 10% in Jalal-Abad oblast, and 8% in Osh oblast). On average, however, the representation of female farmers within WUA decision-making bodies is significantly lower. For instance, the representation of women in WUA bodies is 4% in Batken oblast, 7% in Jalal-Abad oblast and 9% in Osh oblast. Although there are no legal restrictions on employment of female staff there remain strong patriarchal social norms that hinder the full potential of women to participate in the sector. Also, WUA memberships, often linked to land holding titles, favors male representation under a one member per household policy.

25. **Climate change is a priority issue for the government: the Kyrgyz Republic seeks to lead in Central Asia on climate change mitigation and adaptation policies, and institutional development.** The Kyrgyz government recognizes the need to develop a long-term national strategy for low-carbon development and has signed and ratified 13 international environmental conventions⁴⁹ and submitted its National Communications in compliance with the United Nations Framework Convention on Climate Change (UNFCCC). By ratifying the Paris Agreement on Climate Change on November 11, 2019, the country committed to reducing greenhouse gas emissions unconditionally by 16% by 2025 and 15% by 2030, and conditional to international support, by 36% by 2025 and 43% by 2030 and confirmed its intention to transform economic activities to a low-carbon model and to increase climate resilience⁵⁰.

26. **Within the Third National Communication of the Kyrgyz Republic under the UNFCCC, submitted in 2016, a range of climate-related water challenges and mitigation and adaptation priorities were identified.** Water resources were identified as the sector facing the highest estimated economic losses in the absence of adaptation measures, more than energy, agriculture, environment, and health⁵¹. In addition, the Third National Communication recognizes the natural limits of hydropower production in the face of climate change uncertainty, which means that the country's climate agenda focuses strongly on the efficiency improvement measures in energy consumption, including in the water sector. The 2021 Updated Nationally Determined Contribution describes the goal of improving climate resilience of I&D and WSS infrastructure as key adaptation measures to counter climate change impacts⁵².

⁴⁸ A review of the effectiveness of the corporate development programs among vodokanals has been carried out by SECO and lessons of this review, once published, will be incorporated during project implementation

⁴⁹ <https://www.oecd-ilibrary.org/sites/0617b71a-en/index.html?itemId=/content/component/0617b71a-en#>

⁵⁰ Kyrgyz Republic (2021). Updated Nationally Determined Contribution 2021.

<https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Kyrgyzstan%20First/%D0%9E%D0%9D%D0%A3%D0%92%20ENG%20%D0%BE%D1%82%2008102021.pdf>

⁵¹ See table 3.2 in the Third National Communication of the Kyrgyz Republic under the UNFCCC. Available from:

https://unfccc.int/sites/default/files/resource/NC3_Kyrgyzstan_English_24Jan2017_0.pdf

⁵² See Annex 2 in the Updated Nationally Determined Contribution 2021.



27. **In 2019, the Kyrgyz Government rearranged the institutional settings to coordinate activities related to climate change.** It established the Green Economy and Climate Change Coordination Committee consisting of the heads of key ministries and divisions which are concerned with climate-related policies and activities. These include the Ministry of Finance, MNRETS and its Climate Finance Center and to a certain extent also Kyrgyzhydromet. In terms of research, the Kyrgyz Institute of Water Problems and Hydropower is the key research institution working on quantifying the impacts of climate change on mass balances and dynamics of glaciers in the Tien Shan mountains.

28. **This institutional and policy context is rapidly evolving following recent (October 2021) changes to the Cabinet of Ministers.** In particular, the mandate of MNRETS has been expanded to include regulation and allocation of water resources. MNRETS is now also a Secretariat for National Land and Water Council that used to be under the State Water Resources Agency (SWRA). Under the above shift, the WRS still retains full responsibility for irrigation service delivery and related improvements. Given this project's focus on service delivery improvement, this shift is not expected to influence overall project ambition, structure, and implementation.

C. Relevance to Higher Level Objectives

ALIGNMENT WITH WORLD BANK STRATEGIES AND CORPORATE PRIORITIES

29. **The proposed project is aligned with the World Bank Group's twin goals of eliminating extreme poverty and boosting shared prosperity as well as with the current FY19-22 Country Partnership Framework (CPF) (Report No. 130399-KG, discussed by the Board on November 13, 2018).** The project is aligned with the CPF under Focus Area 3: *enhance economic opportunities and resilience*. The objectives of Focus Area 3 are: (a) develop human capital (objective 7); (b) support regional development (objective 8); and (c) enhance resilience to climate change and disaster risks (objective 9). The project will support provision of (i) improved access to drinking water and sanitation, in particular in poor rural communities in Batken and Issyk-Kul; (ii) increased crop yields within the areas of water user associations; and (iii) enhanced resilience to climate change in the water sector.

30. **The project is aligned with the World Bank COVID-19 response and Green, Resilient and Inclusive Development.** The project is aligned with Pillar 2 ("protecting the poor/vulnerable") and Pillar 4 ("Strengthening policies, institutions, and investment for rebuilding better") of the World Bank COVID-19 Crisis Approach Paper⁵³: it will (a) build resilience in the water sector and strongly contribute to a green recovery, including through a focus on reducing the water and energy footprint of irrigation and on expanding access to WSS services and (b) enhance the sustainability of water service providers by improving their operational and financial efficiency. The project is also aligned with the ECA Green Transition Framework that calls for a shift towards a green, resilient, and inclusive development, while continuing to support the ongoing transition of Central Asian countries from centrally planned to market-based economies. The project will address ECA Green Transition supporting resilient recovery while positioning ECA for a sustainable future. This will be achieved by reducing risk associated with and strengthening resilience to natural disasters and climate change (Priority 3), and through inclusive infrastructure service delivery by ensuring equitable access to quality water and wastewater services (Priority 4).

31. **The project, through its integrated approach to improve water service delivery, aligns with the WBG Action Plan on Climate Change Adaptation and Resilience (Report No. 136368), notably with Objective 1 (Boosting Adaptation Financing).** The Action Plan identifies water as one of six adaptation themes that the WBG will support. It states that the WBG is seeking to support interventions that provide at least 100 river basins with climate-informed management plans

⁵³ World Bank (2020) *COVID-19 Crisis Response Approach Paper: Saving Lives, Scaling-up Impact and Getting Back on Track*. Unpublished paper. Washington, DC.



and/or improved river basin management governance and provide at least 15 million people with improved flood and drought risk management infrastructure.

32. **To further align with corporate priorities on climate and strengthen alignment to the WBG action plan, the project is explicitly designed to address four major risks related to climate change.** First, it will address drought risks, which are currently classified as medium to high in the country, impacting irrigated agriculture and drinking water sectors⁵⁴. Second, it will address temperature and extreme heat risks. In the Kyrgyz Republic, there is more than a 25% chance that at least one period of prolonged exposure to extreme heat, resulting in heat stress, will occur in the next five years⁵⁵. These events can damage crops and reduce agricultural incomes, and their impacts can be buffered through reliable service delivery in irrigated agriculture. Third, the project will address urban water management risk, especially in relation to sewer blockages and overflows resulting from flood events. Urban flood hazards are classified as high in the Kyrgyz Republic⁵⁶, meaning that enhanced collection of wastewater combined with proper drainage can significantly reduce risks to lives and economic activity. Finally, the project will increase resilience to flood risk, as it will support dam management compliance with applicable international best-practice and infrastructure designs that reduce service disruptions following flood events.

33. **Beyond addressing climate adaptation priorities, the project also contributes to the Kyrgyz Republic’s mitigation agenda.** The project’s interventions promote improved energy and water efficiency in irrigation and WSS service provision, thus reducing the water sector’s GHG emissions. Furthermore, the project’s focus on dam management helps ensure the long-term sustainability of this renewable energy source, in alignment with the National Development Strategy 2018-2040, the Updated Nationally Determined Contribution, the Third National Communication to the UNFCCC, and the WBG Climate Action Plan 2021-2025.

ALIGNMENT WITH SUSTAINABLE DEVELOPMENT GOALS

34. **The project contributes holistically towards Sustainable Development Goal 6 on clean water and sanitation for all.** Within SDG 6, the project specifically supports the Kyrgyz Republic’s advancement on four targets: (a) universal and equitable access to safe and affordable drinking water, sanitation and hygiene (SDG 6.1. and SDG 6.2), (b) improved water quality by reducing pollution and halving the proportion of untreated wastewater and increasing recycling and safe reuse (SDG 6.3.1), and (c) implementation of integrated water resources management at all levels (SDG 6.5.1.). The project also contributes to SDG 2 on food security, as it helps to stabilize food production in the face of climatic shocks through more reliable irrigation water services.

II. PROJECT DESCRIPTION

A. Project Development Objective

PDO Statement

35. **The project development objective is to (i) increase access to climate-resilient water services in selected river basins, and (ii) strengthen institutional capacities for climate-resilient water management at the local and national levels.**

⁵⁴ GFDRR (2020). Kyrgyz Republic. Country Profile. ThinkHazard. <https://thinkhazard.org/en/report/138-kyrgyz-republic/EH>

⁵⁵ *ibid.*

⁵⁶ *ibid.*



36. **Water services include WSS services and I&D services.** The project will improve the coverage and quality of WSS and I&D services in selected basin. At national level the project will increase institutional capacities for climate-resilient water management. With regards to the first part of the PDO, climate resilient water services are defined as water services that achieve coverage and quality standards despite possible climate risks (droughts, high temperature and extreme heat, urban flooding and sewerage overflows, floods, and mudflows). With regards to the second part of the PDO, climate-resilient water management is defined as the ability of water sector institutions at the local and national levels to prepare for disruptions and recover from shocks related to climate risks. This follows the World Bank's Resilience Rating System definition (see Section IV.A).

PDO Level Indicators

37. **Key results towards the specific Project Development Objective (PDO) will be measured with the following indicators:**

- (a) People provided with access to safely managed water supply services (Number), out of which female (percentage)
- (b) People provided with access to safely managed sanitation services (Number), out of which female (percentage)
- (c) Farmers provided with improved irrigation and drainage services (Number), out of which female (percentage)
- (d) Area provided with improved irrigation and drainage services (Ha) – Corporate Results Indicator
- (e) National Program for climate resilient water services developed and aligned with National Water Resources Strategy 2040 (Yes/No)
- (f) Reduction in the specific energy consumption of water supply delivery (Percentage)

B. Project Components

38. **The project is designed to ensure consistent policy, investment, and institutional approaches to deliver climate resilient water services.** The project includes national-level activities, basin-level activities (KSA basin and Issyk-Kul river basins⁵⁷), and rural level activities. The project is structured in four components. A brief description of activities under each Component is provided below, with a summary in Table 1 and additional details provided in Annex 1. Table 2 shows how project subcomponents have been explicitly designed to build climate resilience.

39. **Component 1: Infrastructure Investments and Service Improvements (US\$90 million).** This component contributes to the implementation of high priority investments aligned⁵⁸ with the river basin management plans⁵⁸ and with the country's climate change adaptation and mitigation agendas. It finances civil works, goods, equipment, and related services to reduce climate risks in the provision of drinking water and sanitation services, I&D services, and resource utilization efficiency. The infrastructure investments will also help reduce (a) environmental pollution of the Issyk-Kul lake; (b) public health risks associated with exposure to untreated wastewater in the event of flooding induced by climate change, and (c) energy and GHG footprint of service provision. These investments will be designed with the intent of minimizing GHG emissions through reductions in energy consumption by (i) prioritising gravity-based solutions for irrigation and drinking water supply, (ii) increasing pumping efficiency for service delivery, (iii) reducing nitrous oxide,

⁵⁷ This subdivision is based on a Kyrgyz Republic classification of its water bodies according to the Resolution "On Approval of the List of Main River Basins of the Kyrgyz Republic and Their Hydrographic Borders".

⁵⁸ River basin management plans for the Issyk-Kul and KSA river basins were developed under the World Bank executed National Water Resources Management Project (NWRMP) and identified improvements in water service delivery as a key priority area for investment.



methane, and carbon dioxide as well as Biological Oxygen Demand (BOD) discharges through proper wastewater and sanitation services and (iv) promoting water conservation through water metering and on-farm interventions. Hence, this component is climate co-benefit intensive.

40. **Subcomponent 1.1: Water Supply and Sanitation Infrastructure (US\$45 million).** This subcomponent covers investments to increase the climate resilience of drinking water supply and sanitation services, and to enhance wastewater treatment capacity. The subcomponent finances civil and electrical/mechanical installations for water supply production (boreholes, well-fields, intakes, as well as disinfection and energy efficient/renewable energy pumping as required), works for transmission and distribution of water to households in the project areas, along with wastewater management infrastructure, sewerage collection, conveyance, treatment, and disposal facilities. The subcomponent will also finance equipment for drinking water quality and water supply and wastewater pipes testing. These investments help small-town utilities and rural service providers to adapt to the anticipated impacts of climate change, diversify their water supply sources to better confront droughts and reduce their overall water consumption through efficiency improvements. This subcomponent will benefit (a) 95,000 people in 31 villages around Issyk-Kul lake and Batken oblast with climate resilient drinking water services; (b) 43,000 people with climate resilient sanitation services in three villages around Issyk-Kul lake through either sewers or on-site solutions. Improving sewerage and stormwater services will reduce the volume of untreated wastewater discharged into water bodies, as well as exposure to waterborne pathogens and related diseases. The project will also support reconstruction of WASH facilities in selected schools, kindergartens, rural health centers/hospitals in the project areas to ensure that they are female-friendly and disability inclusive. The potential impact of surface sewer overflows exacerbated by climate change-induced extreme rainfall events will also be reduced and thus communities' resilience to intense rainfall events under climate change will increase.

41. **Subcomponent 1.1 is explicitly designed to achieve mitigation and adaptation co-benefits.** This subcomponent achieves the following in terms of mitigation: (a) poor efficiency pumps (around 30%) will be replaced with high efficiency pumps (around 85%); (b) old, undersized and leaking (leakage is estimated at more than 40%) distribution network will be replaced with properly sized pipes to reduce both pumping energy and leakage (targeted leakage is estimated at less than 15%); (c) improved water supply quality will eliminate additional energy used in distributing water by trucks and need to boil water for drinking purposes; (d) wastewater collection and treatment will reduce GHG emission (including nitrous oxide, methane and carbon dioxide) as well as protecting the vulnerable water resources from pollution due to discharge of high BOD loads from untreated sewage; and (e) installation of water meters will promote water conservation and hence improvement of water use (and energy) efficiency, thus increasing the available volume of water for targeted communities, which will help them better withstand climate-related shocks to water supply such as droughts/water shortages and heat waves. Table 2 details the adaptation co-benefits for this subcomponent.

42. **Subcomponent 1.2: Irrigation and Drainage Services Improvement (US\$45 million).** This subcomponent covers modernization of three existing I&D schemes (Kara-Unkur in Jalal-Abad, Shakhimardan in Batken and Kurshab-Sai in Osh) located in the KSA basin covering 28,000 ha. At the level of infrastructure assets, the project finances rehabilitation and modernization of I&D canals (234 km) and appurtenant structures⁵⁹. The rehabilitation and modernization are based on the World Bank's Resilient Water Infrastructure Design principles⁶⁰. These activities support adaptation to drought risks through improved conveyance efficiency and control of water use with modern structures, and to flood and mud-flow risks through improved bypasses and protection structures. Modernized and well-functioning I&D schemes also help avoid maladaptation and land-use change related emissions that arise from (a) utilization of diesel pumps to withdraw groundwater to substitute for unreliable canal water supplies and (b) expansion of cropland – with related emissions associated in land-use change - to recoup losses caused by drought and lack of irrigation water supplies. At the farm level,

⁵⁹ Note: structures include: water control/distribution; outlets; mudflows, tunnels, small bridges and volumetric measurement structures.

⁶⁰ World Bank. 2020. Resilient Water Infrastructure Design Brief. World Bank, Washington, DC.



the project will promote climate-smart irrigation practices and resource utilization through (i) improved on-farm water management practices, (ii) deep ripping, and (iii) laser land levelling. This will address the rising impact of drought, high temperature and extreme heat risks related to climate change on crop yields and agricultural production. This will also help reduce soil erosion while enhancing soil carbon sequestration and fertility. Under this subcomponent, the project also finances technical assistance for preparation of the engineering studies and designs, as well as construction supervision for the above activities.

43. **Subcomponent 1.2 is explicitly designed to achieve mitigation and adaptation co-benefits.** Mitigation co-benefits are linked with (a) rehabilitation and upgrade of the three gravity-fed I&D schemes to minimize dependence on groundwater abstractions that rely on GHG emitting diesel pumps and (b) promotion of climate-smart agriculture at the farm level to enhance soil carbon sequestration and fertility, reduces soil erosion, and improves water and energy efficiency. Table 2 details the adaptation co-benefits for this subcomponent.

44. **Component 2: Institutional Strengthening for Climate Resilient Service Delivery, Water Resources Management and Dam Management (US\$7 million).** This component finances the acquisition and installation of equipment and services to facilitate the uptake of innovations and best-practices for water management based on climate resilience and low-carbon principles. The focus is on improving the institutional knowledge and preparedness with regards to aspects of IWRM and climate resilience, including (a) regulatory and oversight capacity at the national level, (b) operational capacity for service delivery at local level, (c) water and soil quality, and (d) dam management. Activities under this component are grouped into four subcomponents.

45. **Subcomponent 2.1: Institutional Strengthening for WSS Service Delivery (US\$1.5 million).** This subcomponent will finance activities (goods and services) in the target areas and national level designed to strengthen policy and regulatory frameworks and institutional capacity to advance sector reform and promote sustainable service delivery. The subcomponent targets key stakeholders, including DDWSWD, GOSSTROY, local governments, urban and rural service providers, service sector policymakers and regulators. It will support the Government's sector development strategy and reform roadmap and is informed by previous analytical and advisory services. Support for water supply and sewerage sector reforms will finance expert advisory services and technical assistance targeting priority areas of reform and institutional strengthening. Technical assistance incorporates considerations on climate change variability and related impacts, strengthening institutional capacity to identify and design resilient water supply and sanitation systems, mainstream gender and social inclusion aspects into the national program. A more effective institutional and regulatory framework will enhance water sector governance, operational efficiency, and sustainability, thereby enhancing the provision (in terms of coverage and quality) of water services. This will in turn reduce the risk of water shortages/droughts, improve the quality of water, and enhance overall resilience. Annex 1 provides a detailed description.

46. **Subcomponent 2.2: Institutional strengthening for irrigation water services delivery (US\$ 2.0 million).** This activity builds WRS's tools and capacity for irrigation service delivery, with a focus on digitalization. It finances equipment and services to improve data collection, storage, and processing into the existing Digital Water Information System (DWIS). This digitalization is expected to significantly strengthen WRS's ability to identify and prepare for droughts or floods and their impact on I&D infrastructure. This subcomponent will support (a) integration of surface water abstraction data for the irrigation sector within the DWIS; (b) uptake of remote sensing for irrigation water management and water accounting and their integration into the DWIS; (c) expansion of the data visualization functionalities of the DWIS; and (d) support to WUAs including trainings, asset management, operating budget and climate smart irrigation. The project will prioritize capacity building of female farmers to improve their technical, leadership, and communication skills to build their confidence and increase their voice and role in WUA decision-making bodies. This subcomponent supports climate



adaptation because the integration of surface abstraction data and remote sensing in the DWIS and expansion of DWIS data visualization functionality increase WRS's ability to control and monitor water use during drought. In addition, WUAs training in climate-smart agriculture helps farmers adapt to water stress.

47. **Subcomponent 2.3: Water and soil quality monitoring system (US\$2.5 million).** This subcomponent finances goods, works and services to strengthen the country's soil and surface water quality monitoring system. It invests to improve water and soil quality data collection, storage, and processing to help WRS and DEM better prepare and respond to the impacts of climate extremes (floods and droughts) on soil and water quality. It includes two main activities. First, the improvement/establishment of biochemical laboratories at the central level in Bishkek and in the three oblasts of the KSA basin (Osh, Jalal-Abad, and Batken) and capacity building of relevant specialists in the State Ecological Laboratory under the DEM. This activity finances repair of existing laboratory buildings, provision of equipment, support in accreditation of laboratories, and the upgrade of IT systems in the DEM. Second, this subcomponent finances institutional strengthening of the DEM to (a) improve staff capacity in chemical surface water and soil quality monitoring techniques, including data collection and analysis, and (b) develop a country-wide water and soil quality monitoring plan. This subcomponent supports climate adaptation because it improves capacity and knowledge to monitor and respond to the impacts of droughts and floods on water quality and of erosion on soil quality.

48. **Subcomponent 2.4: Dam management (US\$ 1 million).** This subcomponent finances services and equipment to: (a) establish a dam management unit within WRS, tasked with providing oversight on dam management across the country; (b) formulate guidelines for the elaboration of dam management plans; (c) develop dam management plans for four dams located in the KSA basin (Papan, Naiman, Tortgul and Bazar-Korgon); and (d) develop a dam information module within the DWIS, including introduction of remote monitoring tools such as drone applications and remote sensing. Activities under this subcomponent will increase the resilience of dams – and their related services including low-carbon hydropower production – to flood and drought shocks. This subcomponent supports climate adaptation because dam management involves, by definition, management of climatic risks (floods and droughts).

49. **Component 3: Project Management, Monitoring and Evaluation (M&E) and Professional Development (US\$3 million).** This component will finance the required staff, consultant services, professional development and operating costs that will allow the Project Implementation Units to carry out their responsibilities for implementation. These responsibilities include project management and coordination, procurement, and financial management, monitoring and evaluation, social and environmental standards management and oversight, communications, and outreach. This component will also finance the preparation of a feasibility study for future investments aimed at improving water services. Finally, this component includes professional development and other interventions to promote gender diversity in water sector entities. For example, the project will support, among others, review of human resources policies on recruitment, promotion and retention in water sector entities, development of guidelines for a safe and comfortable work environment including sexual harassment reporting mechanism.

50. **Component 4: Contingent Emergency Response Component (CERC) (US\$ 0 million).** Providing immediate response to an Eligible Crisis or Emergency, as needed. This component allows the Government to request the World Bank to recategorize and reallocate uncommitted financing from other project components to cover emergency response and recovery costs.



Table 1. Summary of project costs, financing, and responsible entity by component.

Project Components	Cost (US\$, million)	IDA Credit Financing (US\$, million)	IDA Credit % of Total	IDA Grant Financing (US\$, M)	IDA Grant % of Total	Responsible entity
Component 1: Infrastructure Investments and Service Improvements	90	50	56%	40	44%	
Subcomponent 1.1: Water Supply and Sanitation infrastructure	45	25	56%	20	44%	DDWSWD
Subcomponent 1.2: Irrigation and Drainage Services Improvement	45	25	56%	20	44%	WRS
Component 2: Institutional Strengthening for Climate Resilient Service Delivery, Water Resources Management and Dam Management	7	0	0%	7	100%	DDWSWD & WRS
Component 3: Project Management, M&E and Professional Development	3	0	0%	3	100%	DDWSWD & WRS
Component 4: Contingent Emergency Response Component	0	0	0%	0	100%	Ministry of Finance
Total	100	50	50%	50	50%	

Table 2. Project activities are explicitly designed to address climate vulnerabilities.

