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Report No: PAD1833

INTERNATIONAL DEVELOPMENT ASSOCIATION

PROJECT APPRAISAL DOCUMENT

ON A

PROPOSED CREDIT

IN THE AMOUNT OF US$25 MILLION

AND A

PROPOSED GRANT

IN THE AMOUNT OF SDR 18.3 MILLION
(US$25 MILLION EQUIVALENT)

TO THE

REPUBLIC OF TAJIKISTAN

FOR A

STRENGTHENING CRITICAL INFRASTRUCTURE AGAINST NATURAL HAZARDS PROJECT

June 16, 2017

Social, Urban, Rural and Resilience Global Practice
Europe and Central Asia Region

CURRENCY EQUIVALENTS

(Exchange Rate Effective April 30, 2017)

Currency Unit	=	Tajikistan Somoni (TJS)
TJS8.050	=	US$1
US$0.113	=	TJS1

Currency Unit	=	Special Drawing Right (SDR)
SDR 0.729	=	US$1
US$1.371	=	SDR 1

FISCAL YEAR
January 1 – December 31

ABBREVIATIONS AND ACRONYMS

ADB	Asian Development Bank
ALRI	Agency for Land Reclamation and Irrigation
B/C	Benefit over Cost Ratio
CAMP4ASB	Climate Adaptation and Mitigation Program for the Aral Sea Basin Project for Central Asia
CAR	Central Asia Road Links Project
CAREC	Central Asia Economic Cooperation
CE	Citizen Engagement
CERC	Contingent Emergency Response Component
CMC	Crisis Management Center
CoESCD	Committee for Emergency Situations and Civil Defense
CPS	Country Partnership Strategy
CQS	Selection Based on Consultant's Qualifications
DA	Designated Account
DC	Direct Contracting
CRED	Centre for Research on the Epidemiology of Disasters
DIPECHO	Disaster Preparedness Program of the European Commission's Humanitarian Aid and Civil Protection Office
DRM	Disaster Risk Management
EIA	Environmental Impact Assessment
EMF	Environmental Management Framework
EM-DAT	Emergency Events Database (part of CRED)
EMP	Environmental Monitoring Plan
ERR	Economic Rate of Return
FBS	Selection under a Fixed Budget

FM	Financial Management
FVWRMP	Fergana Valley Water Resources Management Project
GBAO	Gorno-Badakhshan Autonomous Oblast
GDP	Gross Domestic Product
GFDRR	Global Facility for Disaster Reduction and Recovery
GIS	Geographic Information System
GoT	Government of the Republic of Tajikistan
GRM	Grievance Redress Mechanism
IA	Implementing Agency
ICB	International Competitive Bidding
IDA	International Development Association
IFAC	International Federation of Accountants
IFR	Interim Financial Report
IMF	International Monetary Fund
IoSEE	Institute of Seismology and Earthquake Engineering
IPCC	Intergovernmental Panel on Climate Change
IPF	Investment Project Financing
IRM	Immediate Response Mechanism
ISA	International Standards on Auditing
LCS	Least-cost Selection
LEGEN	Environmentally and Socially Sustainable Development and International Law Practice Group
M&E	Monitoring and Evaluation
MoF	Ministry of Finance
MoT	Ministry of Transport
NCB	National Competitive Bidding
ND-GAIN	University of Notre Dame Global Adaptation Initiative
NPDRR	National Platform on Disaster Risk Reduction
NPV	Net Present Value
PAMP II	Public Employment for Sustainable Agriculture and Water Resources Management Project Phase II
PIG	Project Implementation Group
PIU	Project Implementation Unit
PMU	Project Management Unit
POM	Project Operational Manual
PPA	Project Preparation Advance
QBS	Quality-based Selection

QCBS	Quality- and Cost-based Selection
RAP	Resettlement Action Plan
REACT	Rapid Emergency Assessment and Coordination Team
RPF	Resettlement Policy Framework
SCES	State Commission for Emergency Situations
SCINHP	Strengthening Critical Infrastructure against Natural Hazards Project
SIC	State Committee on Investment and Management of State Property of the Republic of Tajikistan
SOE	Statement of Expenditure
SORT	Systematic Operations Risk Rating Tool
SSS	Single-source Selection
ToR	Terms of Reference
UNDP	United Nations Development Programme
UNISDR	United Nations International Strategy for Disaster Reduction