Climate vulnerability	Project intent to address vulnerability	Link to project activities	Sub-component
<i>Increasing risk of drought threatens reliability and quality of drinking water supply services</i>	Enhance the climate resilience of water supply services through efficiency improvements and protection/diversification of supply sources	Reduction in non-revenue water and metering to improve efficiency Modernisation of water supply production facilities (boreholes, well-fields, intakes, disinfection and energy-efficient pumps) to protect/diversify water supplies.	1.1
	Strengthen institutional capacity to plan and respond to drought risks to drinking water supply services	Develop a WSS investment program that includes principles of climate resilient design Build capacity of WSS actors to respond to climate risks.	2.1
<i>Risk of urban floods and sewerage overflow because of intense precipitation events</i>	Improve the climate resilience of sanitation services to reduce risk of overflow and volume of untreated wastewater discharged in water bodies	Construction of sewerage collection infrastructure and three wastewater treatment facilities to safely convey and treat excess sewerage and urban runoff during intense precipitation events	1.1

<i>Increasing risk of drought, warming temperatures and extreme heat intensify crop water stress and soil erosion</i>	Help farmers cope with water stress, reduce vulnerability of crop yields, and enhance the climate resilience of irrigation water services	Modernization of irrigation infrastructure to improve conveyance efficiency, reduce water losses and increased ability to control water deliveries Laser-land levelling and deep-ripping to improve on-farm water use and reduce risk of soil erosion	1.2
	Strengthen institutional capacity to plan and respond to drought conditions in agriculture	Integration of surface abstraction data and remote sensing in the DWIS and expansion of DWIS data visualization functionality increase WRS's ability to control and monitor water use during drought WUAs training in climate-smart agriculture helps farmers adapt to water stress.	2.2
<i>Risk of urban floods and sewerage overflow because of intense precipitation events</i>	Improve the climate resilience of sanitation services to reduce risk of overflow and volume of untreated wastewater discharged in water bodies	Construction of sewerage collection infrastructure and three wastewater treatment facilities to safely convey and treat excess sewerage and urban runoff during intense precipitation events	1.1
<i>Risk of mudflows in rural areas because of intense precipitation events</i>	Reduce the vulnerability of irrigation services to disruptions caused by mudflows	Rehabilitation and upgrading of mudflow bypass structures in the target irrigation schemes	1.2
<i>Increasing flood and drought risk threaten water quality and increase soil erosion risk</i>	Strengthen institutional capacity to monitor and collect data on soil and water quality	Finance equipment and services to improve water and soil quality data collection, storage, and processing to help water sector institutions better prepare and respond to the impacts of floods and droughts on soil and water quality	2.3
<i>Increasing flood and drought risk threaten operation of country's dams and timeliness of dam management decisions</i>	Strengthen institutional capacity to monitor and manage dams and increase the resilience of dams and their related services including low-carbon hydropower production – to flood and drought shocks.	Finance equipment and services to advance dam management in the country (by definition dam management includes plans for flood and drought management)	2.4

C. Project Beneficiaries

51. **Direct beneficiaries. The direct beneficiaries are rural and peri-urban communities in the target areas.** These comprise farmers, low-income households, women, and youth. Improved water service delivery is expected to provide a range of benefits to these social groups. These include fulfilling the human right to water and sanitation, livelihood opportunities and jobs in irrigated agriculture, lower morbidity and public health risks from waterborne diseases, and enhanced environmental quality (including reduced odour emissions from unsafely managed latrines and untreated sewage) and decreased vulnerability to droughts and floods. Improved environmental quality is expected to enhance the recreational, mental, and physical health of the beneficiaries, as clean water bodies provide important spaces for recreation.

52. **Social dynamics (conflict resolution) and ecosystem quality and conservation.** The project will also benefit social dynamics and ecosystems. Under component 2, activities will empower decision-makers and water managers at all levels to take evidence-based and transparent decisions based on data. This is expected to enhance sector transparency and participation, in turn reducing the risk of disputes. Activities will also enhance knowledge and preparedness to respond to droughts, thus reducing their potential to trigger disputes over allocation of water in times of shortage. Overall, this is expected to benefit social dynamics and break the vicious cycle of water insecurity and fragility. Beyond conflict



resolution, the project will also have direct benefits for ecosystem quality and conservation. The project will directly benefit freshwater ecosystems of the Issyk Kul lake through reduced inflows of wastewater and thus reduced risks of eutrophication. Through improved I&D service delivery, the project will also reduce the risk of erosion, land degradation and surface sediment runoff in target areas.

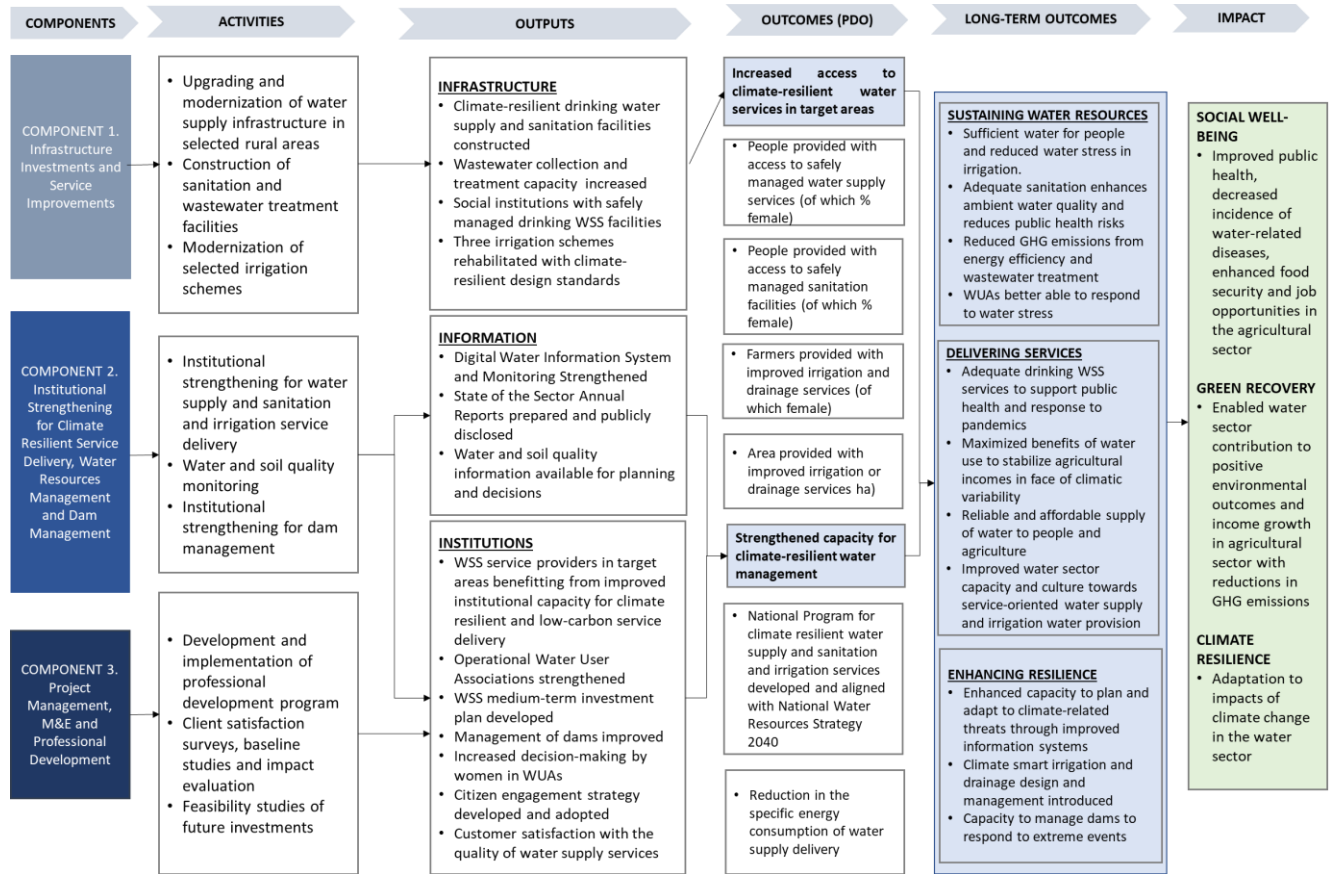
53. **Institutional beneficiaries.** Activities supported under Component 2 target central and decentralized state agencies managing water resources and delivering water services. Staff in these public agencies are expected to benefit from increase technical and operational capacity to carry out their mandates, improved equipment and improved and more accessible data to support user-centered and timely decision-making related to water resources and hydro-climatic risks. At the national level, the main beneficiaries are the WRS, DDWSWD and DEM.

D. Results Chain

54. **Results chain and assumptions.** The project seeks to achieve two outcomes: (a) increase access to climate-resilient water services in selected river basins, and (b) strengthen institutional capacities for climate-resilient water management at the local and national levels. The two outcomes are linked by the project's organizing principle: advance the climate resilience of the water sector (Figure 1). *To achieve the first outcome*, the project supports rehabilitation and upgrading of WSS and I&D infrastructure. *To achieve the second outcome*, the project strengthens institutions at multiple levels through investments in monitoring systems, capacity, and assessments. The theory of change assumes (i) continued support to IWRM as per Water Code, (ii) willingness of beneficiaries to invest labour and time in adopting improved irrigation practices and to continue paying for water services, and (iii) willingness of agency staff to engage with climate resilient water management approaches.



Figure 1. Results Chain.



E. Rationale for Bank Involvement and Role of Partners

55. **Rationale for Bank Involvement.** First, the Bank has a long history in supporting the water sector in the Kyrgyz Republic. IDA has been the catalyst for the development of water legislation (e.g., WUA Law of 2002 and the Water Code of 2005) and for the improvement of rural water supply and irrigation services. This project capitalizes on lessons learned from previous engagements and exploits the World Bank’s comparative advantage at providing long-term support to enhance water service provision across multiple water-using sectors and promote integrated water resources management. Second, given the public nature of water, IDA support is one of the few options available to the Kyrgyz Republic to extend water access to all in a sustainable and inclusive way. Finally, this project is well aligned with and contributes to the relevant World Bank strategies for the sector and sustainable development more broadly. The project supports activities that touch all three of the Water Global Practice pillars (sustain water resources, deliver water services and build resilience to hydro-climatic shocks) and thus contributes to the World Bank’s vision of constructing “A Water-Secure World for All”.

56. **The project also advances Green, Inclusive and Resilient Development.** The proposed investments are green, as they sustain and restore natural capital (land and water resources), by reducing pollution (sanitation and water quality monitoring), by improving the energy-efficiency and by conserving water resources (modernisation of infrastructure assets). The proposed investments also address resilience, because they: (a) enhance reliability of water infrastructure and related services in the face of climatic extremes (component 1); (b) mainstream climate resilience know-how and planning in the water sector, including by strengthening the information systems and technical capacity required to



prepare for the impacts of climate shocks (component 2). Finally, the project also addresses inclusion, as it focuses on enhancing access to water services for marginalized and underserved rural and peri-urban communities, including in the Batken oblast which is a lagging region.

57. **Role of partners.** The project was prepared under the ongoing SDC-financed NWRMP. SDC has been active in supporting water sector reforms for the past ten years through integrated water resources management. SDC and Swiss State Secretariat for Economic Affairs (SECO) expressed interest to coordinate and contribute to institutional strengthening activities. At this stage, it was agreed that there is no financing gap, however, the situation will be monitored should any opportunities for parallel financing arise during implementation.

F. Lessons Learned and Reflected in the Project Design

58. **The Project design reflects important lessons from World Bank-financed water projects in the Kyrgyz Republic and across the globe.** These include:

59. **Complementary infrastructure, institutional, and information support.** Project design reflects the need for not only supporting the development of infrastructure and related investments, but also for establishing the foundational institutional structures that form the core enablers of water resources management, service delivery and risk management. Supporting institutional development also helps ensure that infrastructure investments are sustainably planned, implemented, operated, and managed for long-term climate resilience and inclusion. The project balances activities focused on improving basic public water services with activities aimed at strengthening institutions. This rationale follows evidence from several projects highlighting the importance of joint action on infrastructure and institution to build the foundations for improved water management⁶¹.

60. **Stakeholder coordination.** The importance of adequate coordination between all stakeholders is a critical factor for success in complex water sector projects involving multiple agencies. In light of this lesson, the project works with and empowers the National Land and Water Council, the body tasked with overseeing and coordinating the implementation of the country's Water Code. By supporting this existing coordination mechanism and by incentivizing project implementing agencies to work within existing institutional structures, the project is expected to strengthen the National Land and Water Council's coordination role and contribute to improved sector coordination. Stakeholder coordination is also critical during project implementation to ensure transparency of decisions made and seek community support. Setting up digital platforms proved to be instrumental to receive feedback from the ground on the project issues during the pandemic or could be effectively used as an additional tool for citizen engagement.

61. **Gradual institutional change, flexibility, and adjustment in implementation.** This project builds on the recent experience and implementation of the ongoing NWRMP and SRWSSD projects. NWRMP and SRWSSD focus on a gradual, stepwise and flexible approach to improve institutional performance and promote change. This project will follow a similar approach, focusing on practical and selected areas for institutional improvement and on empowering existing institutional structures (WRS, DDWSD and MNRETS) and legislation (Water Code) rather than pushing for an overhaul of the country's water sector institutions. Given the complexity of institutional change, building support for reform and capacity through, for example, developing norms for dam management and capacity for water quality monitoring, is the most effective approach. While the SRWSSD project is being implemented by ARIS (Community Development and Investment Agency), a non-governmental agency established by the President's Administration, the component on water

⁶¹ <https://www.worldbank.org/en/topic/water/publication/water-security-diagnostic-initiative#1>



supply and sanitation of this project will be implemented by the DDWSWD to contribute to capacity building for its mandate to improve water supply and sanitation services.

62. **Design and implement irrigation water use interventions with wider context in mind.** The project is designed with consideration of the lessons learned with regards to water management in irrigated agriculture⁶². At the level of the irrigation system, this project promotes technical interventions to improve water delivery, such as rehabilitation of canals. On-farm, the project supports improved agricultural practices (laser land leveling, deep ripping). Overall, these interventions are expected to improve service delivery, giving farmers more reliable supplies, greater control on water applications, and wider cropping options. At the farm level, improved agricultural practices are also expected to lower chemical applications, pollution, and improve drainage and water resource utilization, yielding reductions in GHG emissions and enhancements in soil carbon sequestration. At the basin and national level, the ongoing NWRMP is supporting WRS' capacity in improving irrigation services through piloting volumetric water measurement, asset management and improved operation and maintenance methods. This project builds upon these activities by strengthening the Digital Water Information System (DWIS) with new data on water use and with remote sensing, which will be essential to enhance monitoring and evaluation and identify opportunities for water savings in irrigated agriculture.

63. **To further strengthen ownership and sustainability, it is critical to include water user associations in the design and implementation of irrigation service improvement projects.** Inputs of farmers (i.e., the users) during design and implementation is needed to better understand the constraints (both technical and social) faced by the users. District water management offices (responsible for irrigation bulk water supply) have given special attention to this issue and ensured that the investments incorporate sufficient consultations with WUAs.

64. **Strengthening WUAs requires substantial long-term effort.** This is a long-term process that requires substantial nurturing. First, support units of WUAs with sufficient operational budget are very important in the development of mechanisms for decision-making and to establish legally empowered institutions. Second, sequencing of the support is important. WUA's need to be strengthened and consolidated before they are tasked with managing and maintaining rehabilitated infrastructure. Based on past and ongoing experience, the project will focus on (a) providing training and technical support to WUAs, (b) monitoring their performance through regular site visits and attending meetings, (c) reviewing WUAs performance by conducting (annual) inspection of the books and records maintained by WUAs.

65. **Reduce disparities in access to water supply and sanitation and address cross-sectoral issues related to water supply and sanitation.** Lessons learned from a meta-analysis of World Bank support to water supply and sanitation⁶³ highlight the need to focus on disparities in WSS access, particularly to address lack of water services in small towns and rural areas. Building upon the advances of the SRWSSD project, this project prioritizes expansion of access to WSS for small towns in rural areas and small towns in depressed areas of the Kyrgyz Republic. Furthermore, the project design also considers another key lesson learned from global experience, namely the importance of addressing cross-sectoral issues alongside increasing access to WSS. This lesson is reflected in the project design, which combines investments in WSS with (a) capacity-building to monitor water quality and municipal pollution and (b) adoption of resilient and low-carbon design principles.

⁶² Yu, W., Uhlenbrook, S., von Gnechten, R., van der Blik, J. (2021). Can water productivity improvements save us from global water scarcity? White paper 1. FAO. Rome.

⁶³ Independent Evaluation Group (2017). A Thirst for Change: The World Bank Group's Support for Water Supply and Sanitation, with Focus on the Poor. World Bank, Washington, DC.



III. IMPLEMENTATION ARRANGEMENTS

A. Institutional and Implementation Arrangements

66. **The Ministry of Agriculture through the Water Resource Service and the State Agency for Architecture, Construction and Communal Services (GOSSTROY) through the Department of Drinking Water Supply and Wastewater Disposal (DDWSWD) will share the overall responsibility for project implementation.** Each implementing entity will take the lead on project elements under their respective institutional mandate and capacity. Each implementing entity will be supported through a PIU tasked to carry out the fiduciary function (disbursement, financial management, procurement, environmental and social standards, and monitoring & evaluation). This will be done in compliance with the requirements and environmental and social policies, including occupational, health and safety standards. The PIUs will each develop separate procurement plans and manage the flow of funds on behalf of the Ministry of Agriculture and GOSSTROY. It is envisaged that engineering consultancies will be hired under each PIU to support engineering, construction supervision and quality control.

67. **The project advisory committee will provide strategic guidance, oversight, and coordination.** The committee will be convened once a year by the Secretariat of the Land and Water Council, with the first meeting expected shortly after the project starting date. The committee acts as a forum for (a) reviewing annual work plans prepared by the PIUs, (b) providing relevant technical inputs, especially those at a strategic and policy level or on issues related to the implementation of the Water Code, (c) reviewing progress against performance indicators, and (d) continuing policy dialogue among the involved entities. The advisory committee includes representatives of the Ministry of Agriculture, GOSSTROY, Ministry of Finance and Plenipotentiaries of the Batken, Issyk-Kul, Jalal-Abad and Osh oblasts.

68. **The PIU of the WRS has experience implementing trust-funded projects administered by the World Bank (the ongoing NWRMP and Agricultural Productivity and Nutrition Improvement Project).** The WRS's PIU is adequately staffed, and has established appropriate external audits, funds flow, organization, and staffing arrangements, which are rated *satisfactory*. There are no overdue Interim Financial Reports or audit reports for the projects implemented by the PIU. This PIU has an environmental and social development specialist responsible for all environmental (including Occupational Health and Safety (OHS)) and social issues, such as environmental and social assessment, supervising preparation of site-specific Environmental and Social Impact Assessments (ESIAs)/Environmental and Social Management Plan (ESMPs), monitoring, and reporting. DDWSWD under GOSSTROY also has appropriate controls and procedures; however, it has not been directly involved in implementation of World Bank-financed projects. DDWSWD has experience with projects financed by other international financial institutions. Identification of project fiduciary risks and detailed assessment of fiduciary capacity of DDWSWD and the proposed existing PIU took place during preparation and was deemed adequate.

69. **Subcomponent 2.3 (water and soil quality monitoring) will be implemented by the WRS PIU in close collaboration with the Ministry of Natural Resources, Ecology and Technical Supervision.** The MNRETS was established in October 2021 on the basis of the former State Agency for Environmental Protection and Forestry under the Government, to formulate and implement policy on environmental protection. The MNRETS has a mandate of policymaking, regulation and supervision on environmental protection, climate change, and water policy and administration. It has also become a Secretariat for National Land and Water Council. The MNRETS's Department of Environmental Monitoring (DEM) is responsible for executing policy on environmental monitoring, including surface water and soil quality.



B. Results Monitoring and Evaluation Arrangements

70. **A M&E system will be implemented as part of the project design.** Both PIUs will be responsible for (a) regular monitoring the performance of the project towards achievement of its objective and result indicators; (b) progress reports on civil works and institutional activities and timely identification of bottlenecks; (c) preparation of semi-annual and quarterly progress reports. M&E specialists to be recruited under each PIU will be in charge of data collection, analysis, evaluation and coordination between WRS and DDWSWD. In addition, M&E specialists will prepare monthly reports to track progress of civil works and compliance with environmental and social (E&S) standards and consolidate input from both PIUs. The M&E Framework will be an integral part of the POM. A detailed review of the implementation progress will be conducted at the project's midterm review to assess the progress, potential for scale-up and any adjustments required.

71. **The PIUs will design and set up an appropriate project-level M&E system for enhanced result orientation and better coordination.** The M&E system will record data on contract management, institutional performance, operation and maintenance, and grievances. Methodologies, procedures, data sources, clear roles and responsibilities for data collection and entry will be determined before the M&E system is put into operation. The M&E specialists will be responsible for verification of the accuracy and timeliness of data entry and for training of new staff on the use of the M&E systems.

72. **A key aspect of the results monitoring will be the consumer satisfaction surveys for water services and engagement processes.** Consumer satisfaction surveys will be conducted every year for selected subprojects after the start of the project implementation to assess satisfaction levels and measure attributable outcomes of the project. Surveys for the engagement processes will be conducted every year using various means of communication. Baseline surveys will be conducted in the first year of project implementation after effectiveness. An impact evaluation will be carried out prior to project closing.

73. **Support will be provided to updating existing water information systems upon commissioning of I&D schemes and WSS systems.** The M&E specialists will support integration of updated information on rehabilitated schemes with the Water Information System and ensure update of the information on water infrastructure, performance of service providers in target settlements in SIASAR.

C. Sustainability

74. **The project addresses sustainability at four distinct levels:**

75. **Technical sustainability: targeting and designs.** The choice of target areas was informed by considerations of current and future levels of water demand and water stress under climate change, by consultation with the local and national stakeholders, and in light of the priorities identified under the ongoing NWRMP project. Choice of exact designs for water infrastructure and locations for the WSS investments⁶⁴ will be informed by the World Bank Rating System for Project Resilience and the Resilient Water Infrastructure Design brief⁶⁵, to ensure their adaptability to current and future natural disasters and long-term shifts in climatic conditions. The technical sustainability of irrigation headworks will be ensured through a careful consideration of future flood and mudflow risks to inform the reinforcement of ageing

⁶⁴ While resilience principles will be used to identify the locations of the WSS investments (e.g., location of pumps, wells, conveyance systems), this will not be possible for the irrigation infrastructure investments because the project aims to rehabilitate and modernize existing structures.

⁶⁵ This brief provides a six-step process to help users address weather and climate related challenges (drought, floods and high winds) that are most likely to affect an infrastructure component at some point in its operational lifetime. The brief also includes a sample module/task description for applying the resilient design principles to an engineering design or feasibility study terms of reference.



spillways and emergency structures. To ensure that water infrastructure is adaptive to changing circumstances and long-term shifts in external conditions, the project also directly builds additional institutional capacity to deal with natural disasters and unforeseen events.

76. **Technical analysis: operation and maintenance.** While insufficient allocation of resources for operation and maintenance is a key concern, especially for subcomponent 1.2, the technical analysis reveals a high sustainability readiness. All the on-farm irrigation areas are under the responsibility of Water User Association (WUA). WUAs across the three target schemes report substantial irrigation service recovery collection ratios (72% to 90%). In this context, the project's investments will help improve water delivery to WUAs and are expected to further bolster their collection efficiency. WRS is tasked with operation and maintenance of off-farm infrastructure and the preparation of regular asset management plans.

77. **Institutional Sustainability.** Project preparation has been characterized by close engagement with communities and institutions at all levels, from local rayon and oblast authorities, to staff from WRS and DDWSWD and ministers. This engagement is expected to bolster the project's institutional sustainability and capitalize on already sustainable local and national institutions. All activities are designed to include extensive community consultations and stakeholder participation, notably to inform the infrastructure works. These consultations capitalize on existing community-based mechanisms for water resources management, including water user associations. In the target areas, water user associations successfully manage on-farm water allocations and collection of irrigation service fees (see Annex 1). At the institutional level, project activities explicitly aim to (a) build capacity of the implementing agencies in key areas of organizational performance (contract management, data collection and dissemination and cost recovery mechanisms), (b) build functional communication channels between different agencies involved in different aspects of water management at multiple scales and (c) facilitate implementation of the Water Code and remain closely aligned to the country's water legislation. Activities at the institutional level build upon WRS and DDWSWD existing capacities and expertise in the operation and maintenance of water infrastructure and water service delivery.

78. **Environmental and Social Sustainability.** The project's Environmental and Social plan identifies measures to mitigate the project's environmental and social impacts. Over the long-term, national, and local authorities and implementing agencies will be responsible for the environmentally and socially sustainable operation of water systems and delivery of water services. To further ensure sustainability, components 2 and 3 include activities to build capacity of beneficiary agencies in key areas of water quality, climate resilience and social inclusion.

79. **Financial Sustainability.** Insufficient allocation of resources for operation and maintenance and low-cost recovery are key concerns for projects aiming to improve water services, particularly I&D services. To avoid the vicious cycle of build-neglect-rebuild, the project: (a) involves local authorities in the design and implementation of the interventions to ensure local ownership and involves national-level authorities to ensure continued public funding to support O&M of major water infrastructure (b) strengthens the WRS's technical and financial performance through integration of surface water abstraction data for the irrigated agricultural sector in the DWIS, which will facilitate monitoring and enforcement of efficient water use and digital payments of irrigation service fees; (c) strengthens the know-how and tools available to the WRS and DDWSWD for monitoring performance and service delivery outcomes; (d) reduces the cost related to WSS and irrigation service delivery by promoting energy-efficient and low-carbon pumping systems and by reducing conveyance losses and leakage.



IV. PROJECT APPRAISAL SUMMARY

A. Technical, Economic and Financial Analysis

TECHNICAL ANALYSIS

80. **Technical Analysis: overview.** The project builds on analytical studies and capacity-building activities undertaken as part of the ongoing trust funded project (NWRMP) and past project (Water Management Improvement Project, WMIP). The project design is based on the principles of the national Water Code, IWRM and the World Bank's Water Global Practice approach to water service delivery. In keeping with the principles of IWRM and the Water Code, the Project will be implemented in a participatory and inclusive manner to consider inputs from a diverse range of stakeholders and experts. The project's technical analysis shows high project readiness and emphasizes the project's approach to resilience, as detailed below.

81. **Project readiness.** For infrastructure works under Component 1, readiness is high given that schemes have already been identified and preliminary studies and surveys have been completed; detailed designs will continue from now until the first year of the project. The procurement plan for the activities to be undertaken during the 18 months of project implementation has been agreed. The procurement of civil works, goods and consultancies has been identified. Detailed engineering design and bidding documents will be prepared during the effectiveness period. Given the nature of the civil works (upgrading and rehabilitation of existing infrastructure), it is envisaged that detailed designs will not require multi-year complex technical assessments. For the institutional strengthening activities under Component 2, readiness is high given that these activities largely build upon the institutional and human capacity strengthened under NWRMP. Finally, in terms of environmental and social aspects, project readiness is high. The draft Environmental and Social Framework (ESF) was disclosed by the WRS and DDWSWD on the project website on November 30, 2021, and the updated ESF documents including minutes of public consultations were disclosed on December 24, 2021. The final Environmental and Social Commitment Plan (ESCP) were redisclosed on March 15, 2022. The draft Resettlement Framework (RF) has been prepared by the WRS and DDWSSSD and reviewed by the task team.

82. **Technical analysis: resilience of the project.** The following natural hazards have been identified as potentially harmful to the project: (a) mudflows and flash floods (b) drought and extreme heat, (c) earthquake and high wind. To mitigate mudflow and flash flood risks especially at irrigation headworks and for primary canals, the project promotes upgrading and reinforcement of anti-mudflow structures (outlet conduits and by-passes) and of spillways. This will help increase the resilience of irrigation services to flood and mud-flow risk. Activities to expand WSS will include source protection measures to prevent flash floods and mudflows from contaminating water supplies. To mitigate drought and extreme heat risk on water supply security and on the performance of the planned infrastructure investments, the project improves the overall quality of water infrastructure. For irrigation infrastructure, the project reduces conveyance losses and supports the uptake of improved agricultural practices (land levelling, deep ripping) which are known to reduce drought vulnerability and improve water resource utilization and energy efficiency, leading to reductions in GHG emissions. For WSS infrastructure, the project relies on groundwater supplies whose availability is typically less affected by droughts. To mitigate earthquake and high wind risk, the project will follow guidelines from the Ministry of Emergency Situations.

83. **Technical analysis: resilience through the project.** The introduction of international best-practice for resilient design based on the Water Global Practice standards, improvements to the country's water data platforms (DWIS) and the introduction of risk management approaches for dam management will build system-wide resilience and strengthen disaster risk governance. It is expected that this information and institutions-related outputs will improve the resilience



of future projects and investments to the inevitable shocks arising from climate change and other uncertain drivers of change.

ECONOMIC AND FINANCIAL ANALYSIS

84. **Summary of the economic analysis.** The capital investments under component 1 will enhance rural and agricultural economic productivity through increased access to clean drinking water and sanitation in Issyk-Kul and Batken oblasts as well as will increase efficiency of I&D systems in Batken, Jalal-Abad and Osh oblasts. The overall Economic Internal Rate of Return (EIRR) is calculated at 14.8% and the Economic Net Present Value (ENPV) (with a 6% discount rate) is estimated at around US\$59.5 million. It includes total project costs and all benefits stream accrued from the project activities. Annex 3 presents the detailed economic and financial analysis. Considering the indirect benefits from carbon sequestration, the project is viable with an EIRR Carbon of 19.9% and 21.2% as per lower and higher bound assumptions for the shadow price of carbon, respectively (see Annex 4).

85. **Subcomponent 1.1.** The economic analysis of subcomponent 1.1 considers a range of benefits associated with access to safely managed drinking water supply and sanitation services. These include: (a) reduced time in collecting water (annual benefits of US\$2,332,772 from economic gains of saving time to collect water); (b) reduced need in purchasing drinking water (annual benefits of US\$36,089); (c) reduced coping costs from boiling water (annual benefits of US\$3,922,696 from energy savings related to boiling water); (d) economic savings from leak reduction of US\$379,830 annually; (e) economic savings from energy saving due pump efficiency and leak reduction valued at US\$568,106 per year; (f) reduced waterborne diseases (annual benefits not quantified due to lack of data); (g) other unquantifiable benefits accruing from water supply and sanitation services which are difficult to quantify. The summary economic analysis for subcomponent 1.1. is shown in table 3.

86. **Subcomponent 1.2.** The economic and financial analysis of subcomponent 1.2 aggregates costs and benefits from each of the three irrigation schemes. The cost-benefit analysis for subcomponent 1.2 included the following steps: (a) financial prices were converted into economic values in crop budgets and rehabilitation cost estimates; (b) rehabilitation costs were spread over a projected construction period during Y2-Y5; (c) 12% VAT allowance was excluded from the economic analysis because it does not represent national costs, but simply redistribution among national agents; (d) agricultural returns were calculated by multiplying the scheme crop areas by without- and with-Project crop budgets to arrive at incremental benefits from Project activities; (e) conservative adoption rate of 80% applied on all benefits streams based on the experience of other projects in the country and region; (f) costs and benefits were aggregated over a 25-year period to calculate the EIRR and the ENPV assuming a 6% social discount rate using the following data on the command area of each scheme (see Annex 3).

Table 3. Summary of the economic analysis for Component 1.

Subcomponent 1.1. Water supply and sanitation infrastructure				
Investments in the Batken and Issyk-Kul oblasts		Total economic cost (US\$)	EIRR (%)	ENPV (US\$)
		40.1 million	27%	49 million
Subcomponent 1.2: Irrigation and drainage services improvement				



	Main agricultural crops	Total fin Cost (US\$/ha)	EIRR (%)	ENPV (US\$/ha)
Kara-Unkur (Jalal-Abad oblast)	Cotton, Lucerne, Maize, Melon, Potato, Rice (paddy), Oilseeds, Vegetables and HG, Wheat (winter).	1,094	16%	1,071
Shakhimardan (Batken oblast)	Stone fruits, Perennials, Maize, Melon, Potato, Pome fruits, Oilseeds, Vegetables and HG, Wheat (winter)	2,255	12%	1,112
Kurshab-Sai (Osh oblast)	Cotton, Perennials, Maize, Melon, Potato, Oilseeds, Vegetables and HG, Wheat (winter), Stone fruits	1,656	13%	1,107

B. Fiduciary

(i) Financial Management

87. **The Project will follow standard financial management arrangements.** The WRS and the DDWSWD will be supported through a PIU tasked to carry out the fiduciary function, including disbursement and financial management.

88. **The Borrower will provide annual audited project financial statements to the Bank within six months of the end of each fiscal year and at the closing of the project.** The audit will be conducted by an independent auditor acceptable to the Bank and in line with agreed Terms of Reference. The Borrower will send an unaudited Interim Financial Report (IFRs) combined for all components for each calendar quarter throughout the life of the project. The IFR is due 45 days after the end of each quarter. The PIUs will be responsible for the preparation of the IFRs, as well as annual project financial statements. The format of the IFRs will be agreed between the Government and the Bank. Accounting software, acceptable to the Bank, will be used for project accounting and reporting, including principal financial reports being quarterly IFRs and annual project financial statements.

89. **Internal controls and procedures to be used by the project will be described in the Financial Management Manual, which will include financial management aspects, detail procedures and processes on planning and budgeting, accounting, financial reporting, internal controls, flow of funds and external audit for the project.** It will also describe roles and responsibilities and communication channels and modes between the PIUs and beneficiary state agencies. This will minimize risk of an error, safeguard project’s assets and ensure use of funds for intended purposes. The Bank’s supervision will verify application of the controls and procedures.

90. **A Designated Accounts in foreign currency for administering the project funds will be opened in the acceptable commercial bank for each PIU separately and the PIUs will process the payments in scope of their fiduciary role.** Statement of Expenditures (SOEs) based disbursement will be applied, with advances being the primary disbursement method, but direct payments and reimbursement also allowed.

91. **Overall inherent financial management risk is assessed to be *Moderate* due to the complexity and specifics of the project.** Annex 2 details the mitigation measures to be implemented to reduce this risk.

(ii) Procurement

92. **Procurement activities will be carried out by the PIUs.** The Bank team conducted procurement capacity and risks assessment using the Procurement Risk Assessment and Management System (PRAMS). The review identified several risks related to the procurement policy and institutional arrangements which need to be mitigated.



93. **Summary of Risks and Risk Mitigation Measures.** The Procurement Capacity Assessment Report, covering the risks and risk mitigation plan, has been filed in PRAMS. There are six key issues and risks concerning procurement. (a) State agencies have limited capacity to prepare detailed designs and technical specifications for the defined investments. This increases the risk for accountability of procurement decisions, especially at the local level. (b) Possible delays with procurement: ongoing and completed projects show frequent delays caused by poor planning. (c) Low level of competition in the civil works sector: past experience suggests that the country suffers from limited competition due to low capacity of local contractors. (d) Perceived high level of corruption, as measured by Transparency International. (e) For national bidding, PIUs will follow the public procurement legislation and national procurement procedures, which may increase risks due to the (technical) issues related to the e-Government Procurement (e-GP) system. (f) Inadequate contract management and lower-than-required quality of procured works, goods, and services. Given the findings of the assessments, overall procurement risk under the Project is assessed as high.

94. **To align procurement arrangements with the Bank’s requirements, PIUs will implement the following mitigation measures:** (a) with additional consultants’ support, be responsible for the preparation of technical documents; (b) realistic procurement planning and scheduling, including timely preparation of the technical specifications or terms of references with Bank’s close supervision and monitoring, particularly from the country office; (c) consider analysis for bidder’s capacity in the procurement timeline (early engagement with the market and business outreach will be required); (d) apply the World Bank’s Anti-Corruption Guidelines; (e) register as a Purchaser in state procurement portal; and (f) more emphasis on and training in contract management; regular physical inspections by Bank supervision missions.

95. **The activities under the project will be subject to the World Bank’s new Procurement Framework.** All procurement of contracts will be conducted through the procedures as specified in the World Bank’s Procurement Regulations for IPF Recipients-Procurement in Investment Project Financing Goods, Works, Non-Consulting and Consulting Services, dated November 2020 (Procurement Regulations). The Project will also be subject to the World Bank’s Anti-Corruption Guidelines, dated July 1, 2016. The procurement and contract management processes will be tracked through the Systematic Tracking of Exchange in Procurement (STEP) system. As required by the Procurement Regulations, a Project Procurement Strategy for Development (PPSD) is developed, based on which, two Procurement Plans for each implementing agency are prepared, setting out the selection methods to be followed by the Borrower during the Project implementation in the procurement of goods, works, non-consulting and consulting services financed by the World Bank. Specific procurement procedures to be followed for managing project resources will be documented in the POM. A detailed description of procurement arrangements and a summary Procurement Plan are provided in Annex 2.

C. Legal Operational Policies

	Triggered?
Projects on International Waterways OP 7.50	Yes
Projects in Disputed Areas OP 7.60	No

96. **Projects on International Waterways (OP/BP 7.50).** Operational Policy 7.50 (OP 7.50) of the World Bank, covering projects on international waterways, is applicable to this project because the project finances (i) rehabilitation and improvements to drinking water supply, sanitation, and irrigation systems located within the Syrdarya basin (Batken, Osh and Jalal-Abad oblasts), which is an international waterway (component 1), and (ii) feasibility studies of future investments, some of which might be located in international river basins (component 3). It was determined that this



project falls within the exception provided for in paragraph 7(a) and 7(b) of OP 7.50. The exception to the notification requirement was approved by the Regional Vice President, in accordance with World Bank policy, on February 7, 2022.

97. **Component 1 will not adversely change the quantity or quality of water flows to other riparians.** In terms of water supply and sanitation investments these are expected to have negligible impacts on transboundary waters given the minimal impact of domestic water consumption on overall river basin balance and given that this domestic water uses are already being met through unimproved sources. The project will also promote water conservation measures to minimize municipal water withdrawals. Water conservation will be promoted through improved demand-management measures, i.e., replacement of continuously running communal standpipes, replacement of communal standpipes with household standpipes, and installation of individual meters. In terms of irrigation investments, the project will aim to bring the most important infrastructure of existing irrigation systems back to fully operational condition and allow for improved management of water and reduction in conveyance water losses. No new canals or structures that will allow for an increase in the abstraction and supply of water are going to be constructed, and no development of new irrigation areas will be financed. The project will not involve works or activities that will exceed the capacity of original systems, change their location, or alter or expand their scope and extent to make it appear new or different systems. As shown in the irrigation's schemes water balance of Annex 1, no additional water withdrawals are expected to take place following rehabilitation of the irrigation systems Any potential changes in water quality during the construction works will be mitigated through implementation of the Environmental Management Plan.

98. **For the water sector feasibility study under component 3, the terms of reference for the activities will include an examination of any potential riparian issues.** To conclude, the nature of project activities will not (i) cause appreciable harm to the other riparian states as it will not adversely change the quality or quantity of water flows, and (ii) will not be appreciably harmed by other riparian state's possible water use given the country's upstream geographic position.

D. Environmental and Social

99. **The environmental risk rating is Substantial, and the social risk rating is Substantial. Accordingly, the project overall ESF risk rating is Substantial.** Based on the E&S screening, ESS 1, ESS 2, ESS 3, ESS 4, ESS 5, ESS 6, ESS 8, and ESS10 are deemed relevant to the project activities.

100. **The environmental risks are associated with the construction activities of water boreholes, wells, storage and network, sewerage collection, treatment and disposal, and rehabilitation of the I&D schemes.** The environmental risks and potential adverse impacts associated with project activities are expected to include (i) generation of dust, noise, and vibration due to the construction vehicles and machinery; (ii) improper disposal of construction waste and asbestos-containing materials (ACMs) that could be encountered in the pipes of the old water supply systems if replaced, (iii) operational or accidental spills of fuel and lubricants from the construction machinery; (iv) improper reinstatement of construction sites upon completion of works; (v) management of fecal sludge and septage; (vi) OHS issues, and (vii) disturbance and pollution of natural ecosystem and biodiversity. The main social risks of the project are: (i) land acquisition and involuntary resettlement necessitated due to (a) new construction and/or rehabilitation of water supply and sanitation infrastructure and (b) rehabilitation and modernization of irrigation infrastructure; (ii) social exclusion risk, the interests of vulnerable and disadvantage groups will need to be considered in the project design to ensure that they have equal access to project benefits; and (iii) low institutional capacity to deal with issues of tariffs/fees and permits regulation, planning, and oversight.

101. **The project follows a framework approach as not all investment subprojects have been identified in sufficient detail and site-specific design studies will be completed within the first year of the project.** Accordingly, the WRS and



the DDWSWD have jointly prepared, consulted on, and disclosed the following draft instruments during project preparation: (i) Environmental and Social Management Framework (ESMF); (ii) Labor Management Procedures (LMP); (iii) Resettlement Framework (RF); (iv) Stakeholder Engagement Plan (SEP); and (v) Environmental and Social Commitment Plan (ESCP). These instruments cover the activities to be implemented by the WRS and DDWSWD. The draft instruments will be reviewed by the Association, and approved revised draft will be consulted on, and redisclosed before the Project Effective Date.

102. **Both PIUs will maintain one Environmental Specialist with experience in OHS, one Social Specialist, who will also be responsible for gender-based violence (GBV) as part of the Project implementation team.** Additional staff on short-term or long-term assignment as necessary will be mobilized to manage the E&S risks in accordance with the ESSs and the ESMF institutional assessment/needs will be mobilized.

103. **As the Bank's ESF is new to the two PIUs, a training program to develop and expand professional skills and capacity in ESF issues for staff involved in project implementation will be organized through the two PIUs.**

104. **While the project relies on water resources to deliver improved services, it is not expected to lead to significant increases in water use (ESS3).** Project activities under subcomponent 1.1 are not expected to threaten water resources, given the minimal impact of rural water consumption on overall river basin balance and given that this rural water uses are already being met through unimproved sources. The project will also promote water conservation through improved demand-management measures (i.e., replacement of continuously running communal standpipes, replacement of communal standpipes with household standpipes, and installation of individual meters). Project activities under subcomponent 1.2 will not increase water withdrawals, as shown in the water balance studies carried out for the three irrigation schemes (Annex 1), and as expected given the nature of the civil works.

105. **While the project will not support any civil works on any dam, ESS4 is still relevant as one of the three target irrigation systems relies on an offline reservoir.** The Kara-Unkur irrigation system in the Jalal-Abad oblast relies on the upstream, offline (i.e., located on land outside of a river or waterbody) Bazar-Korgon reservoir (capacity 22.5 million m³ and dam height of 25 meters). In this case, ESS4—Annex 1. Safety of dams will be relevant. The ESMF and ESCP will include relevant actions on dam safety issues. The client will hire 1-2 independent dam safety experts to inspect and evaluate the safety status of the dam, its performance history and O&M procedures. Under subcomponent 2.4, the project supports dam management, institutional strengthening, establishing of a dam management unit, and the evaluation of the safety status and O&M plans of existing dams, including this one.

106. **The Borrower's Environmental and Social Commitment Plan specifies the main responsibilities and actions to be undertaken by the PIUs to ensure project compliance with the Bank's ESS.** These include: (a) apply the ESMF and RF to all project activities, including preparation of site specific ESIA/ESMPs and Resettlement Action Plans where needed; (b) report on the environmental and social performance of all activities every six months; (c) ensure transparency in responding to environmental, social actions and ensuring all ESIA and/or ESMPs are disclosed and publicly consulted with stakeholders; (d) maintain PIUs' capacity and staffing through the whole period of project implementation to ensure project activities, ESIA and ESMP supervision and monitoring; (e) prepare and adhere to the Environment, Social, Health and Safety Code of Conduct by contractors; and (f) implementing and reporting on SEP and LMP; and (g) update, adopt, maintain and operate a grievance redress mechanism (GRM).

107. **The project needs to address security risks by conducting a security assessment and ensuring safety measures for the local communities and project workers as appropriate.** This project will also conduct a security assessment based on findings of the assessment report prepared for the Second Regional Economic Development Project (RED-2). Based



on the results of the Security Assessment, the need for preparation of the Security Management Plan will be decided. The commitment to preparing the Security Management Plan once the project activities are identified and prior to financing is included in the ESCP.