Regional Vice President:	Cyril Muller
Country Director:	Lilia Burunciuc
Senior Global Practice Director:	Ede Jorge Ijjasz-Vasquez
Practice Manager:	David N. Sislen
Task Team Leader:	Jose C. Joaquin Toro Landivar, Ko Takeuchi, Bobojon Yatimov

TAJIKISTAN
Strengthening Critical Infrastructure against Natural Hazards

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Tajikistan

Strengthening Critical Infrastructure against Natural Hazards (P158298)

PROJECT APPRAISAL DOCUMENT

EUROPE AND CENTRAL ASIA

Report No.: PAD1833

Basic Information		
Project ID P158298	EA Category B - Partial Assessment	Team Leader(s) Jose C. Joaquin Toro Landivar,Bobojon Yatimov,Ko Takeuchi
Financing Instrument Investment Project Financing	Fragile and/or Capacity Constraints [ ] Financial Intermediaries [ ] Series of Projects [ ]	
Project Implementation Start Date 15-Jun-2017	Project Implementation End Date 30-Jun-2023	
Expected Effectiveness Date 11-Sep-2017	Expected Closing Date 31-Dec-2023	
Joint IFC No		

Practice Manager/Manager	Senior Global Practice Director	Country Director	Regional Vice President
David N. Sislen	Ede Jorge Ijjasz-Vasquez	Lilia Burunciuc	Cyril E Muller

Borrower: Republic of Tajikistan			
Responsible Agency: Agency for Land Reclamation & Irrigation (Project Management Unit at ALRI)			
Contact:	Kholmurod Rahmon	Title:	Director
Telephone No.:	992-372-36-62-08	Email:	fvwrmp@mail.ru
Responsible Agency: Ministry of Finance (Project Implementation Unit under the Ministry of Finance)			
Contact:	Abdusalom Kurboniyon	Title:	Minister
Telephone No.:	(992 37) 221-14-17	Email:	info@greenfinance.tj
Responsible Agency: Ministry of Transport (Project Implementation Group under the Ministry of Transport)			
Contact:	Khudoyor Khudoyorzoda	Title:	Minister

Telephone No.: 992372211713	Email: mtrt-invest.dep@mail.ru

Project Financing Data(in USD Million)					
[ ]	Loan	[X]	IDA Grant	[ ]	Guarantee
[X]	Credit	[ ]	Grant	[ ]	Other

Total Project Cost:	50.00	Total Bank Financing:	50.00
Financing Gap:	0.00		

Financing Source	Amount
International Development Association (IDA)	25.00
IDA Grant	25.00
Total	50.00

Expected Disbursements (in USD Million)

Fiscal Year	2017	2018	2019	2020	2021	2022	2023	2024	0000	0000
Annual	0.00	2.38	4.48	7.93	12.03	12.38	10.80	0.00	0.00	0.00
Cumulative	0.00	2.38	6.86	14.79	26.82	39.20	50.00	50.00	0.00	0.00

Institutional Data

Practice Area (Lead)

Social, Urban, Rural and Resilience Global Practice

Contributing Practice Areas

Agriculture, Climate Change, Transport & ICT

Proposed Development Objective(s)

The Project Development Objectives are to strengthen the Recipient's disaster risk management capacities, enhance the resilience of its critical infrastructure against natural hazards, and improve its capacity to respond to disasters.

Components

Component Name	Cost (USD Millions)
Strengthening Disaster Risk Management Capacity	4.00
Making Critical Infrastructure Resilient against Natural Hazards	38.00
Contingent Emergency Response Component	6.00
Project Management	2.00

Systematic Operations Risk- Rating Tool (SORT)

Risk Category	Rating

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

Compliance

Policy

Does the project depart from the CAS in content or in other significant respects?	Yes [ ] No [X]
Does the project require any waivers of Bank policies?	Yes [ ] No [X]
Have these been approved by Bank management?	Yes [ ] No [X]
Is approval for any policy waiver sought from the Board?	Yes [ ] No [X]
Does the project meet the Regional criteria for readiness for implementation?	Yes [X] No [ ]