Gender, Citizen Engagement and Climate Change

108. **Gender.** Past surveys indicated that some 80% of those tasked with collecting household water (for example, for drinking/bathing/washing) were women. Time spent for this activity is significant, due to long distances to the nearest water sources (for example, standposts or canals). The project will improve access to water supply through house connections and can then reduce the burden of collecting water on women and girls. Construction of improved female-friendly sanitation facilities in rural schools and health centers will be supported by nation-wide communications as well as WASH education (including Menstrual Hygiene Management (MHM)) and promotion activities at local level targeted at teachers, students, health care workers and village health committees under Component 2. The project will integrate lessons and good practices from ongoing projects, the design and implementation of awareness-raising campaigns will include a central role for women's groups to ensure they will benefit equally from project outcomes. The project is expected to eliminate disproportional time-use burden on women in project areas, contribute to girls' learning environment and reduce health risks for women related to poor MHM.

109. **The project will increase women's voice and decision making in WUA bodies.** Women's participation in decision-making, especially at the local level, is limited as traditional decision-making mechanisms in rural areas, in particular in southern regions, tend to involve men with the exclusion of women and youth. The rapid assessment indicates that the share of women in WUA bodies in the country is low (8%) and even less in southern regions (7%⁶⁶), which is mainly due to persistence of gender stereotypes, low level of education and skills in IWRM and other technical sciences, low access to information and capacity development⁶⁷. For example, only 8 women (2%) in the country in leadership positions and there are no women elected as directors of WUAs in 25 target WUAs in the project areas. Given the recent trends, whereby traditional gender norms are gaining strength at the community level, a target of 12% would demonstrate significant progress in reducing the gender gap in decision-making. Under Component 2, the project will raise awareness in the communities about women's knowledge and critical roles in the management of water resources and to stress the importance and benefit of women's voice and decision-making in the community organizations. Trainings will be specifically targeted to women to build their confidence and encourage active involvement in the work of WUA bodies. Trainings could cover water scheduling, operation and maintenance of irrigation on-farm infrastructure/equipment, calculation of irrigation service fees as well as leadership, negotiations and communication skills to increase technical and leadership skills of female farmers. The project will support election of women to WUA bodies in leadership positions, including WUA councils and conflict resolution committees, through trainings and peer exchanges. The project will promote high representation of women in general assembly meetings through targeted outreach (via messengers, outreach by village activists, schools or other places of women gatherings) and convening WUA assembly meetings at times and location that facilitate women's participation (given that women are often constrained in time and mobility due to their need to balance productive and reproductive roles). In capacity building activities under the project, female participation will be prioritized since on average only 7% of training participants are women. For example, demonstration activities will need to consider land plots of female farmers on a priority basis. The needs assessment will be carried out during the first year of the project implementation and will help to finetune the proposed trainings and recommend additional capacity building activities to be tailored to the women's needs and other interventions and pre-requisites to improve gender diversity in the WUAs. The Result Framework includes an indicator "the share of decision-making

⁶⁶ Batken, Jalal-Abad and Osh regions

⁶⁷ Practical Outlook on Gender Issues in the Water Resources Sector (2020). http://cakn.online/wp-content/uploads/collection_eng.pdf.



positions in WUA decision-making bodies held by women (%)” that will track progress in closing the above-mentioned gender gap.

110. **The project will also promote gender equality in the workplace in water sector entities (urban utilities, rural service providers and water management organizations).** A recent rapid assessment showed that while the share of women in the WRS head office is relatively equal, the share of women in the oblast/rayon level departments is on average 20%, ranging from 3% in Kadamjai rayon water administration to 37% in Issyk-Kul oblast water administration. Women are even less represented in technical (14%) or managerial (11%) positions in irrigation institutions. The assessment indicated that the share of women in the DDWSWD and urban WSS utilities range from 13% in Osh’s WSS utility to 34% in Bishkek’s WSS utility (overall, women comprise 25% of staff, 32% of staff in technical positions, and only 15% in managerial positions in WSS institutions). Factors such as sociocultural stereotypes in the male-dominated sector; female staff’s lower access to technical and managerial training opportunities in water institutions (which undermines their promotion prospects and professional growth), and women’s and girls’ lower enrollment in STEM fields⁶⁸ and likelihood of pursuing technical careers explain the gender gaps in entry, retention, and advancement in WSS/irrigation sector employment. For example, preliminary data from four institutions surveyed in the rapid assessment finds that women comprise on average only 12% of staff that participate in technical trainings. Furthermore, HR policies and processes are often gender blind and do not actively support equal employment opportunities for women and men. Under component 3, the project will develop a gender enhancement plan to promote gender equality in the workplace that will include, among others: review and update of human resources policies in WRS, DDWSWD, utilities, water management administrations, implementation of a professional development program. The professional development program will take into account female staff’s training needs and be implemented in a way to facilitate their participation.⁶⁹ The Project will also support a more detailed assessment of the work environment (using Equal Aqua tools)⁷⁰ to obtain the most recent and comprehensive data on female employment, including in recruitment, promotion, and retention (for example, the distribution of female and male employees in various types of jobs). The assessment will further examine the range of barriers to women’s employment, particularly in technical positions and recommend actions for promoting gender diversity in the water sector.

111. **Citizen Engagement.** Citizen engagement mechanisms are an integral part of the project to enable effective and inclusive two-way interactions at all stages of the project. Project design and implementation will follow a participatory approach in decision-making and project monitoring to empower citizens to provide feedback and suggestions on the project design, project implementation (for example, construction, compliance with E&S standards, connections to WSS systems, quality of service delivery in completed subprojects, tariffs). A detailed assessment will be carried out at the start of the project to ensure that the needs of vulnerable households⁷¹ are considered in all project activities. Citizen engagement will include: (a) participatory planning and monitoring of the design and implementation of irrigation service improvements through the water users’ associations to better understand users’ constraints; (b) setting up a digital platform for the project that will enable real-time community participatory monitoring and reporting on the actions taken; (c) organizing regular community meetings/consultations and focus group discussions with involvement of service providers and implementing entities who will inform the actions taken and where actions taken based on the results of

⁶⁸ UN Women (2019). *Rural girls in Kyrgyzstan learn coding as a step toward a future in STEM*.

⁶⁹ For example, targeted outreach to female staff to encourage them to apply to training programs and organizing the trainings at times and locations that would facilitate female staff’s participation (since women are often time constrained due to their multiple responsibility including domestic and productive roles).

⁷⁰ Equal Aqua is a platform that promotes inclusive water institutions and offers guidelines, tools, and solutions to promoting gender equality in the workplace in water institutions: <https://www.worldbank.org/en/topic/water/brief/inclusive-water-institutions-platform>.

⁷¹ Such as low-income households, physically impaired people, elderly people living alone with low-income families, families with single parents with children.



previous surveys and of the participatory planning and monitoring will be disseminated and discussed, (d) establishing a functional grievance redress mechanism fully integrated into project, and (e) implementing annual consumer satisfaction surveys in each subproject to monitor (i) access to project information and awareness of decisions taken, (ii) beneficiaries' satisfaction with opportunities to provide feedback and take part in the dialogue; and (iii) satisfaction with the responsiveness of implementing entities to the feedback provided. Citizen engagement will also be geared to raise awareness of climate-friendly consumption and adaptation practices, in terms of domestic water use, and irrigation practices, to ensure water conservation in agriculture and efficient on-farm practices. Two citizen engagement indicators – effectiveness of the engagement process and client satisfaction – are incorporated as part of the Results Framework. A grievance redress mechanism to record and address citizens' complaints related to implementation will be established.

112. **Climate adaptation co-benefits.** The project areas are exposed to high climatic risks (droughts, high temperatures and extreme heat, floods, including urban floods and mudflows). The project is *explicitly designed to foster climate adaptation against these climate risks* and reduce their impact on people's well-being, livelihoods, and the rural economy. A summary of the project's adaptation co-benefits according to the Joint MDB Methodology for Tracking Climate Finance is provided in Table 2. Subcomponent 1.1 supports adaptation of water supply and sanitation services to drought and flood shocks through efficiency improvements, protection/diversification of water supply sources and enhanced collection and treatment of excess sewerage and urban runoff. The introduction of metering and incentive programs to conserve water will promote water use (and energy) efficiency improvements and reduction in water losses in WSS systems, thus increasing the available volume of water for targeted communities, which will help them better withstand climate-related shocks to water supply such as droughts/water shortages and heat waves. Subcomponent 1.2 supports adaptation of irrigation water services and the broader irrigated agricultural sector to drought, warming temperature, and long-term reduction in precipitation. It does so through improvements in water conveyance efficiency and other irrigation structures which allow for improved control of water delivery to farms and through promotion of climate-smart practices on-farm (deep-ripping, laser land levelling) which are expected to reduce water use and crop water stress and reduce soil erosion. Under component 1, the project finances modernization using resilient design principles based on World Bank guidelines⁷² to ensure that each infrastructure asset is robust to climate change and capable of maintaining the desired performance across a range of climate conditions and minimize service disruptions in the face of floods and droughts (see section IV). Institutional strengthening activities under component 2 are also explicitly designed to reduce vulnerability to climate risks through activities that build the ability and capacity of national and local institutions to plan for and respond to these risks, as detailed in Table 2.

113. **Climate mitigation co-benefits.** The project aims to reduce GHG emissions associated with WSS and I&D services. For subcomponent 1.1, the project climate mitigation co-benefits accrue from: (a) the reduction in nonrevenue water, (b) improvement in energy efficiency and improvement of collection and treatment of wastewater and (c) avoided usage of fuel to boil and transport drinking water by trucks. With such emphasis on green development the sub-component will result in reducing total CO₂eq emissions by 73.7% (from 3,549 to 933 tons/year) N₂O by 57.6% (from 331 to 141 of CO₂eq tons/year), CH₄ by 55.9% (from 1210 to 533 of CO₂eq tons/year) as well as reduction in water abstraction by 2.374 million cubic meters per year (29.41%, from 8,071,391 to 5,697,452 m³/year). More details on co-benefits are presented in tables A3.1 and A3.2. For subcomponent 1.2, the project has climate change mitigation co-benefits through (i) rehabilitation and upgrade of the three gravity fed irrigation schemes that minimize dependence on groundwater abstractions that rely on GHG emitting diesel pumps and that reduce surface water abstraction by 31% (from 554 to 383 million m³/year, see water balance in Annex 1) and (ii) promotion of climate-smart agriculture at the farm level that enhances soil carbon sequestration and fertility. This modernization is expected to further strengthen the role of irrigated areas as GHG sinks. Annex 4 estimates that the net carbon savings over a period of 25 years are 320,512tCO₂-eq

⁷² World Bank (2020). Resilient Water Infrastructure Design Brief. World Bank, Washington, DC.



(approximately 12,820 tCO₂-eq/year), a further 20% increase in the GHG carbon sequestration efficiency of the irrigated areas.

V. GRIEVANCE REDRESS SERVICES

114. **Communities and individuals who believe that they are adversely affected by a World Bank (WB) supported project may submit complaints to existing project-level grievance redress mechanisms or the WB's Grievance Redress Service (GRS).** The GRS ensures that complaints received are promptly reviewed in order to address project-related concerns. Project affected communities and individuals may submit their complaint to the WB's independent Inspection Panel which determines whether harm occurred, or could occur, as a result of WB non-compliance with its policies and procedures. Complaints may be submitted at any time after concerns have been brought directly to the WB's attention, and Bank Management has been given an opportunity to respond. For information on how to submit complaints to the World Bank's corporate Grievance Redress Service (GRS), please visit <http://www.worldbank.org/en/projects-operations/products-and-services/grievance-redress-service>. For information on how to submit complaints to the World Bank Inspection Panel, please visit www.inspectionpanel.org.

VI. KEY RISKS

115. **The residual risk rating for the project is *Moderate* in view of the following risks and mitigation measures.** The Bank and the implementing agencies are both cognizant of the risks and will include elements into the project design for mitigation, building upon experience of ongoing and previous projects and incorporating lessons learned into the project design and implementation. With sufficient support from the Government and the Bank during implementation, potential risks can be identified and resolved. The substantial risks to successful project implementation are fiduciary, environmental, social. All other risks are moderate.

116. **The residual Fiduciary risk is rated *Substantial*.** Prevalent issues relate to weak procurement and contract management capacity. The project will be implemented through two PIUs, one within WRS and one within DDWSWD, the latter implementing for the first time a World Bank project. Risk mitigation measures will include: (i) strengthening procurement capacity of the implementing entities (including tender committee members) and particularly for preparation of technical specifications and efficiency of managing procurement processes; (ii) clear definition of decision-making processes, accountability and integrity standards for procurement decisions (to be described in the POM); (iii) setting up an efficient contract management mechanism and regular capacity building of the project staff on contract management; and (iv) close supervision by the Bank.

117. **The residual Political and Governance risk is rated *Substantial*.** The Kyrgyz parliamentary elections were held on November 28, 2021 and expected changes of Government structures may have an impact on the Project implementation. To mitigate this risk, the preparation phase included several meetings and briefings with the relevant stakeholders of the government at different levels and agreement on the Project design was reached. This practice will continue as part of the parliamentary ratification process with the members of the Parliament once the Project is approved by the Board. To ensure proper coordination within the Government, the Project Advisory Committee and including members from all relevant Ministries and regional representatives, will ensure coordination at a higher level.

118. **The environmental risk rating is *Substantial*, and the social risk rating is *Substantial* for an overall ESF risk rating of *Substantial*.** The main social and environmental risks and mitigation measures will revolve around the activities of Component 1. The project's environmental risk rating is based on risks potentially arising from infrastructure rehabilitation including wastewater treatment, and risks related to possible pollution of water and soil. The risks will be



mitigated through adequate capacity-building activities for the project staff and the staff of the service provider, thorough environmental assessments, adequate environmental management mechanism within the PIU, and regular monitoring of the quality of water and soil in risk areas.



VII. RESULTS FRAMEWORK AND MONITORING

Results Framework

COUNTRY: Kyrgyz Republic

Climate Resilient Water Services Project

Project Development Objectives(s)

The project development objective is to (i) increase access to climate-resilient water services in selected river basins, and (ii) strengthen institutional capacities for climate-resilient water management at the local and national levels.

Project Development Objective Indicators

Indicator Name	PBC	Baseline	Intermediate Targets						End Target
			1	2	3	4	5	6	
Increased access to climate resilient water services in selected basins									
People provided with access to safely managed water supply services (Number)		0.00	0.00	0.00	2,000.00	15,000.00	40,000.00	65,000.00	95,000.00
Out of which female (Percentage)		0.00	0.00	0.00	49.00	49.00	49.00	49.00	49.00
People provided with access to safely managed sanitation services (Number)		0.00	0.00	0.00	0.00	9,000.00	21,000.00	33,000.00	43,000.00



Indicator Name	PBC	Baseline	Intermediate Targets						End Target
			1	2	3	4	5	6	
Out of which female (Percentage)		0.00	0.00	0.00	0.00	49.00	49.00	49.00	49.00
Farmers provided with improved irrigation and drainage services (Number)		0.00	0.00	0.00	2,000.00	5,000.00	8,400.00	11,700.00	16,800.00
Out of which female (Percentage)		0.00	0.00	0.00	5.00	5.00	5.00	5.00	5.00
Area provided with new/improved irrigation or drainage services (CRI, Hectare(Ha))		0.00	0.00	0.00	0.00	5,600.00	11,200.00	19,600.00	28,000.00
Area provided with improved irrigation or drainage services (CRI, Hectare(Ha))		0.00	0.00	0.00	0.00	5,600.00	11,200.00	19,600.00	28,000.00
Strengthened institutional capacities for climate resilient water management									
National Program for climate resilient water services developed and aligned with National Water Resources Strategy 2040 (Yes/No)		No	No	No	No	No	Yes	Yes	Yes
Reduction in the specific energy consumption of water supply delivery (Percentage)		0.00	0.00	0.00	5.00	10.00	15.00	20.00	30.00



Intermediate Results Indicators by Components

Indicator Name	PBC	Baseline	Intermediate Targets						End Target
			1	2	3	4	5	6	
Infrastructure Investments and Service Improvements									
Water supply systems rehabilitated with climate-resilient design standards (Number)		0.00	0.00	0.00	2.00	7.00	17.00	27.00	37.00
Continuity of water supply in participating water utilities (Hours)		4.00	4.00	4.00	6.00	8.00	12.00	16.00	20.00
Wastewater treatment facilities constructed (Number)		0.00	0.00	0.00	0.00	0.00	1.00	2.00	3.00
Wastewater collection and treatment capacity (Cubic meters/year)		0.00	0.00	0.00	0.00	500,000.00	1,000,000.00	1,500,000.00	1,500,000.00
Social institutions with functional safely managed drinking water supply and/or sanitation facilities (Number)		0.00	0.00	0.00	4.00	15.00	35.00	70.00	93.00
Water meters installed (Number)		0.00	0.00	0.00	400.00	3,000.00	8,000.00	13,000.00	19,000.00
WSS service providers benefitting from improved institutional capacity for improved service delivery (Number)		0.00	0.00	0.00	2.00	7.00	15.00	22.00	30.00
Irrigation and drainage schemes rehabilitated with climate-resilient design standards		0.00	0.00	1.00	1.00	1.00	1.00	2.00	3.00



Indicator Name	PBC	Baseline	Intermediate Targets						End Target
			1	2	3	4	5	6	
(Number)									
Institutional Strengthening for Service Delivery, Water Resources Management and Dam Management									
Digital Water Information System and Monitoring Strengthened (Yes/No)	No	No	No	No	Yes	Yes	Yes	Yes	Yes
State of the Sector Annual Reports prepared and publicly disclosed (Yes/No)	No	No	No	No	Yes	Yes	Yes	Yes	Yes
Operational Water User Associations strengthened (Number)	0.00	0.00	0.00	0.00	2.00	5.00	10.00	15.00	21.00
Management of dams improved (Yes/No)	No	No	No	No	Yes	Yes	Yes	Yes	Yes
WSS Sector-wide monitoring and benchmarking system established and operational (Yes/No)	No	No	No	No	No	No	Yes	Yes	Yes
Development of WSS medium-term investment plan (Yes/No)	No	No	No	No	No	No	Yes	Yes	Yes
Development of pro-poor tariff setting procedures, modelling and institutionalization (Yes/No)	No	No	No	No	No	No	Yes	Yes	Yes
Improved billing and collection efficiency (Percentage)	30.00	30.00	50.00	60.00	70.00	80.00	90.00	90.00	90.00
Operation cost ratio	0.00	0.00	0.00	0.60	0.70	0.80	0.90	0.90	1.00



Indicator Name	PBC	Baseline	Intermediate Targets						End Target
			1	2	3	4	5	6	
improved (Number)									
Development of energy efficiency improvement plan for priority utilities (Yes/No)	No	No	No	No	Yes	Yes	Yes	Yes	Yes
Share of decision-making positions in WUA decision-making bodies held by women (Percentage)	7.00	7.00	7.00	7.00	7.00	7.00	8.00	10.00	12.00
Project Management, M&E and Professional Development									
Customer satisfaction with the quality of water supply services (percentage of customers) (Text)	tbd				40.00	50.00	60.00	70.00	70.00
Share of water users satisfied with WUA managerial and operational performance (Percentage)	0.00	0.00	20.00	20.00	40.00	60.00	70.00	90.00	
Share of beneficiaries who report that the project has established effective engagement processes (Percentage)	0.00	0.00	50.00	75.00	75.00	75.00	75.00	75.00	75.00
Of which female (Percentage)	0.00	0.00	50.00	75.00	75.00	75.00	75.00	75.00	75.00
Communication and citizen engagement strategy developed and adopted (Yes/No)	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes



Monitoring & Evaluation Plan: PDO Indicators

Indicator Name	Definition/Description	Frequency	Datasource	Methodology for Data Collection	Responsibility for Data Collection
People provided with access to safely managed water supply services	The indicator for SDG 6.1, safely managed drinking water services is defined as use of an improved drinking water source which is accessible on premises, available when needed and free from contamination (compliant drinking water quality as per national norms).	Semi-annual	PIU progress reports	The number of people provided with access to improved water sources will be calculated based on the number of customers provided by service providers multiplied by the average family size.	PIU
Out of which female	The indicator provides supplemental information on the percentage of women benefiting from increased access to safely managed water services.	Semi-annual	PIU progress reports, local self-governments , service providers	Based on the information from local self-governments and service providers	PIU
People provided with access to safely managed sanitation services	The indicator for SDG 6.2, safely managed sanitation services, is defined as households that use an improved, not shared sanitation facility where	Semi-annual	PIU progress reports, local self-governments , service providers	The information will be compiled by the PIU with inputs from service providers and local self-governments.	PIU



	excreta are disposed in situ or transported and treated offsite as per national effluent norms.				
Out of which female	The indicator provides supplemental information on the percentage of women benefiting from increased access to safely managed sanitation services.	Semi-annual	PIU progress reports, local self-governments , service providers	The information will be compiled by the PIU with inputs from service providers and local self-governments	PIU
Farmers provided with improved irrigation and drainage services	This indicator measures the cumulative number of farmers (WUA members) that benefit from improved irrigation and drainage services as a result of the project interventions.	Semi-annual	WRS, WUA support units, PIU progress reports	The information will be calculated based on the number of WUA members that are provided with improved irrigation services from the selected scheme.	PIU
Out of which female	This indicator measures the percentage of female farmers (WUA members) who benefit from improved irrigation and drainage services as a result of project interventions.	Semi-annual	WRS, WUA support units, PIU	The information will be compiled on the female heads of WUAs that benefit from improved irrigation and drainage services in the selected scheme.	PIU
Area provided with new/improved irrigation or drainage services	This indicator measures the total area of land provided with irrigation and drainage services under the project,	Semi-annual	Remote sensing data, ground truth data,	Data will be compiled by PIU based on the progress of advancement of civil	PIU



	including in (i) the area provided with new irrigation and drainage services, and (ii) the area provided with improved irrigation and drainage services, expressed in hectare (ha).		impact evaluation surveys	works and data of WUA support units	
Area provided with improved irrigation or drainage services	Measures in hectares the total area of land provided with new or improved irrigation or drainage services in operations supported by the World Bank.	Semi-annual	Remote sensing data, ground truth data, impact evaluation surveys	Data will be compiled by PIU based on the progress of advancement of civil works and data of WUA support units	PIU
National Program for climate resilient water services developed and aligned with National Water Resources Strategy 2040	This indicator measures the presence of a national program focused on the resilience of water supply/sanitation and irrigation infrastructure.	Annual	PIU progress report	Independent audit of the national program before project	PIU
Reduction in the specific energy consumption of water supply delivery	Specific energy consumption is defined as the ratio of total energy consumed by water supply in kWh to the volume of the water supply delivered measured in cubic meters. This indicator calculates the percentage reduction in specific energy consumption, which is expected to take place because of strengthened	Annual	PIU progress report and system surveys	Data will be compiled by PIU based on regular surveys of energy consumption of water supply systems.	PIU



	<p>institutional capacity to deliver climate-resilient water services. Therefore this indicator reflects the level of institutional capacity strengthening: to be achieved, it requires improved operational, design and planning capacity in energy efficiency, energy alternatives (renewables), leakage reduction and water metering.</p>				
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Monitoring & Evaluation Plan: Intermediate Results Indicators

Indicator Name	Definition/Description	Frequency	Datasource	Methodology for Data Collection	Responsibility for Data Collection
Water supply systems rehabilitated with climate-resilient design standards	This indicator measures the number of water supply systems rehabilitated with climate-resilient design standards.	Semi-annual	PIU progress reports	PIU progress reports on completed detailed designs and works	PIU
Continuity of water supply in participating water utilities	This indicator measures the continuity of water supply services delivered in the target areas expressed in hours per day.	Annual	PIU progress reports and reports from service providers	Data will be compiled by the PIU based on surveys and reports from the participating water utilities	PIU



Wastewater treatment facilities constructed	The indicators measures the progress in construction of wastewater treatment facilities in selected target areas.	Annual	PIU progress reports	Data will be compiled by PIU based on the progress of advancement of civil works.	PIU
Wastewater collection and treatment capacity	This indicator measures the volume of wastewater appropriately collected, treated and disposed in cubic meters per year.	Annual	PIU progress reports, service providers	The information will be compiled by the PIU with inputs from the service providers.	PIU
Social institutions with functional safely managed drinking water supply and/or sanitation facilities	This indicator measures the number of social institutions in the target areas that have functional water supply or sanitation facilities and are provided with safely managed water supply and/or sanitation services. Social institutions include schools, kindergartens, health centers, and hospitals.	Semi-annual	PIU progress reports	Data will be compiled by PIU based on the progress of advancement of civil works and annual reviews of the functionality of the facilities.	PIU
Water meters installed	This indicator measures the cumulative number of consumer water meters installed in the project areas.	Semi-annual	PIU, service providers	This information will be compiled by PIU with inputs from service providers.	PIU
WSS service providers benefitting from improved institutional capacity for improved service delivery	This indicator measures the number of service providers in target project areas that have improved capacity	Annual	Service providers and PIU	The information will be compiled by the PIU with inputs from service providers.	PIU



	<p>under the project and meet at least 3 out of the following criteria: (i) have a signed contract with the asset owner (local self-government); (ii) have a signed contract with laboratories in charge of water quality monitoring; (iii) have an approved tariff determined in line with the tariff setting methodologies; (iv) have reported (at least once a year) to the customers and asset owner on achievement of key performance indicators (KPIs) in a transparent manner through public meetings, citizen engagement platforms or other channels; and/or (v) have developed performance improvement plans (reduced Non-Revenue Water, use of meter readings for billing) in consultation with the customers and are implementing measures included in the plan.</p>				
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Irrigation and drainage schemes rehabilitated with climate-resilient design standards	This indicator measures the number of irrigation and drainage schemes rehabilitated with climate-resilient design standards taking into account communities' feedback.	Semi-annual	PIU progress reports	PIU progress reports on completed detailed designs and works	PIU
Digital Water Information System and Monitoring Strengthened	This indicator measures whether the project has strengthened institutional capacities for water information management and monitoring. The following criteria are used to measure progress: (i) Digital Water Information System contains at least oblast-level data on water use and abstraction licenses, water quality, dams (ii) Digital Water Information System has improved visualization and dissemination functionalities (iii) water and soil quality monitoring laboratories in target areas are equipped and functioning according to international standard (ISO17025) (iv) a country-wide water and soil quality monitoring plan is	Annual	Independent reviews and audits, PIU progress reports	Independent auditing methodologies, PIU progress reports	PIU



	developed.				
State of the Sector Annual Reports prepared and publicly disclosed	"State of the Sector Annual Report" means an annual analytical report to be prepared for the water sector by the end of each calendar year, providing comprehensive analysis of the sector performance reflecting data from the information systems.	Annual	PIU progress reports	State of the Sector Annual Report publicly disclosed	PIU
Operational Water User Associations strengthened	The indicator measures the number of WUAs that have strengthened their capacity for service delivery and meet the following criteria: (i) WUA has a signed contract with service provider and WUA members; (ii) at least 70% of the irrigation service fee amount collected as percentage of planned amount; (iii) WUA prepared annual maintenance plan and budget that is approved by WUA assembly; (iv) at least 20% of total actual expenditures of WUA account for maintenance expenditures; and (v) WUA	Annual	Satisfaction surveys of samples of farmers, key informant interviews with WUA representatives	Independent audits of Water User Associations	PIU



	members are trained under the project.				
Management of dams improved	This indicator measures the progress in establishment of: (i) the Dam management Unit in the Water Resource Service that will be in charge of regular dam inspections, review of dam management procedures and guidelines, enforcement of and compliance with these procedures and guidelines (ii) guidelines for dam management plans and (iii) applying these guidelines to four dams in the target areas.	Annual	PIU progress reports, WRS	Data will be provided by the Water Resource Service Agency	PIU
WSS Sector-wide monitoring and benchmarking system established and operational	This indicator measures the progress in establishment and operationalization of a sector-wide monitoring and benchmarking system of water supply and sanitation to measure sector performance and sustainability and progress towards the sustainable development goals for water supply and sanitation. "Established" means the system is developed and	Annual	PIU progress reports. Information from DDWSWD and system users	PIU will compile information on the presence of the system, availability of guiding documents for management and operation of the system, and functionality of the system based on the results of the pilot.	PIU



	populated with baseline data. "Operational" means the system is used to monitor the sector performance, inform investment planning and decision-making in the sector.				
Development of WSS medium-term investment plan	This indicator measures the progress in development of the WSS medium-term investment plan.	Annual	DDWSWD	PIU progress reports with inputs from DDWSWD	PIU
Development of pro-poor tariff setting procedures, modelling and institutionalization	This indicator measures the progress in development and institutionalization of pro-poor tariff setting procedures and modelling.	Annual	PIU progress reports	PIU	PIU
Improved billing and collection efficiency	This indicator measures the ratio of collected amount to the billed amount.	Annual	PIU progress reports	The information will be compiled by PIU with inputs from service providers.	PIU
Operation cost ratio improved	This indicator measures the ratio of total revenue to the total operating cost.	Annual	Monitoring and reporting by service providers	The information will be compiled by PIU with inputs from service providers	PIU
Development of energy efficiency improvement plan for priority utilities	This indicator measures the progress in development of energy efficiency improvement plans for	Annual	PIU progress reports, service providers	The information will be compiled by PIU with inputs from service providers.	PIU



	priority utilities.				
Share of decision-making positions in WUA decision-making bodies held by women	The indicator measures the percentage of decision-making positions held by women in WUA decision-making bodies (administrations, councils, dispute resolution committees) in the project areas.	Annual	WRS, WUA support units, WUAs	The data will be compiled by the PIU with inputs from WRS WUA specialist, WUA support units and WUAs.	PIU
Customer satisfaction with the quality of water supply services (percentage of customers)	This indicator measures overall customer satisfaction with the water system expressed in percentage. It is based on expressed opinions on factors such as satisfaction with quantity and quality of water received, taste and color, and continued use of alternative sources.	Annual	Satisfaction surveys	Satisfaction surveys will be held annual for all ongoing subprojects (at least twice for each subproject).	PIU
Share of water users satisfied with WUA managerial and operational performance	This indicator measures the water user satisfaction related to irrigation water services in target areas as measured by: (i) frequency of meetings of WUA assembly; (ii) annual budget prepared and approved by WUA assembly; (iii) irrigation service fee	Annual	PIU progress reports	The information will be compiled by the PIU based on the data from Oblast and Rayon WUA Support Units.	PIU



	approved; (iv) annual water distribution plan and scheduled prepared and approved by WUA assembly; and (v) annual maintenance plan and budget prepared and approved by WUA assembly.				
Share of beneficiaries who report that the project has established effective engagement processes	Citizen engagement indicator that measures progress on three core elements: (i) satisfaction with access to information about the project, (ii) with opportunities/channels for feedback and dialogue, and (iii) satisfaction with responses received to feedback. Engagement mechanisms include community consultations, online survey complemented by local snapshots, public hearings, roundtables, accessibility of the GRM, and outreach through Public Water Management Council and village meetings.	Annual	Satisfaction surveys	Satisfaction surveys will be held annual for all ongoing subprojects (at least twice for each subproject). The value will be calculated as the average value of three elements.	PIU
Of which female	This indicator monitors if female beneficiaries are satisfied with the projects	Annual	Satisfaction surveys	Share of women (out of all female respondents) who report satisfaction	PIU



	engagement processes as described in the parent indicator			with established engagement process.	
Communication and citizen engagement strategy developed and adopted	This indicator measures if a communication and engagement strategy has been developed and adopted.	Annual	WRS and DDWSWD	PIU progress reports with inputs from WRS and DDWSWD	PIU



ANNEX 1: Detailed Project Description

COUNTRY: Kyrgyz Republic Climate Resilient Water Services Project

- 1. The project development objective is to (i) increase access to climate-resilient water services in selected basins, and (ii) strengthen institutional capacities for climate-resilient water management at the local and national levels.**
- 2. Infrastructure investments target the KSA and Issyk-Kul basins, which are facing heightened water-related challenges.** The KSA basin⁷³ is the only basin in the Kyrgyz Republic containing areas facing extremely high-water stress conditions, where total water withdrawals are more than 80% of the available renewable freshwater supply⁷⁴. Because of climate variability and change and the poor condition of on-farm irrigation infrastructure, irrigators in the KSA basin face water scarcity, particularly during the summer months from June to August⁷⁵. This lack of water often leads to disputes and conflicts in communities, especially among irrigators⁷⁶. Improved reliability of water supply in these areas may help diffuse social tensions and stabilize agricultural incomes in the face of climate change, while improving soil fertility and carbon sequestration potential. The share of the population with access to sewerage in the KSA basin extremely low (below 9%), as such service only is available in parts of some of the major towns. Residents not connected to a central/communal sewerage system depend on on-site sanitation facilities (i.e., pit latrines and septic tanks). The existing sewerage infrastructure, built in the 1960s and 1970s, is in poor condition and needs rehabilitation or replacement. Untreated wastewater is discharging into disposal fields which increases the risk of the community's exposure to contaminated groundwater and surface water. The KSA basin includes the Batken oblast, which has recently received a high priority status for development due to tensions with Tajikistan.
- 3. The Issyk-Kul basin is the second river basin targeted under the project because of its strategic importance to the Kyrgyz Republic.** The basin faces high water stress conditions and, more importantly, it contains the Issyk-Kul Lake: the second largest mountain-lake in the world, UNESCO Biosphere Reserve and a primary attraction at the center of the country's tourism industry⁷⁷. This significant socio-economic and environmental value calls for prudent river basin management to avoid overuse and pollution of water resources flowing into the lake and to adapt to the impacts of climate change, including potential higher glacial meltwater and evaporation rates. The existing sewerage services are extremely limited with only a small share (less than one town in four) having access to the centralized sewerage system while treatment facilities are absent or obsolete, thus increasing the risk of lake pollution. Rapid development of tourism infrastructure, particularly along the northern lakeshore, puts pressures on the lake through increasing wastewater loads, water jets, illegal fishing, and solid waste dumping.
- 4. While the project operates at multiple, nested scales, all interventions are guided by the vision to advance climate change adaptation and mitigation in the water sector.** This vision is informed by (a) relevant higher-level objectives, (b) existing river basin plans, and (c) global principles for climate resilient and low-carbon water sector

⁷³ The KSA basin is located on the territory of three administrative oblasts: Jalal-Abad (partially), Osh and Batken.

⁷⁴ Based on analysis of WRI Water Risk Atlas data, where extremely high water stress is defined as a condition where irrigated agriculture, industries and municipalities withdraw more than 80% of the available renewable freshwater supply on average every year available from: <https://www.wri.org/applications/aqueduct/water-risk-atlas>

⁷⁵ For a review of conflict over irrigation water in the KSA basin, see: ACTED and USAID. 2013. Conflicts on Irrigation Water in the South of the Kyrgyz Republic. Report. Available from: <https://www.usaid.gov/sites/default/files/documents/1861/COMTACA%20Irrigation%20Water%20Conflict%20Sources%20Report-%20English.pdf>

⁷⁶ *ibid.*

⁷⁷ OECD EAP Task Force. 2013b. Improving the Use of Economic Instruments for Water Resources Management in Kyrgyzstan: the Case of Lake Issyk-Kul Basin.



interventions. Relevant higher-level objectives are described in Section C. The river basin plans for the two target areas were developed under NWRMP and provide a framework to identify water-related challenges and required investments⁷⁸. Both plans call for the inclusion of climate change considerations in the pursuit of the identified investment priorities. Finally, the vision is also informed by global principles for climate resilient and low-carbon water sector interventions. These include the productive use of wastewater, water-use and energy efficiency measures, and measures to increase adaptive capacity and rural and urban populations to climatic shocks through improved water services. These principles are integrated in the infrastructure investments supported by the project, but also in the institutional strengthening activities aimed at equipping water sector institutions with the knowledge and tools required to confront and manage the impacts of climate change on water services.

PROJECT COMPONENTS

COMPONENT 1: INFRASTRUCTURE INVESTMENTS AND SERVICE IMPROVEMENTS (US\$90 MILLION)

SUBCOMPONENT 1.1: WATER SUPPLY AND SANITATION INFRASTRUCTURE (US\$ 45 MILLION)

5. **This subcomponent covers investments to improve access to drinking water supply and sanitation services, and to enhance wastewater treatment capacity. (US\$45 million).** The subcomponent finances civil and electrical/mechanical installations for water supply production (boreholes, well-fields, intakes, as well as disinfection and energy efficient/renewable energy pumping as required), works for transmission and distribution of water to households in the project areas, along with wastewater management infrastructure, sewerage collection, conveyance, treatment, and disposal facilities. The subcomponent will also finance equipment for drinking water quality and water supply and wastewater pipes testing. These investments help small-town utilities and rural service providers to adapt to the anticipated impacts of climate change, diversify their water supply sources to better confront droughts and reduce their overall water consumption through efficiency improvements. This subcomponent will benefit (a) 95,000 people in 31 villages around Issyk-Kul lake and Batken oblast with climate resilient drinking water services; (b) 43,000 people with climate resilient sanitation services in three villages around Issyk-Kul lake through either sewers or on-site solutions. Improving sewerage and stormwater services will reduce the volume of untreated wastewater discharged into water bodies, as well as exposure to waterborne pathogens and related diseases. The project will also support reconstruction of WASH facilities in selected schools, kindergartens, rural health centers in the project areas to ensure that they are female-friendly and disability inclusive.

6. **The subcomponent** will finance (i) rehabilitation of three water supply and wastewater systems in three settlements in Issyk-Kul oblast, including Kyzyl-Suu, Bokonbaevo, and Kadji-Sai (three wastewater treatment plants with a capacity ranging from 1,700 to 2,500 m³/d); (ii) rehabilitation of 21 existing water supply systems in 19 rural settlements with house/yard connections in Batken oblast (over 140 km of transmission mains); (iii) the upgrading and modernization (e.g., protection of supply source) of existing village water supply schemes in 12 rural settlements with house/yard connections in Batken oblast; (iv) around 31 bulk meters and 19,000 individual meters for household connections. Scaling up of metering associated with volumetric water use charges will ultimately increase resilience to climate change through efficient water use; (v) rehabilitation of female-friendly WASH facilities in 93 social institutions (29 rural health centers, 36 schools, 28 kindergartens) in all target settlements; and (vi) required engineering studies, detailed engineering design and design review, construction supervision and site specific environmental and social assessments and plans for the aforementioned investments. The design of WASH facilities will respond to women's needs (privacy, MHM facilities) and

⁷⁸ State Water Resources Agency (2020). Plan for elaboration, use and protection of water resources of the Karadarya-Syrdarya-Amudarya River Basin (KSAb). Bishkek; State Water Resources Agency. 2018. Basin plan for development, use and protection of Issyk-Kul Tarim water resources. Bishkek.



be accessible for people with disabilities. The list of the proposed priority villages which will benefit directly from the project and the cost of investment is illustrated in Table A1.2.

Table A1.2. List of Participating Villages, Estimated Investment Cost.

No	Aiyl Aimak	Village	Population	Estimated Cost, US\$ million	Average Cost per Capita, US\$
Batken region, Leilek rayon					
1	Katran	Jany-Turmush (Baul)	2,300	0.5	217
2		Katran	6,906	1.4	203
3	Kulundu	Bulak-Bashy	1,800	0.4	222
4	Toguz-Bulak	Sabyrov (50 years of Kyrgyzstan)	810	0.3	370
5		Aibike (Madaniyat)	3,400	1	294
6	Margun	Margun	3,564	1	281
Sub-Total 1		6 villages	18,780	4.6	245
Batken region, Batken rayon					
7	Dara	Chek	5,500	3.2	370
8		Jany-Jer	3,158		
9		Kayindy	1,011	0.3	297
10		Kan	619	0.3	258
11		Sary-Talaa	544		
12	Suu-Bashy	Apkan	1,245	0.4	321
13		Boz-Adyr	3,357	0.5	149
14		Aigul-Tash	222	0.4	1,801
15	Kara-Bulak	Kara-Bulak	3,725	1.2	322
16	Tort-Gul	Ak-Otok	401	2	254
17		Ak-Turpak	1,272		
18		Zar-Tash	915		
19		Chon-Gara	3,472		
20		Chon-Talaa	1,800		
Sub-Total 2		14 villages	27,241	8.3	305
Batken region, Kadamjai district					
21	Ak-Turpak	Otukchu	634	2	551
22		Kyzyl-Korgon	1,012		
23		Tokoi	276		
24		Chogorok	277		
25		Ak-Turpak	698		
26		Kalacha	345		
27		Chon-Kara	390		
28	Sovetskoe	Sovetskoe	2,200	1.5	682
Sub-Total 3		8 villages	5,832	3.5	600
Total – Batken region		28 villages	51,853	16.4	316
Issyk-Kul region, Jety-Oguz district					
29	Kyzyl-Suu	Kyzyl-Suu	18,476	10.3	557
Sub-Total 4		1 village	18,476	10.3	557
Issyk-Kul region, Ton district					
30	Kun-Chygysh	Bokonbaevo	20,557	8.8	428
31	Ton	Kadji-Sai	4,527	3.8	839
Sub-Total 5		2 villages	25,084	12.6	502
Total – Issyk-Kul region		3 villages	43,560	22.9	526
Grand Total		31 villages	95,143	39.3	412

SUBCOMPONENT 1.2: IRRIGATION AND DRAINAGE SERVICES IMPROVEMENT (US\$ 45 MILLION)

7. **The three irrigation schemes (Kara-Unkur in Jalal-Abad, Shakhimardan in Batken and Kurshab-Sai in Osh) cover an area of 28,000 ha and are managed by 21 Water User Associations (WUAs).** The project finances rehabilitation and modernization of I&D systems at off-farm and on-farm levels, covering two headworks, main canals (234 km in total) and single structures (589 in total). The following structures will be rehabilitated across the three irrigation schemes: water control/distribution; outlets; mudflows, tunnels, small bridges, and volumetric measurement structures. Under this subcomponent, the project finances the required engineering design and design review, construction supervision and site specific environmental and social assessments and plans for the investments.

8. **The project finances modernization based the World Bank’s Resilient Water Infrastructure Design Brief to ensure that each structure is rehabilitated and modernized to minimize service disruptions in the face of climate and other disasters.** At the farm level, the project will promote climate-smart irrigation practices and resource utilization through on-farm water management, deep ripping and laser levelling. A summary and estimated cost is provided in Table A1.3. Tables A1.4, A1.5 and A1.6 present the water balance for each irrigation system.

Table A1.3. Civil works for improvements of irrigation and drainage service delivery.

Irrigation Scheme	Average 5yrs irrigated area	Actual/design capacities main canal	Canals	Structures	Headworks
	ha	m3/s	km	no	no
Kurshab-sai	15,400	14/20	108	168	1
Kara Ungur	8,225	15/18	96	321	0
Shakimardan	4,435	6/8	30	100	1
Total	28,060		234	589	2

Note: structures include: water control/distribution; outlets; mudflows, tunnels, small bridges and volumetric measurement structures.

Table A1.4. Water balance of the Kara-Ungur-Sai Irrigation Scheme.

	Baseline		After Project implementation		2050 Climate Change scenario		Comment
Runoff of Kara-Ungur-Sai river with 75% of water intake at the section of the headworks	716	mcm/yr	716	mcm/yr	608	mcm/yr	Reduced flow rate due to Climate change @15% reduction rate
Irrigation Water requirement for Pravaya Vetka (12576 ha)	176	mcm/yr	122	mcm/yr	146	mcm/yr	Increased conveyance efficiency from 52% to 76% (currently under implementation with a different project)
Irrigation Water Requirement for Levaya Vetka (8,225 ha)	143	mcm/yr	99	mcm/yr	119	mcm/yr	Increased conveyance efficiency from 52% to 76% after project implementation



Crop ET in Pravaya Vetka	65	mcm/yr	65	mcm/yr	78	mcm/yr	20% PET increase by 2050 due to climate change
Crop ET in Levaya Vetka	53	mcm/yr	53	mcm/yr	63	mcm/yr	20% PET increase by 2050 due to climate change
Available water for downstream	396	mcm/yr	495	mcm/yr	344	mcm/yr	Total available river flow minus the irrigation demand

Table A1.5. Water balance of Kurshab-Sai Irrigation Scheme.

	Baseline		After Project implementation		2050 Climate Change scenario		Comment
Runoff of Kurshab-Sai river with 75% of water intake at the section of the headworks	585	mcm/yr	585	mcm/yr	497	mcm/yr	Reduced flow rate due to Climate change @15% reduction rate
Irrigation Water requirement for Kochkor Ata Canal (4827 ha)	71	mcm/yr	49	mcm/yr	59	mcm/yr	Increased conveyance efficiency from 52% to 76% after project implementation
Irrigation Water Requirement for Otuz-Aydar (15403 ha)	238	mcm/yr	164	mcm/yr	197	mcm/yr	Increased conveyance efficiency from 52% to 76% after project implementation
Crop ET in Kochkor Ata	26	mcm/year	26	mcm/year	31	mcm/year	20% PET increase by 2050 due to climate change
Crop ET in Otuz-Aydar	87	mcm/yr	87	mcm/yr	105	mcm/yr	20% PET increase by 2050 due to climate change
Available water for downstream	276	mcm/yr	372	mcm/yr	241	mcm/yr	Total available river flow minus the irrigation demand

Table A.1.6. Water balance of the Shakhimardan Irrigation Scheme.

	Baseline		After Project implementation		2050 Climate Change scenario		Comment
Runoff of Shakhimardan river with 75% of water intake at the section of the headworks	314	mcm/yr	314	mcm/yr	267	mcm/yr	Reduced flow rate due to Climate change @15% reduction rate
Allocated water	157	mcm/yr	157	mcm/yr	134	mcm/yr	Reduced flow rate due to Climate change @15% reduction rate
Irrigation Water Requirement (4435 ha)	69	mcm/yr	48	mcm/yr	57	mcm/yr	Increased conveyance efficiency from 52% to 76% after project implementation
Crop ET in Shakhimardan	25	mcm/yr	25	mcm/yr	30	mcm/yr	20% PET increase by 2050 due to climate change
Available water for downstream	88	mcm/yr	109	mcm/yr	76	mcm/yr	Total available river flow minus the irrigation demand

9. **All individual farmers and other water users using water for irrigation within the service area of a WUA are members.** The WUAs pay a bulk water supply charge to the District Water Management Organization (DWMOs) and collect an Irrigation Service Fee (ISF) among the water users to operate and maintain the on-farm irrigation infrastructure. The ISF rate is decided during the Annual General Assembly of WUA by the WUA members. WUA activities include: (a) preparation of annual water use plan for WUA; (b) ensuring reliable water supply to water users; (c) O&M, repair, and restoration of WUA’s canal and drainage networks, including organizing collective maintenance with individual farmers and household labor; (d) maintaining recordings of canal operations, measurement and recording from irrigation supply; and (e) collecting irrigation service fees from water users.



10. **The lower-level canals in the target irrigation schemes are managed by a total of 21 WUAs.** In all three irrigation schemes, WUA revenue arises from an irrigation service fee collected from farmers, with rates depending on location and typically defined on a per ha basis. Across the three schemes, ISF rates range from about KGS 715 to KGS 961 per ha to cover the cost of bulk water delivery from the WRS, maintenance and WUA staff costs and overheads. WRS bears most of the O&M costs in the headworks, primary and secondary canals.

11. **WUAs across the three target schemes report moderately high ISF collection ratios.** Overall collection ratios range from 72% to 90%, according to data collected as part of NWRMP. This suggests that WUAs are largely functioning and effective. In this context, the capital investments provided under this project to modernize and rehabilitate main canals managed by WRS will help improved water delivery to WUAs⁷⁹ and are expected to further bolster their collection efficiency.

COMPONENT 2. INSTITUTIONAL STRENGTHENING FOR CLIMATE RESILIENT SERVICE DELIVERY, WATER RESOURCES MANAGEMENT AND DAM MANAGEMENT (US\$ 7 MILLION)

SUBCOMPONENT 2.1. INSTITUTIONAL STRENGTHENING FOR WATER SUPPLY AND SANITATION SERVICE DELIVERY (US\$1.5 MILLION)

12. **This subcomponent will finance activities (goods and services) at the project area and national level designed to strengthen policy and regulatory frameworks and institutional capacity to advance sector reform and promote sustainable service delivery.** The interventions will target key stakeholders, including DDWSWD, GOSSTROY, local governments, urban and rural service providers, service sector policy makers and regulators. Subcomponent 2.1 has been structured around the Government's sector development strategy and reform roadmap and is informed by previous analytical and advisory services.

13. **Support for water supply and sewerage sector reforms will finance expert advisory services and technical assistance targeting priority areas of reform and institutional strengthening.** Technical assistance incorporates considerations on climate change variability and related impacts, strengthening institutional capacity to identify and design resilient water supply and sanitation systems. A more effective institutional and regulatory framework will enhance water sector governance, operational efficiency, and sustainability, thereby enhancing the provision (in terms of coverage and quality) of water services. This will in turn reduce the risk of water shortages/droughts, improve the quality of water, and enhance overall resilience. Focus areas for technical assistance will include: (a) development and/or support of a national sector monitoring and benchmarking system for tracking and analyzing performance of water service providers; (b) support for the development of pro-poor tariff setting procedures, modelling and institutionalization to enable tangible service improvements and operational sustainability; (c) development of a National Water Supply and Sanitation Development and Investment program 2027-2040⁸⁰ aligned with the National Water Strategy 2040⁸¹; (d) development of fecal sludge management plan and feasibility for selected areas; (e) development of energy efficiency improvement plan for priority utilities; (f) carrying out national-level communications, citizen engagement and public awareness strategies and tools to improve social and gender inclusion and effectiveness of reform actions; (g) knowledge exchange and support to DDWSWD for improved sector coordination including support for preparation of State of the Sector Annual Reports; (h) preparation of a pilot performance based contract for one urban

⁷⁹ Verheijen, O. (2016). Performance Assessment of 72 Water Users' Associations, prepared by NWRMP for the World Bank.

⁸⁰ Such program can form the basis for a future Program for Results Operation.

⁸¹ Under preparation under the NWRMP.

utility to emphasize the importance of accountability, incentive and transparency in services delivery; and (i) capacity building for water utility financial management, accounting and reporting.

SUBCOMPONENT 2.2. INSTITUTIONAL STRENGTHENING FOR IRRIGATION WATER SERVICES DELIVERY (US\$ 2.0 MILLION)

14. **This subcomponent finances equipment and services to expand the Digital Water Information System (DWIS).** The DWIS currently includes 5 database applications: water quantity, irrigation water use, hydrological monitoring structures, national water use and water user associations. The DWIS also comprises two online web mapping services, with over 100+ spatial layers & 40+ thematic maps. Finally, the DWIS also acts as a knowledge repository, and it currently contains 701 scanned documents and maps, including 38 raster maps which have been converted from existing hardcopy versions.

15. **While the DWIS is currently operational, its functionality and capability need to be further strengthened.** The following areas for expansion of the DWIS were identified during the NWRMP⁸² and will be pursued under this project. First, integrate geospatial data, including remote sensing imagery and already existing geospatial layers. This will build on ongoing World Bank analytical work⁸³ on remote sensing for agricultural water use and productivity monitoring. Second, integrate data on water use and abstraction permits in irrigation. Finally, this subcomponent will also finance equipment and services to further build the user interface and data visualization aspects of the DWIS. This latter activity will help disseminating data and information nationwide, allowing water users to access information from their computers and devices. Table A1.8 summarizes current DWIS functionalities and advances planned under this project. This subcomponent supports climate adaptation because the integration of surface abstraction data and remote sensing in the DWIS and expansion of DWIS data visualization functionality increase WRS's ability to control and monitor water use during drought. In addition, WUAs training in climate-smart agriculture helps farmers adapt to water stress.

Table A1.8. Current DWIS functionalities and advances planned under the project.

DWIS functionality	Current	Planned under the project
Water use and abstraction permits	Not included	Water use and abstraction permits by major irrigation schemes included and updated
Dams data	Not included	Inventory of dams included in DWIS and dam monitoring enabled (subcomponent 2.4)
Remote sensing	Not included	Integration of remote sensing information on water use and productivity for water accounting and drought risk management
Water and soil quality data	Included manually	Real-time through apps linked with water and soil quality testing facilities (subcomponent 2.3)
Data dissemination and analytics	Online web-mapping services	Dashboards Expanded online web-mapping services

16. **Under this subcomponent, the project will also support WUAs.** This includes trainings and support for asset management and operating budget planning. This subcomponent will also support the promotion of online payment of ISFs to WUAs and assess the need for the creation of a digital database on landownership in order to have an overview

⁸² Computer Assisted Development (CADI) (2019). Department of Water Resources and Land Improvement. National Water Resources Management Project – Recommendations. Unpublished document.

⁸³ Strengthening Irrigation Management and Reforms in Central Asia (P173250).



of the total irrigable area. Finally, this subcomponent will assess the potential to install automated discharge measurement devices at head off- and on-farm canal systems. The project will support, among others, capacity building of female farmers on water scheduling, calculation of irrigation service fee, leadership, negotiations, and communication skills to build their confidence and encourage participation in WUA decision-making bodies. Also, the project will enhance technical skills of women on advanced irrigation technologies prioritizing their participation in the trainings.

SUBCOMPONENT 2. 3: WATER AND SOIL QUALITY MONITORING (US\$ 2.5 MILLION)

17. **Subcomponent 2.3: Water and soil quality monitoring system (US\$2.5 million).** This subcomponent finances goods, works and services to strengthen the country's soil and surface water quality monitoring system. More specifically, it invests to improve water and soil quality data collection, storage, and processing to help water sector institutions better prepare and respond to the impacts of climate extremes (floods and droughts) on soil and water quality. It includes two main activities. First, the improvement/establishment of biochemical laboratories at central level in Bishkek and in the three oblasts of the KSA basin (Osh, Jalal-Abad, and Batken) and capacity building of relevant specialists in the State Ecological Laboratory under the DEM. This activity finances repair of existing laboratory buildings, provision of equipment, support in accreditation of laboratories, and the upgrade of IT systems in the Department of Environmental Monitoring. Second, this subcomponent finances institutional strengthening of the DEM to (i) improve staff capacity in chemical surface water and soil quality monitoring techniques, including data collection and analysis, and (ii) develop a country-wide water and soil quality monitoring plan.

18. **DEM has been established under the MNRETS and is included into its organizational structure.** The DEM has the legal capacity of a legal entity. Staff of DEM are civil servants. The DEM Director is appointed by the Chairman of Cabinet of Ministers based on proposal of the Minister of Natural Resources, Ecology and Technical Supervision. The DEM has a Sector of Surface Water and Wastewater.

19. **The overall goal of the DEM is to execute a unified policy in environmental monitoring over pollution.** The functions of the DEM include: (a) policy implementation on environmental monitoring; (b) regulatory functions; (c) service provision. Environmental monitoring includes: (i) environmental pollution monitoring; (ii) inspection of entities; (iii) assessment and analysis of environmental pollution; (iv) formation of governmental database on the impact of economic entities on the environment, analysis of data and information sharing; and (v) participation in development of legislation.

20. **The Work Plan of the DEM for 2022-2024 includes monitoring and capacity-building activities.** Activities include monitoring of transboundary rivers and their tributaries: Kara-Darya, Sumsar, Kyzyl-Suu, Chu and Talas, Issyk-Kul lakeshore areas at the end of the tourist season, rivers, and lakes in Protected Areas, as well as large water reservoirs. Other activities include measurements and calibration of environmental monitoring equipment, capacity building of staff, laboratory services to public and private entities. Currently, only Central Environmental Laboratory (CEL) in Bishkek (12 staff) and Issyk-Kul Laboratory (5 staff) operate. DEM also plans to upgrade its IT systems to facilitate linkages with existing water databases.

21. **The CEL has not been accredited under ISO17025 and ISO 17020 standards in the last 5 years because the office facilities and equipment are not meeting relevant requirements.** Due to the critical need to expand water quality and soil quality monitoring, the MNRETS has initiated and included budget for covering 5 staff for the branch laboratory in Osh and 4 staff in Jalal-Abad. The office building of laboratories in Osh and Jalal-Abad that used to function during Soviet times, are available and may need minor repairs, equipment, as well as capacity building of laboratory staff to meet requirements for accreditation. The current equipment needs of the DEM to enable proper monitoring of surface water and soil (salinization), have the following purposes: identification of nitrates, phosphates, sodium, potassium; volumetric



analysis of chlorides, calcium, magnesium; BOD5 in wastewater; heavy metals; pesticides; cyanides; pH; gamma-rays; water transparency.

SUBCOMPONENT 2.4. DAM MANAGEMENT (US\$ 1.0 MILLION)

22. **This subcomponent finances services and equipment to advance dam management in the country.** In particular, it supports activities to: (a) establish a dam management unit within WRS, tasked with providing oversight on dam management across the country; (b) formulate guidelines for the elaboration of dam management plans; (c) develop dam management plans for four dams located in the KSA basin (Papan, Naiman, Tortgul and Bazar-Korgon); and (d) develop a dam information module within the Digital Water Information System, including introduction of remote monitoring tools such as drone applications and remote sensing. Activities under this subcomponent will increase the resilience of dams – and their related services including low-carbon hydropower production – to flood and drought shocks.

23. **This subcomponent aims to strengthen the capacities and institutional framework for WRS staff and operators that have oversight of dam management, to identify and address any issues.** This subcomponent supports climate adaptation because dam management involves, by definition, management of climatic risks (floods and droughts), and therefore the expected improvements will help institutions better plan for and respond to these risks. This subcomponent will support various activities to modernize institutions and information for dam management.

24. **Establishing the foundations for dam management is a first major focus of activities under this subcomponent.** This includes establishing a dam management unit within WRS, tasked with providing oversight and overall guidance on dam management across the country. This will require creating and staffing a dam management unit within WRS and a panel of three experts, with one international expert as per Water Code requirements. The dam management unit will act as a conduit for organizing national knowledge on dam management, for attracting international experiences and know-how and for collaborating with international organizations (such as International Commission on Large Dams, ICOLD).

25. **A second group of activities focuses on creating guidelines for dam management plans and applying them to dams in the target areas.** These activities finance services and equipment to develop dam management guidelines based on international best practice and building upon existing World Bank approaches, including ‘Extending the Life of Reservoir Sustainable Sediment Management for Dams and Run-of-River Hydropower’. This activity will put in place systems to improve the develop and implement dam management plans, including the identification of financing needs for dam management. Building upon the dam management guidelines, the subcomponent finances the development of dam management plans for four dams located in the KSA basin (Papan, Naiman, Tortgul and Bazar-Korgon).

26. **A third group of activities focuses on integrating information on dam management into the existing DWIS.** To further capture the potential of the DWIS, this subcomponent will develop a dam management information module within the Digital Water Information System and finance the adoption of equipment to implement innovations in remote monitoring of dams, such as drones and remote sensing.



COMPONENT 3. PROJECT MANAGEMENT, M&E AND PROFESSIONAL DEVELOPMENT (US\$3 MILLION)

27. **This component will finance the required staff, consultant services, professional development and operating costs that will allow the Project Implementation Units to carry out its responsibilities for Project implementation and promote gender equality.** These responsibilities include Project management and coordination, procurement and financial management, Project monitoring and evaluation, social and environmental standards management and oversight, and strategic Project communications and outreach. First, it includes a subcomponent for project management (US\$ 1.4 million) that supports project management-related activities of the PIUs, including project audits, training, standards and fiduciary management, inclusive beneficiary satisfaction surveys, managing a beneficiary feedback mechanism, including a grievance redress mechanism. Second, it includes professional development and other interventions to promote gender diversity in water sector entities. For example, the project will support, among others, review of human resources policies on recruitment, promotion and retention in water sector entities, development of guidelines for a safe and comfortable work environment including sexual harassment reporting mechanism. Finally, this component supports development of feasibility studies and environmental and social impact assessments for future investments in water supply and sanitation. For the water sector feasibility study under this subcomponent, the terms of reference for the activities will include an examination of any potential riparian issues.

COMPONENT 4. CONTINGENT EMERGENCY RESPONSE COMPONENT (US\$0)

28. **This component is designed to support the Government’s emergency response in the event of an eligible emergency.** A provisional zero-amount component is included, which will allow for rapid reallocation of credit/loan proceeds from other components during an emergency under streamlined procurement and disbursement procedures. This component allows the Government to request the World Bank to recategorize and reallocate financing from other project components to cover emergency response and recovery costs. The CERC will be established and managed in accordance with the provisions of the World Bank Policy and World Bank Directive on Investment Project Financing. The CERC, if activated, will be able to finance eligible activities included in the positive list, stipulated in the Project Operations Manual (POM) (dedicated CERC annex). Emergencies could include pandemics, floods, droughts, and landslides.

PROJECT COST AND FINANCING

29. **The total project cost is US\$100 million.** Site-specific designs will follow World Bank Water Global Practice guidelines on Resilient Water Infrastructure Design⁸⁴. A breakdown of costs per Component is presented in Table A1.9 below.

Table A1.9. Summary of Project Costs, Financing allocations and responsible entity.

Project Components	Cost (US\$, million)	IDA Credit Financing (US\$, million)	IDA Credit % of Total	IDA Grant Financing (US\$, million)	IDA Grant % of Total	Responsible entity
Component 1: Infrastructure Investments and Service Improvements	90	50	56%	40	44%	
Subcomponent 1.1: Water supply and sanitation infrastructure	45	25	56%	20	44%	DDWSWD
Subcomponent 1.2: Irrigation and drainage services improvement	45	25	56%	20	44%	WRS

⁸⁴ Resilient Water Infrastructure Design Brief (English). Washington, D.C.: World Bank Group.



Component 2: Institutional Strengthening for Climate Resilient Service Delivery, Water Resources Management and Dam Management	7	0	0%	7	100%	DDWSWD & WRS
Subcomponent 2.1. Institutional strengthening for WSS service delivery	1.5	0	0%	1.5	100%	DDWSWD
Subcomponent 2.2. Institutional strengthening for irrigation services delivery	2	0	0%	2	100%	WRS
Subcomponent 2.3. Water and soil quality monitoring	2.5	0	0%	2.5	100%	WRS
Subcomponent 2.4. Dam management	1	0	0%	1	100%	WRS
Component 3: Project Management, M&E and Professional Development	3	0	0%	3	100%	
Component 4: Contingent Emergency Response Component	0	0	0%	0	100%	Ministry of Finance
Total	100	50	50%	50	50%	



ANNEX 2: Implementation Arrangements and Support Plan

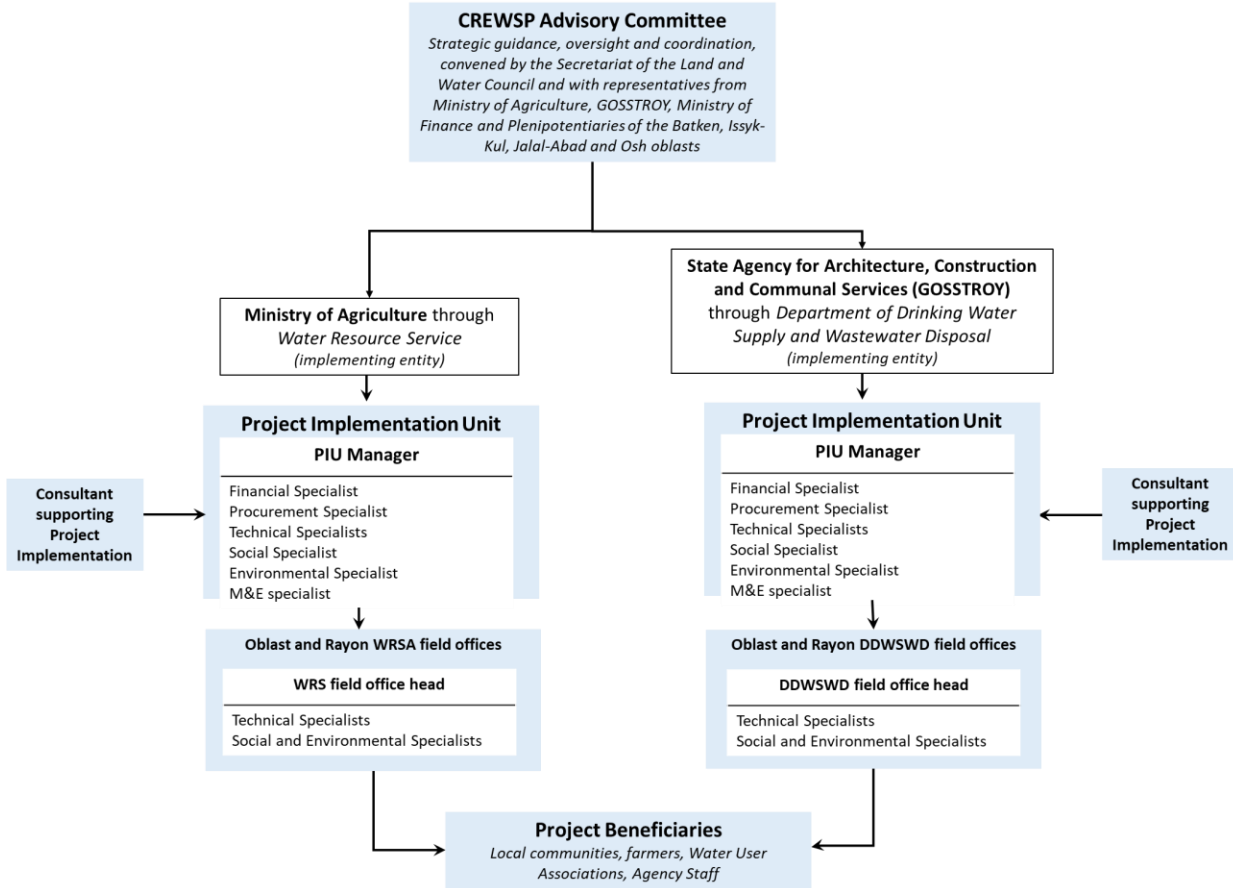
COUNTRY: Kyrgyz Republic Climate Resilient Water Services Project

- 1. The Ministry of Agriculture through the Water Resource Service and the State Agency for Architecture, Construction and Communal Services (GOSSTROY) through the Department of Drinking Water Supply and Wastewater Disposal (DDWSWD) will share the overall responsibility for project implementation.** Each implementing entity will take the lead on project elements under their respective institutional mandate and capacity. Each implementing entity will be supported through a PIU tasked to carry out the fiduciary function (disbursement, financial management, procurement, environmental/social standards, and monitoring & evaluation). This will be done in compliance with the requirements and environmental and social policies, including occupational, health and safety standards. The PIUs will each develop separate procurement plans and manage the flow of funds on behalf of the Ministry of Agriculture and GOSSTROY. It is envisaged that engineering consultancies will be hired under each PIU to support engineering, construction supervision and quality control.
- 2. The project advisory committee will provide strategic guidance, oversight, and coordination.** The committee will be convened once a year by the Secretariat of the National Land and Water Council, with the first meeting expected shortly after the project starting date. The committee acts as a forum for (a) reviewing annual work plans prepared by the PIUs, (b) providing relevant technical inputs, especially those at a strategic and policy level or on issues related to the implementation of the Water Code, (c) reviewing progress against performance indicators, and (d) continuing policy dialogue among the involved entities. The advisory committee includes representatives of the Ministry of Agriculture, GOSSTROY, Ministry of Finance and Plenipotentiaries of the Batken, Issyk-Kul, Jalal-Abad and Osh oblasts (Figure A2.1).
- 3. Project Operations Manual.** Project implementation will be guided by a POM, developed by the two PIUs and approved by the World Bank. The POM will include details on institutional and implementation responsibilities, technical aspects of all components and activities, guidance on M&E of project results and outcomes, environmental and social risk mitigation measures, disbursements and financial management (FM) aspects, applicable procurement rules and plans, and project supervision and reporting provisions.
- 4. The PIU of the WRS has experience implementing trust-funded projects administered by the World Bank.** The WRS's PIU is adequately staffed, and has established appropriate external audits, funds flow, organization, and staffing arrangements. This PIU has an environmental and social development specialist responsible for all environmental (including OHS) and social issues, such as environmental and social assessment, supervising preparation of site-specific ESIA/ESMPs, monitoring, and reporting. DDWSWD under GOSSTROY also has appropriate controls and procedures; however, it has not been directly involved in implementation of World Bank-financed projects. DDWSWD has experience with projects financed by other international financial institutions. Identification of project fiduciary risks and detailed assessment of fiduciary capacity of DDWSWD and the proposed existing PIU took place during preparation and was deemed adequate.
- 5. Subcomponent 2.3 (water and soil quality monitoring) will be implemented by the WRS PIU in close collaboration with the Ministry of Natural Resources, Ecology and Technical Supervision.** The MNRETS was established in October 2021 on the basis of the former State Agency for Environmental Protection and Forestry under the Government, to formulate and implement policy on environmental protection. The MNRETS has a mandate of policymaking, regulation and supervision on environmental protection, climate change, and water policy and administration. It has also become a Secretariat for National Land and Water Council. The MNRETS's Department of



Environmental Monitoring (DEM) is responsible for executing policy on environmental monitoring, including surface water and soil quality.

Figure A2.1. Implementation arrangements.



6. The WRS PIU has an environmental and social development specialist responsible for all environmental (including OHS) and social issues, such as environmental and social assessment, supervising preparation of site-specific ESIA/ESMPs, monitoring, and reporting. Under each WRS and DDWSWD PIU, the project will include one dedicated Environmental Specialist with experience in OHS, and one dedicated Social Specialist who will also be responsible for GBV.

PROCUREMENT

7. **Applicable Procurement Framework: Activities under the project will be subject to the Bank’s New Procurement Framework.** Procurement of all contracts will follow the procedures specified in the Bank’s Procurement Regulations for IPF Recipients-Procurement in Investment Project Financing Goods, Works, Non-Consulting and Consulting Services, dated November 2020 (Procurement Regulations). The project will also be subject to the World Bank’s Anti-Corruption Guidelines, dated July 1, 2016. The procurement and contract management processes will be tracked through the Systematic Tracking of Exchange in Procurement (STEP) system.

8. **Summary of Project Procurement Strategy for Development:** As required by the Procurement Regulations, Project Procurement Strategy for Development (PPSD) is developed, based on which two Procurement Plans for each



implementing agency are prepared setting out the selection methods to be followed by the borrower during the project implementation when procuring goods, works, non-consulting and consulting services, financed by the Bank. The procurement approaches for key packages have been determined in the PPSD as described in the following paragraphs.

9. **Procurement approach for key goods, works and non-consulting services contracts.** Civil works for (i)rehabilitation of the water supply system, and wastewater systems in about 38 villages will be procured though Request for Bids using the international/national market approach; ii) rehabilitation and modernization of three large irrigation systems at off-farm and on-farm levels will be procured though Request for Bids using the international market approach, and iii) equipment and services to expand the Digital Water Information System (DWIS) will be procured though Request for Bids using the international market approach.

10. **Procurement approach for key consultancy contracts:** Consulting firms will be used for engineering studies and detailed designs for identified investments as well as technical supervision, these packages will be procured through Quality and Costs based selection using an international market approach. In addition, there will be various technical assistance packages which will be procured through Selection based on Consultant’s qualification using international/national market approach.

11. **Key conclusions from the conducted market analysis.** The current state of the construction market has sufficient competition to offer the best value under all equal conditions, even taking into account the regionality, so that the construction market is quite competitive. There is also a need for an adequate and safe system of transferring the facility to the contractor and vice versa with the participation of third parties, possibly various public associations and active social groups.

12. **Procurement risks analysis.** Procurement capacity assessment was performed by the Bank using the Procurement Risk Assessment and Management System, with the main risks listed in table A4.1 and risk management measures in table A4.2. Based on the assessment the project procurement risk is rated as *High*.

Table A2.2. Procurement risks.

Procurement risks
Project beneficiaries do not have capacity to prepare detailed designs and technical specifications for defined investments. This increases the risk of accountability of procurement decisions, especially at the local level.
Potential procurement delays: completed and on-going projects experience suggests that frequent procurement delays should be expected due to the poor procurement planning, lack of procurement capacity and limitations of the markets.
Low level of competition in civil works sector: Past experience indicates that the procurement in the country often did not attract adequate competition due to the limited capacity of the local contractors especially in the remote areas.
Civil works packages include rehabilitation of the water supply system/wastewater systems as well as large irrigation systems. These packages pose additional procurement, social and environmental risks.
Perceived high level of corruption as measured by Transparency International.
PIUs will follow public procurement law and national procurement procedures when procuring at the national level, which may hold increased risks due to technical issues related to the e-Government Procurement (e-GP) system
Inadequate contract management brings risk of lower-than-required quality of procured works, goods and services



Table A2.3. Actions to mitigate procurement risks.

Preliminary risk mitigation measures
With the support from additional consultants, PIUs will be responsible for preparation of procurement and technical documents. Qualified consulting firms will be hired to prepare detailed designs.
Realistic procurement planning and scheduling, including timely preparation of the technical specifications or terms of references with Bank’s close supervision and monitoring, particularly from the country office.
PIUs shall consider analysis for bidder’s capacity in the procurement timeline. Early engagement with the market and business outreach will be required.
Application of World Bank’s Anti-Corruption Guidelines
PIUs shall register as a Purchaser in the state procurement portal. The Bidding process shall not be cancelled solely due to the reason that minimum bid price is larger than the amount allocated by procuring entity for this procurement.
More emphasis on and training in appropriate contract management is required, supplemented by regular physical inspections during the Bank’s supervision missions
Close supervision and implementation support by the Bank staff.

Use of National Procurement Procedures

13. In accordance with paragraph 5.3 of the Procurement Regulations, when approaching the national market, procurement under World Bank financed operations may be carried out in accordance with “Single-Stage Bidding” (one envelope, two envelopes) set forth in the Public Procurement Law of the Kyrgyz Republic dated April 3, 2015 № 72 (the “PPL”) with amendments dated November 18, 2016 - N182; December 10, 2016 - N195; February 14, 2017 - N25; May 30, 2017 - N93; March 29, 2018 - N32; January 11, 2019 - N4; June 26, 2019 - N76; April 20, 2020 - N 48; and December 18, 2020 - N8; provided that such arrangements continue to meet requirements of the paragraph 5.4 of the Procurement Regulations and the following conditions:

- (a) The request for bids/request for proposals document shall require that bidders/proposers submitting bids/proposals present a signed acceptance at the time of bidding, to be incorporated in any resulting contracts, confirming application of, and compliance with, Bank Anti-Corruption Guidelines, including without limitation the Bank’s right to sanction and the Bank’s inspection and audit rights.
- (b) Bidding documents, including contract forms, acceptable to the Bank shall be used. Bidding documents shall include provisions, as agreed with the Bank, intended to adequately mitigate against environmental, social (including sexual exploitation and abuse and gender-based violence), health and safety (“ESHS”) risks and impacts. The request for bids/request for proposals document for civil works shall require that Bidders/Proposers submitting Bids/Proposals present a signed Code of conduct form, Environmental and Social Performance Declaration (when required) and Management Strategies and Implementation Plans. For procurement of civil works Standard Bidding Documents for works (Request for Bids, Small works) developed by the World Bank shall be used. Relevant conditions from the Bank’s SPD for Goods to be incorporated in the Borrower’s bidding document for procurement of goods. Contract forms should include appropriate requirements for insurance and contract termination.
- (c) The Bidding process shall not be cancelled solely on the reason that the minimum bid price is larger than the amount allocated by procuring entity for this procurement.
- (d) There shall be no preference applied during procurement of goods and works.



(e) The Implementing agency shall have an option to publish the procurement notice without disclosing cost estimate.

14. **When other national procurement arrangements other than national open competitive procurement arrangements are applied by the Borrower, such arrangements shall be subject to paragraph 5.5 of the Procurement Regulations.** Other national procurement arrangements such as “Simplified Method” (Request for Quotation) may be applied on the same conditions stated above for procuring limited quantities of readily available off-the-shelf goods or simple civil works of small value. In addition, not less than three quotations shall be requested to ensure competition.

15. **Training and Operating Costs.** The project will finance operating costs for PIUs. When required, PIUs personnel will be selected on the basis of experience, qualifications, and capability to carry out the assignment. The selection shall be carried out through the comparison of the relevant overall capacity of at least three qualified candidates among those who have expressed interest in the assignment. Detailed procedures will be outlined in the POM. PIUs will develop a detailed training plan and prepare annual operational budget for the Bank team’s review and clearance. Operating costs and training will be financed as per annual budget approved by the Bank.

16. **Record keeping.** All records pertaining to award of tenders, including bid notification, register pertaining to sale and receipt of bids, bid opening minutes, bid evaluation reports and all correspondence pertaining to bid evaluation, communication sent to/with the Bank in the process, bid securities, and approval of invitation/evaluation of bids would be retained by respective agencies and uploaded in the STEP.

17. **Disclosure of procurement information.** The following documents shall be disclosed: (a) Procurement Plan and updates; (b) an invitation for bids for goods and works for all contracts; (c) request for expression of interest for selection/hiring of consulting services; (d) contract awards for goods, works, non-consulting and consulting services.

18. **The following details shall also be published in the United Nations Development Business and Bank’s external website:** (a) an invitation for bids for procurement of goods and works following open international market approaches; (b) Request for Expression of Interest for selection of consulting services following open international market approaches; and (c) contract award details of all procurement of goods and works and selection of consultants.

19. **Fiduciary oversight by the Bank and procurement supervision.** The Bank shall prior review contracts as per prior review thresholds set in the PPSD/Procurement Plan. All contracts not covered under prior review by the Bank shall be subject to post review during implementation support missions and/or special post review missions, including missions by consultants hired by the Bank. Two half-yearly missions are envisaged for procurement support and supervision of the proposed project.

Table A2.4: Summary Procurement Plans

Implementing Agency 1

Contract Description	Proc. Method	Procurement Approach	WB Review (prior/post)
Goods			
Purchase office furniture and equipment for billing system of beneficiaries (several contracts)	RFB	Open international	Post
Supply of water meters	RFB	Open international	Post



Works			
Sub-project: Lot-1 Toguz-Bulak (Sabyrov (50 let Kirgizii) and (Lot-2) Margun (Margun))	RFB	Open national	Post
Sub-project Ak-Turpak (Otukchu, Kyzyl-Korgon, Tokoi, Chogorok, Ak-Turpak, Kalacha, Chon-Kara)	RFB	Open national	Post
Sub-project Kyzyl-Suu (Kyzyl-Suu)	RFB	Open international	Prior
Sub-project: Lot-1 Katran (Jany-Turmush (Baul)) and Lot 2 Kulundu (Bulak-Bashy)	RFB	Open national	Post
Sub-project Dara (Kayindy, Kan, Sary-Talaa, Chek, Jany-Jer) and Sub-project Suu-Bashy (Apkan)	RFB	Open national	Post
Sub-project Sovetskoe (Sovetskoe)	RFB	Open national	Post
Sub-project Kun-Chygysh (Bokonbaevo)	RFB	Open international	Prior
Sub-project Ton (Kadj-Sai)	RFB	Open national	Post
Sub-project: Tort-Gul (Ak-Otok, Ak-Turpak, Zar-Tash, Chon-Gara, Chon-Talaa) and Suu-Bashy (Boz-Adyr)	RFB	Open national	Post
Sub-project Katran (Katran)	RFB	Open national	Post
Sub-project Toguz-y (Aibiyke (Madaniyat))	RFB	Open national	Post
Sub-project: Kara-Bulak (Kara-Bulak) and Suu-Bashy (Aigul-Tash)	RFB	Open national	Post
Rehabilitation of WS, sanitation and hygiene (WASH) facilities in social institutions of subprojects	RFB	Open national	Post
Consulting services			
Selection of a Design Institute for the development of detailed design estimates for sub-projects, a review of previously prepared detailed design estimates for 5 objects and preparation of a technical task for the rehabilitation of facilities of the water supply, sanitation and hygiene (WASH) in social institutions of the subprojects. Number of sub-projects for water supply and in Batken oblast - 11 subprojects	QCBS	Open international	Post



Selection of a Design Institute for the development of the detailed design estimates/ a review of previously prepared detailed design estimates and preparation of a technical task for the rehabilitation of facilities of the water supply, sanitation and hygiene (WASH) in social institutions of the subprojects. Number of sub-projects for water supply and sanitation in Issyk-Kul oblast -3 subprojects	QCBS	Open international	Post
Selection of the Construction Supervision Company	QCBS	Open international	Prior
Selection of an Institutional Building Consultant	QCBS	Open international	Post
Low-value packages			
Other low-value goods			
Other low-value works			
Other low-value consulting services	CQS, IC		
Other trainings	AP		
Project Management	IOC		

Implementing Agency 2

Contract Description	Proc. Method	Procurement Approach	WB Review (prior/post)
Goods			
Creation of biochemical laboratories in Bishkek and on the territory of the KSA basin	RFB	Open international	Prior
Works			
Reconstruction and modernization of the Kurshab Sai scheme	RFB	Open international	Prior
Reconstruction and modernization of the Shakhimardan scheme	RFB	Open international	Prior
Reconstruction and modernization of the Kara Unkursay scheme	RFB	Open international	Prior
Consulting services			
Design and estimate documentation of the Kurshab river	QCBS	Open international	Prior
Design and estimate documentation of the Shakhimardan river	QCBS	Open international	Post
Design and estimate documentation of the Kara-Ungur river (Levaya Vetka)	QCBS	Open international	Post
Consulting company for engineering services	QCBS	Open international	Prior
Consulting company for implementation of an existing digital information system	QCBS	Open international	Prior
Low-value packages			



Other low-value goods		
Other low-value works		
Other low-value consulting services	CQS, IC	
Other trainings	AP	
Project Management	IOC	

FINANCIAL MANAGEMENT

20. **The FM arrangements at both implementing agencies are adequate to implement the Project and meet the minimum requirements of the Bank’s Policy and Directive on Investment Project Financing subject to fulfilling the following conditions:** (i) develop and adopt the POM, acceptable to the Bank, which will include the Project’s financial management arrangements (an effectiveness condition); (ii) hire a project related financial management specialist, with relevant knowledge and experience in the Bank FM/Disbursement policies and procedures.

21. **Planning and Budgeting.** The project’s budget will be prepared by the respective PIUs for the components under their implementation. There is sufficient capacity for planning and budgeting within both implementation units to manage project funds, including funds allocation, liquidity planning, and overall performance. Variances of actual versus budgeted figures should be checked on a regular basis, appropriately analyzed, and corrective actions taken. The PIUs will prepare in-year financial plans and cash forecast based on the project’s budget, thus ensuring adequate liquidity management and withdrawal of funds.

22. **Accounting System.** Acceptable accounting software will be procured by the project and administered by the PIUs. Accounting records should include proper analytics of expenditures per contracts and each specific payment.

23. Cash basis will be applied for the Project accounting, and IPSAS “Financial Reporting Under the Cash Basis of Accounting” issued by the International Public Sector Accounting Standards Board (the IPSASB) of the International Federation of Accountants (IFAC) will be used for the Project financial reporting. There should be proper back up of accounting records on external drives, as well as proper security regulation on access and editing rights of the financial information.

24. **Internal Control:** Procedures and controls to be applied on the project will be detailed in the POM. Some of the key internal controls to be applied for the project should include:

- (a) Appropriate authorizations and approvals of all purchases, relevant documentation, transactions of payments etc.
- (b) Segregation of duties as different persons handles different phases of a transaction.
- (c) Reconciliations between project accounting records and other relevant sources of information (Client Connection, bank account statements etc.) performed at least monthly by the Senior Finance Management Officer; and
- (d) Original documentation supporting all project transactions properly filed.

25. **Contract Management.** Contract implementation will be checked in the software and checks and controls of the total contract amount and payments which are due will be checked before each payment under contracts. Respective technical staff and financial department will review and approve invoices and accompanying documentation against contracts provisions for ceilings, dynamics of payments and quality of deliverables.



26. **Financial Reporting.** Unaudited Interim Financial Reports (IFRs) which will include financial information relating to the whole project will be prepared for each quarter and will be due 45 days after the end of each quarter by each PIU respectively. IFRs will be prepared in line with cash basis of accounting. The format of the IFRs will be agreed between the Government and Bank. The PIUs will handle preparation of the IFRs, as well as annual project financial statements. The reporting currency will be USD. IFRs will include the following reports (subject to any modifications agreed with the implementing entity between the date of the report and negotiations): (a) Receipts and Payments, including comparison of budgeted versus actual amounts, (b) Uses of Funds by Activity, (c) Designated Account statement, and (d) Accounting policies and explanatory notes.

External audit

27. **External Audit.** The annual audit of the project financial statements will be conducted by an independent audit firm acceptable to the Bank and in line with agreed Terms of Reference acceptable to the Bank. The audit report will be submitted to the Bank no later than six months after the end of the audited period. The Terms of Reference will be agreed between the Government and the Bank during the selection of the auditor. In addition, the audit will review compliance with procedures laid out in the financial manual. The project will fund the audit of project financial statements. The audited project financial statements will be posted by the client on the agencies' website within one month of their receipt from the auditors and acceptance by the World Bank.

28. **Financial Management covenants.** The financial management covenants for the project will be as follows:

- (a) PIUs to support an adequate financial management system.
- (b) PIUs to prepare IFRs for each calendar quarter and deliver to the Bank no later than 45 days after the end of the reporting quarter.
- (c) Annual project financial statements audited by a private audit firm acceptable to the Bank and such audit to be delivered to the Bank not later than six months after the end of the audited period.

29. **Funds Flow and Disbursement Arrangements** Two Designated Accounts (DA) (one for each PIU) will be opened for the Project to be managed by PIUs for activities to be implemented under the Project. The DAs will be opened in USD, in a commercial bank acceptable for the Bank. The SOE based disbursement method will be applied for the Project. Project funds will flow from the Bank, either: (i) via the DA, which will be replenished based on SOEs or full documentation; or (ii) based on direct payment withdrawal applications and/or special commitments, received from PIUs. Withdrawal applications documenting funds utilized from the DAs will be sent to the Bank at least every three months. The following disbursement methods may be used under the Project: Reimbursement, Advance, Direct payment, and Special Commitment. The DAs' ceilings for each DA as well as the detailed instructions on withdrawal of Project proceeds will be provided in the Disbursement and Financial Information Letter.

30. **FM supervision** The Bank will supervise the project's financial management arrangements in two main ways, namely through: (a) reviewing the project's interim un-audited financial reports for each calendar quarter, as well as the project's and implementation entity's annual audited financial statements and auditor's management letter; and (b) performing on-site supervision and reviewing the project's financial management and disbursement arrangements to ensure compliance with the Bank's minimum fiduciary requirements. The on-site supervision will include monitoring of agreed actions, review of randomly selected transactions, review of internal controls, and other specific supervision activities.



Implementation Support Plan

31. **The World Bank will provide implementation support and oversee appropriate implementation of the Project, in line with World Bank procedures, standards, and requirements.** The World Bank has put in place a task team comprising of a diverse skill mix from Global Practices Water and Environment, Natural Resources and Blue Economy. Skill sets required for continuous effective implementation support include irrigation management, water resources management, water supply and wastewater, dam safety, procurement, FM, environmental and social risks management. It is expected that implementation support by the World Bank team will be more intense during the first two years of project operation. Project Reports will be reviewed periodically by the World Bank as part of project implementation support missions to be carried out at least twice a year.



ANNEX 3: Economic and Financial Analysis

COUNTRY: Kyrgyz Republic Climate Resilient Water Services Project

Introduction

1. The proposed project development objective is to (i) increase access to climate-resilient water services in selected river basins, and (ii) strengthen institutional capacities for climate-resilient water management at the local and national levels. The capital investments will enhance rural and agricultural economic productivity through increased access to clean drinking water and sanitation in Issyk-Kul and Batken oblasts as well as will increase efficiency of irrigation systems and improved management of water resources in Batken, Jalal-Abad and Osh oblasts.

Approach and assumptions for the analysis

2. The financial analysis intends to assess Project impact on farm performance of water users, in particular (a) improved crop performances, on the basis of crop budgets before Project and at full development after the Project for each of the three irrigation schemes, (b) projected impact on household incomes and poverty levels, on the basis of typical farm models, and (c) water users' potential ability to pay fees for irrigation services.

3. The economic analysis aims to assess Project impact at the national level by aggregating all Project costs and projected benefits. The project economic benefits come from two types of capital investments supported by the project:

- (a) *Investments in irrigation and drainage (I&D)*. This will be done by aggregating costs and benefits for each of the three irrigation schemes and adjusting financial prices to get economic values from the models used in the financial analysis.
- (b) *Investments in drinking water and sanitation*. These investments will lead to enhanced welfare of beneficiaries by reducing coping costs (time saved from water collection, reduced need for purchasing drinking water and boiling the drinking water to improve its quality).

4. The main assumptions are:

- (a) The financial analysis aims to quantify incremental benefits attributable to the Project by comparing projections (based on scenarios) of crop performances with Project and without Project.
- (b) The without-Project scenario derives from the "before Project" situation by applying a modest annual rate of crop performances decrease (about 1.0% per year) based on past yield trends due to the continuous deterioration of I&D infrastructure and likely emerged expenditures to access water.
- (c) To avoid errors of comparison of non-average climatic conditions, the "before Project" situation corresponds to the yields reported by WUAs for the period of 2018-2021.
- (d) With-Project projections correspond to realistic and conservative estimates of yield increases and modified cropping patterns resulting from improved water supply.
- (e) In Without Project scenario, it is assumed that present cropping patterns and applied agricultural technology continue for the entire project lifetime.
- (f) In With Project scenario, it is expected that the full command area to be adequately irrigated for the entire project lifetime.
- (g) Values are expressed in constant 2021 prices and exclude inflation.



- (h) Prices were converted into economic values in the analysis by applying conversion factors received from calculating import and export parity prices based on World Bank’s Pink Sheet projections and UN ComTrade data. A standard conversion factor used in the analysis – 0.89.
- (i) The crop budgets show incremental revenues and costs generated by the proposed I&D investment. The Financial Discount Rate (FDR) of 8%⁸⁵ is used in this analysis to assess the viability and robustness of investments, which is the current Opportunity Cost of Capital (OCC) to a beneficiary. The selection criterion for the IRR is to accept all projects for which the IRR is above the opportunity cost of capital. The economic or social discount rate (SDR) of 6.0%⁸⁶ is applied for the economic analysis, which is a Social Opportunity Cost (SOC).
- (j) The exchange rate used in the financial and economic analysis is fixed at US\$ 1= KGS 86.5, with a strong assumption that future inflation of inputs will be outweighed by increase in output prices.
- (k) Family labor is not assumed as a financial cost however the opportunity cost has the same economic value as hired labor.

Financial Analysis

5. **Crop performance.** The financial analysis is based on crop budgets, i.e. typical input-output models of various crops based on observed practices. Table A3.1 below summarizes crop performances in Project areas before and after Project. Yields vary somewhat from one scheme to another. Table A3.1 provides typical yields and financial net returns per ha.

Table A3.1: Crop Performances in the Project areas With and Without Project (selected crops)

Crop	Yield (ton/ha)			Net Return per ha (KGS/ha)		
	Before Project	With Project	Change (%)	Before Project	With Project	Change (%)
Winter wheat (Osh)	3.7	4	10%	30,766	37,817	23%
Melon (Osh)	18.8	21	14%	236,205	278,648	18%
Potato (Osh)	14.3	16	13%	125,310	188,264	26%
Cotton (Osh)	2.6	3	15%	186,590	219,815	18%
Oilseeds (Osh)	2.1	2	12%	28,184	34,274	22%
Lucerne (Jalal-Abad)	5.5	6	14%	85,532	111,238	30%
Maize (Jalal-Abad)	7.0	8	13%	106,944	125,015	17%
Rice (Jalal-Abad)	2.6	3	16%	81,929	98,724	20%
Stone fruits (Batken)	5.00	6	13%	132,198	155,309	17%
Vegetables and HG (Batken)	17.00	19	13%	178,483	211,209	18%
Pome fruits (Batken)	4.00	5	13%	124,325	147,813	19%

6. **Farm Models.** Farm models aim to assess Project impact at household level. Typical farm models were prepared on the basis of average farm sizes observed in the three regions where rehabilitation of irrigation schemes would be introduced: Jalal-Abad region (0.7 ha) where Kara-Unkarsai irrigation scheme; Batken (0.85 ha) where Shakhimardan

⁸⁵ Policy rate as of October 2021. National Bank of the Kyrgyz Republic, <https://www.nbkr.kg/>

⁸⁶ The social discount rate used for the economic analysis is based on World Bank’s estimations, proposed by a standardized methodology. See Discounting Costs and Benefits in Economic Analysis of World Bank Projects, OPSPQ. May 9, 2016. “Where no country-specific growth projections are available, we suggest using 3% as a rough estimate for expected long-term growth rate in developing countries. Given reasonable parameters for the other parameters for the other variables in the standard Ramsey formula linking discount rates to growth rates, this yields a discount rate of 6%.”

irrigation scheme; and Osh (0.5 ha) where Kurshab-Sai irrigation scheme are located. Table A3.2 summarizes farm model analysis results.

Table A3.2: Results of Farm Model Analysis.

Farm Model	Location	Area (in ha per household)	Net Agricultural Benefit per HH				Change (in %)
			Before Project		With Project		
			KGS	US\$	KGS	US\$	
1	Jalal-Abad region	0.7	91,134	1,054	107,364	1,241	+18%
2	Batken region	0.85	74,712	864	90,957	1,052	+22%
3	Osh region	0.5	41,880	484	51,590	596	+23%

7. Improvement in farm revenues depends upon farm size, cropping pattern, and status of irrigation schemes, however it can be seen that the increase in net agricultural benefit per households would be in the range of 18-23%.

8. **Cost of Water – Irrigation Service Fee (ISF).** Water users in the Project areas currently pay the equivalent of about KGS 30 (US\$0.3) per 1,000 m³, corresponding to about KGS 150 (US\$1.7) per ha, assuming that on average 5,000 m³ are charged to water users in one cropping season. Moreover, they pay water delivery fee, which is on average KGS 850 (US\$9.8) per ha per season. In total, a farmer with 1ha land pay about 1,000 KGS or US\$11.6 per year, which corresponds to only about 0.8% of the current gross farm output.

9. The farm-level analysis aims to calculate the impact on farm incomes of various levels of ISF following Project implementation in order to assess beneficiaries' capacity/willingness to pay it. The analysis assumes that future ISF incorporate the cost of scheme O&M; no recovery of rehabilitation cost is expected. Evaluating capacity to pay compares the ISF with: (i) gross revenue per ha, of which a maximum of around 5% for the ISF is assumed would be acceptable to water users; and (ii) incremental financial benefits expected from Project interventions, of which a maximum of 30% for the ISF might be acceptable to water users. The actual cost of O&M will be based on the updated asset management plan and will be determined during project implementation.

10. **Incremental labor.** It is estimated that Project would generate about 3,490 jobs for construction works and project implementation. Moreover, the improved irrigated crop production would require additional 135,276 person-days which is equivalent to approximately 512 full-time permanent jobs. No extra workers would be needed for O&M of rehabilitated infrastructure.

Economic Analysis

11. The economic analysis aims to assess country-level Project impact and includes the following six steps: (i) convert financial prices into economic values to assess the real costs and benefits from the country point of view; (ii) analyze all the three irrigation schemes using economic values and aggregating economic costs and benefits at scheme level; (iii) estimate the aggregated economic benefits from the investment into safely managed drinking water and sanitation services; (iv) undertake economic analysis of the overall Project by aggregating all costs and benefits; (v) conduct GHG analysis and incorporate it to the economic analysis; and (vi) perform a sensitivity analysis.

12. **Financial Prices and Economic Values.** Financial prices were converted into economic values for the economic analysis to correct potential national price distortions. Prices were converted into economic values in the analysis by applying conversion factors received from calculating import and export parity prices based on World Bank's Pink Sheet

projections and UN ComTrade data. A standard conversion factor used in the analysis is 0.89. *Table A3.3* below summarizes the conversion of financial prices to economic values.

Table A3.3: Summary of Financial and Economic Prices.

Item	Unit	Financial Price (KGS)	Economic Value (KGS)	Conversion Factor
Outputs / Commodities				
Cotton	ton	95,000	105,030	1.11
Wheat (winter)	ton	21,000	22,550	1.07
Maize	ton	23,500	20,146	0.86
Melon	ton	18,000	14,892	0.83
Potato	ton	19,700	21,188	1.08
Lucerne	ton	23,000	20,536	0.89
Oilseeds	ton	32,000	25,877	0.81
Vegetables and Home gardens	ton	20,000	18,898	0.94
Rice (paddy)	ton	50,000	40,672	0.81
Stone fruits	ton	40,000	43,222	1.08
Pome fruits	ton	48,000	56,673	1.18
Inputs				
N Fertilizers (Amonium Nitrate)	kg	27	32	1.20
P Fertilizers (P2O5)	kg	36	42	1.16
K Fertilizers	kg	36	42	1.18
Machinery Services	per ha	various	various	0.89
Paid Labor	Day	300	300	100%
Family Labor	Day	0	300	n/a
Electricity	kWh	0.77	23.36	30.33
Irrigation Service Fee ⁸⁷	ha	150	500	3.33
Water delivery ⁸⁸	ha	850	3503	4.12

13. **Economic Analysis of I&D Scheme Rehabilitation.** An economic cost-benefit analysis of rehabilitation for each of the three proposed irrigation schemes was undertaken in the following way (see the results in Table A3.4):

- (a) Financial prices were converted into economic values in crop budgets and rehabilitation cost estimates as described in the previous section;
- (b) Rehabilitation costs were spread over a projected construction period during Y2-Y5, while design will be done in Y1;
- (c) 12% VAT allowance was excluded from the economic analysis because it does not represent national costs, but simply redistribution among national agents.
- (d) Agricultural returns were calculated by multiplying the scheme crop areas by without- and with-Project crop budgets to arrive at incremental benefits from Project activities;

⁸⁷ According to the mission's estimations, the economic cost of water is at least 3 times greater than the financial price.

⁸⁸ The economic cost of water delivery is calculated as in with-Project scenario and includes the full recovery of O&M of the rehabilitated I&D scheme.



- (e) A conservative adoption rate of 80% applied on all benefits streams based on the experience of other projects in the country and region;
- (f) Costs and benefits were aggregated over a 25-year period to calculate the Economic Internal Rate of Return (EIRR) and the Economic Net Present Value (ENPV) assuming a 6% social discount rate using the following data on the command area of each scheme (see Table A3.5).

Table A3.4: Summary Economic Analysis of three irrigation schemes.

Irrigation scheme	Main agricultural crops	Total fin Cost* (US\$/ha)	EIRR (%)	ENPV (US\$/ha)	Annual gross ag output (US\$ million)
Kara-Unkur irrigation scheme (Jalal-Abad region)	Cotton, Lucerne, Maize, Melon, Potato, Rice (paddy), Oilseeds, Vegetables and HG, Wheat (winter).	1,094	16%	1,071	23
Shakhimardan irrigation scheme (Batken region)	Stone fruits, Perennials, Maize, Melon, Potato, Pome fruits, Oilseeds, Vegetables and HG, Wheat (winter)	2,255	12%	1,112	9
Kurshab irrigation scheme (Osh region)	Cotton, Perennials, Maize, Melon, Potato, Oilseeds, Vegetables and HG, Wheat (winter), Stone fruits	1,656	13%	1,107	31

Table A3.5. Command area under each scheme by WUAs.

Jalal-Abad region - Kara-Unkur river system		Osh region - Kurshab river system	
WUA	Area (ha)	WUA	Area (ha)
Karacha-Suu	343	Zhar-Ooz	485
Tamchy-Bulak	1,209	Maz-Aykal	1,830
Kashka-Suu	1,642	Sultan-Naz	4,332
Murap	1,293	Mongu-Suu	2,100
Obi-Hayot	1,308	Vorukh-Ali	1,558
Myrza-Suu	2,430	Zhany-Turmush	2,298
Total	8,225	Ene-Sai	1,281
Batken region - Shakhimardan river system		Uchkun-Akkozu	220
WUA	Area (ha)	Bayel-Asl	315
Ak-Suu-Halmion	2,280	Sarai-Suu	280
Alga-Zharkoton	1,300	Eshme	154
Zhanyzher Pulgon	855	T. Arzykulov	550
Total	4,435	Total	15,403

Benefits from investments in drinking water and sanitation

14. **Reduced time in collecting water.** Based on the results obtained from similar operations in the country (e.g., Sustainable Rural Water Supply And Sanitation Development Project, P154778) and in-depth interview with the Project



beneficiaries, it was assumed that on average households in the Project area spend around 50 minutes of time per day collecting the water from the closest freshwater source, which will not be the case after the Project implementation. To estimate the economic value of an opportunity cost of time that a household would gain in With-project scenario, a rural average hourly wage of KGS 37.5 (US\$ 0.43) was used as a conservative measurement. It was estimated that using this assumption the Project would generate annual benefits of US\$2,332,772 from economic gains of saving time to collect water.

15. **Reduced need in purchasing drinking water.** Based on the results of in-depths interviews with the Project beneficiaries, it was assumed that about 20% of the target households purchase drinking water from trucks with water tanks at the price of about KGS 15/person/month (US\$0.17/person/month). This would generate annual benefits of US\$36,089.

16. **Reduced coping costs from boiling water.** Almost all households boil water prior to consumption to improve its quality. The estimated average volume of water consumed by a person is 5 liters/day. In With-Project scenario, it is assumed that at least 60% of households will stop this practice and will generate associated savings on electricity (it also can be coal or propane). It is assumed that to boil 5 liters of water, it is required about 0.75 kWh of electricity at the economic price of US\$0.27/kWh⁸⁹. Under these assumptions, the project would generate annual benefits of US\$3,922,696 from energy savings related to boiling water.

17. **Leak reduction** of 2,373,939 m3/year at the economic price of US\$0.20/m3 would generate economic savings of US\$379,830 annually.

18. **Due to energy efficiency** including pump efficiency and leak reduction, the project would help to generate energy savings of 2,630,122 kWh/year that can be valued at US\$568,106/year in economic values.

19. **Reduced water-borne diseases.** The analysis has also made an attempt but not succeeded in finding reliable data on these cases. This will be updated during the appraisal as soon as the official data will be received from the Ministry of Healthcare of Kyrgyzstan.

20. **Other unquantifiable benefits.** There are also some benefits accruing from improved sanitation, which are difficult to quantify.

21. Economic analysis of drinking water and sanitation is conducted separately from irrigation and drainage activities provided above and the details are provided in *Table A3.6*.

Table A3.6. Summary Economic Analysis of drinking water and sanitation

Activity	Regions	Total economic cost (US\$)	EIRR (%)	ENPV (US\$)
Investments in drinking water and sanitation	Issyk-Kul and Batken	40.1 million	27.6%	49.0mln

Overall Economic Analysis

22. The overall EIRR is calculated at 14.8% and the ENPV (with a 6% discount rate) is estimated at around US\$59.5 million. It includes total project costs and all benefits stream accrued from the project activities.

⁸⁹ World Bank Sustainable Rural Water Supply and Sanitation Development Project in Kyrgyzstan, PAD (P154778), 2016



Sensitivity Analysis

23. **Economic returns were tested against changes in benefits and costs and for various lags in the realization of benefits.** In relative terms, the Economic Rate of Return (ERR) is equally sensitive to changes in costs and benefits. In absolute terms, these changes do not have a significant impact on the ERR, and the economic viability is not threatened by both a 20% decline in benefits and by a 20% increase in costs, since the ERR in both cases remains well above the discount rate. A two-year delay in Project benefits reduces the ERR to 11%. The results are presented in Table A3.7. The analysis establishes that the estimated benefits will be greater than the costs of the Project.

Table A3.7: Results of Sensitivity Analysis

Sensitivity Analysis (50-year period)	Base case	Costs Increase			Increase of Benefits		Decrease of Benefits			Delay of Benefits	
		+10%	+20%	+50%	+10%	+20%	-10%	-20%	- 30%	1 year	2 years
EIRR	14.8%	13%	12%	8%	17%	18%	13%	11%	9%	12%	11%
ENPV (000'USD)	59,508	52,207	44,906	23,002	72,760	86,012	46,256	33,004	19,752	48,763	38,653

ANNEX 4: Greenhouse Gas Emission Analysis

COUNTRY: Kyrgyz Republic Climate Resilient Water Services Project

1. Project activities are expected to contribute to an overall reduction in greenhouse gas emissions. The project cumulative GHG emission savings from both water supply and sanitation and irrigation investments adds up to an estimated 421,307 tCO₂-eq over a 25-year period, with an annual average of 16852 tCO₂-eq/year (approximately an 81% savings from water supply and sanitation interventions and an additional 20% offset from the irrigation interventions, noting that irrigated areas are already GHG emission sinks).

2. For water supply and sanitation (subcomponent 1.1), the project will mitigate impacts of climate change through: (1) the reduction in nonrevenue water, (2) improvement in energy efficiency and improvement of collection and treatment of wastewater and (3) avoided usage of fuel to boil and transport drinking water. Table A4.1 shows that the project has the potential to save around 2.374 million cubic meters of water per year (29.41% of the production without project). In addition, Table A4.2 summarizes the results for GHG reductions in total GHG of 4,031 tons/year of CO₂-eq (81.2% saving). The breakdown of GHG emission reductions is composed of 443 tons/year of CO₂-eq (assuming 0.156 kg of CO₂/kWh of electricity⁹⁰) due to energy efficiency gains in water pumping and truck distribution; GHG emission reduction of 755 tons/year of CO₂-eq due to wastewater treatment improvement; and 2,833 tons/year of CO₂-eq reduction due to elimination of water boiling for drinking (60% of population boils around 5 l/c/day).

Table A4.1: Water and Energy Savings based on Improvement Targets.

Region / Suvokova	Water Supply (million m ³ /year) With Project	Water Supply (million m ³ /year) Without Project	Energy Consumption (kWh/m ³ Supplied)		Leakage (%)		NRW (%)		Energy Savings due to NRW and Energy Managemen t (kWh/year)	Physical Water Savings from Leak Reduction (m ³ /year)	Reductio n in CO ₂ Emissions (kg CO ₂ -eq/ye ar)
			Current	Target	Current	Target	Curre nt	Target			
Kyzyl-Suu	952,057	1,348,748	0.636	0.238	40.0%	15.0%	60.0%	20.0%	630,573	396,691	98,369
Kadji-Sai	233,274	330,471	0.636	0.238	40.0%	15.0%	60.0%	20.0%	154,503	97,197	24,103
Bokonbaevo	1,059,290	1,500,661	0.636	0.238	40.0%	15.0%	60.0%	20.0%	701,596	441,371	109,449
Batken Pumped	1,726,416	2,445,756	0.636	0.238	40.0%	15.0%	60.0%	20.0%	1,143,451	719,340	178,378
Batken Gravity	1,726,416	2,445,756	0	0	40.0%	15.0%	60.0%	20.0%	0	719,340	0
Total	5,697,452	8,071,391							2,630,122	2,373,939	410,299

Note: Physical water savings are calculated assuming the same quantity of actual water demand. For instance, in Kyzyl Suu, the actual demand will be 952,057 m³/year, but because of the current leakage water rate of 40.00%, the water supplied must be 674,374 m³/year. Based on the planned leakage reduction under the project (i.e., from 40.00% to 15.00%), the required water production will drop from

⁹⁰ Specific emission estimate for Kyrgyzstan grid power is 0.156 kg of CO₂/kWh as provided from the World Bank Toolbox for the calculation of GHG emissions. The estimate is based on the fact that the majority of power is generated from hydropower plans.



1,348,748 m3/year to 952,057 m3/year. Hence, leakage (physical loss) will drop from 539,499 m3/year to 142,809 m3/year and the physical water savings will be 396,691 m3/year. In addition, the water quantity sold will increase by 222.147 m3/year.

Table A4.2: Summary of GHG emissions and savings from both water and wastewater services improvement

Totals by Category	Total CO ₂ Equivalent Gross Emissions in 25 years With Project (tons CO ₂ eq)	Total CO ₂ Equivalent Baseline Emissions in 25 years Without Project (tons CO ₂ eq)	Total CO ₂ Equivalent Net Emissions Saving In 25 years (tons CO ₂ eq)	Total CO ₂ Equivalent Net Average Annual Emissions Saving (tons CO ₂ eq/year)
Emissions for Water Utilities				
Kyzyl Suu	884	3,467	2,583	103
Kadji Sai	217	826	609	24
Bolonbaevo	984	3,874	2,890	116
Batken	1,604	6,612	5,008	200
<i>Total Emissions for Water Utilities</i>	<i>3,689</i>	<i>14,779</i>	<i>11,090</i>	<i>443</i>
Emission savings from water boiling				
<i>Savings from boiling</i>	<i>0</i>	<i>70,826</i>	<i>70,826</i>	<i>2,833</i>
Emissions for Wastewater Utilities				
Kyzyl Suu	8,253	16,993	8,740	350
Kadji Sai	2,097	3,885	1,787	71
Bokonbaevo	9,293	17,645	8,352	334
Batken*	N/A	N/A	N/A	N/A
<i>Total Emissions for Wastewater Utilities</i>	<i>19,643</i>	<i>38,523</i>	<i>18,879</i>	<i>755</i>
Project Total Emissions	23,332	124,128	100,795	4,031

Note:

- (1) For water supply, the main GHG emissions reduction is due to pump efficiency improvement from 30% to 80% and leak reduction from 40% to 15%, the elimination of water boiling for drinking as a result of improving water supply quality and the elimination of water distribution by trucks.
- (2) For wastewater, the GHG emissions reduction is in Kyzyl Suu, Kadji Sai and Bokonbaevo due to collection and treatment of wastewater which used to be dumped without treatment to the surrounding.
- (3) In Batken, the project will mainly finance water supply and septic tanks for some latrines but not sewerage network or centralized wastewater treatment plants.

3. For the irrigation investments (subcomponent 1.2), the greenhouse gas analysis based on the Ex-Ante Carbon-balance Tool (EX-ACT), see Table A4.3, estimates that the net carbon balance over a period of 25 years is -320,512tCO₂-eq (approximately -12,820 tCO₂-eq/year). The analysis shows that the target areas are already net greenhouse gas sinks and that with the project their GHG emission offset will increase by a further 20%.

4. The total GHG emission reduction benefits were estimated through project life taking into account the estimated shadow price of carbon that will evolve from year to year according to the World Bank Shadow Price of Carbon Guidance Note⁹¹. In addition to base case scenario (without carbon benefits), low band of carbon price (starting from US\$41 and evolving over years) as well as higher band of carbon price (starting from US\$82 and evolving over year) scenarios were introduced and the ERR and ENPV were calculated accordingly (see Table A4.4).

⁹¹ "Guidance Note on Shadow Price of Carbon in Economic Analysis," World Bank (2017), and "IFI approach to GHG accounting for renewable energy projects," World Bank (2015).

Table A4.3. Results from the EX-ACT analysis for subcomponent 1.2.

Components of the project	Gross fluxes			Share per GHG of the Balance			Result per year				
	Without	With	Balance	All GHG in tCO2eq			Without	With	Balance		
	All GHG in tCO2eq			CO ₂			N ₂ O	CH ₄			
Land use changes	Positive = source / negative = sink			Biomass	Soil	Other					
				CO ₂ - Biomass	CO ₂ -Soil	CO ₂ - Other	N ₂ O	CH ₄			
Deforestation	0	0	0	0	0		0	0	0	0	
Afforestation	0	0	0	0	0		0	0	0	0	
Other LUC	0	0	0	0	0		0	0	0	0	
Agriculture											
Annual	58,560	-399,224	-457,784	0	-470,707		2,393	10,531	2,342	-15,969	-18,311
Perennial	-2,601,452	-2,845,114	-243,662	-232,460	-11,201		0	0	-104,058	-113,805	-9,746
Rice	11,370	9,941	-1,429	0	0		0	-1,429	455	398	-57
Grassland & Livestocks											
Grassland	0	0	0	0	0		0	0	0	0	
Livestocks	0	0	0				0	0	0	0	
Degradation & Management											
Forest degradation	0	0	0	0	0		0	0	0	0	
Peat extraction	0	0	0		0		0	0	0	0	
Drainage organic soil	0	0	0		0		0	0	0	0	
Rewetting organic soil	0	0	0		0		0	0	0	0	
Fire organic soil	0	0	0	0				0	0	0	
Coastal wetlands	0	0	0	0	0		0	0	0	0	
Inputs & Investments	946,073	1,328,436	382,363			198,271	184,092	0	37,843	53,137	15,295
Fishery & Aquaculture	0	0	0			0	0	0	0	0	0
Total	-1,585,449	-1,905,961	-320,512	-232,460	-481,909	198,271	186,484	9,101	-63,418	-76,238	-12,820
Per ha	-56.6	-68.0	-11.4	-1.2	-17.2	7.1	6.7	0.3			
Per ha per year	-2.3	-2.7	-0.5	0.0	-0.7	0.3	0.3	0.0	-2.3	-2.7	-0.5

Table A4.4. Economic indicators in different scenarios.

Carbon price	No Carbon Credits (Base Case)	Low Price	High Price
ENPV (US\$ million) @6 % discount rate	59.5	68.3	77.0
ERR (%)	14.8	16.1	17.4



ANNEX 5: Map

COUNTRY: Kyrgyz Republic
Climate Resilient Water Services Project