Safeguard Policies Triggered by the Project	**Yes**	**No**
Environmental Assessment OP/BP 4.01	**X**	
Natural Habitats OP/BP 4.04		**X**
Forests OP/BP 4.36		**X**
Pest Management OP 4.09		**X**
Physical Cultural Resources OP/BP 4.11		**X**
Indigenous Peoples OP/BP 4.10		**X**
Involuntary Resettlement OP/BP 4.12	**X**	
Safety of Dams OP/BP 4.37	**X**	
Projects on International Waterways OP/BP 7.50	**X**	
Projects in Disputed Areas OP/BP 7.60		**X**

Legal Covenants

Name	**Recurrent**	**Due Date**	**Frequency**
Channeling of Project Funds	**X**		CONTINUOUS

Description of Covenant

To facilitate the carrying out of the Project, the Recipient shall make the proceeds of the Financing available to the Project Implementing Agencies, as set forth in Article II of the Financing Agreement.

Name	Recurrent	Due Date	Frequency
Safeguards Compliance	X		CONTINUOUS

Description of Covenant

The Recipient shall cause the Project Implementing Agencies to implement the Project in accordance with the Environmental and Social Impact Assessment and the Environmental and Social Management Plan.

Name	Recurrent	Due Date	Frequency
Project Management Units	X		CONTINUOUS

Description of Covenant

The Recipient shall, until completion of the Project, maintain the ALRI-PMU, MOF-PIU, and MOT-PIG (Project Management Units), and shall ensure that the ALRI-PMU, MOF-PIU, and MOT-PIG are adequately staffed by personnel and consultants with qualifications and under terms of reference and functions, at all times, in a manner acceptable to the Association.

Name	Recurrent	Due Date	Frequency
Project Operational Manual	X		CONTINUOUS

Description of Covenant

The Project Implementing Agencies shall carry out the project in accordance with the Project Operational Manual and not amend, suspend, repeal or waive any of the provisions of the Project Operational Manual without the Associations' prior written agreement. In case of any discrepancy between the provisions of the Project Operational Manual and those of the Finance Agreement, the provisions of the Finance Agreement shall prevail.

Name	Recurrent	Due Date	Frequency
Financial management specialist and accountant	X		CONTINUOUS

Description of Covenant

The Recipient shall cause each Project Management Unit to recruit, within 30 days of the Effective Date, and thereafter maintain at all times during Project implementation, a financial management specialist and an accountant for the Project, with qualifications and terms of reference acceptable to the Association.

Name	Recurrent	Due Date	Frequency
Accounting and financial management systems	X		CONTINUOUS

Description of Covenant

The Recipient shall cause the Project Management Units to upgrade and/or modify, within 30 days of the Effective Date, their accounting and financial management systems, in order to be able to generate Project financial statements, in form and substance satisfactory to the Association.

Name	Recurrent	Due Date	Frequency
Annual Work Plan and Budget	X		Yearly

Description of Covenant

The Recipient shall prepare, under terms of reference satisfactory to the Association, and furnish to the Association not later than January 31 in each calendar year, for the Association's consideration, a proposed work plan of activities to be included in the Project for the following calendar year, such plan to include an implementation schedule and budget and financing plan therefor.

Conditions

Source Of Fund	Name	Type
IDA	Project Operational Manual	Effectiveness

Description of Condition

The Recipient has adopted the Project Operational Manual, including the IRM Operational Manual, in form and substance acceptable to the Association.

Source Of Fund	Name	Type
IDA	CERC Disbursement	Disbursement

Description of Condition

For Emergency Expenditures under Component 3 of the Project, unless and until the Association is satisfied, and notified the Recipient of its satisfaction, that all of the following conditions have been met in respect of said activities:

(i) recipient has determined that an Eligible Crisis or Emergency has occurred, has furnished to the Association a request to include said activities in the IRM Part in order to respond to said Eligible Crisis or Emergency, and the Association has agreed with such determination, accepted said request and notified the Recipient thereof;

(ii) the Recipient has prepared and disclosed all Safeguard Instruments required for said activities, and the Recipient has implemented any actions which are required to be taken under said instruments, all in accordance with the provisions of Section I.E of Schedule 2 to the Financing Agreement; and

(iii) the Recipient's Coordinating Authority has adequate staff and resources, in accordance with the provisions of Section I.E of Schedule 2 to the Financing Agreement, for the purposes of said activities.

Team Composition

Bank Staff

Name	Role	Title	Specialization	Unit
Jose C. Joaquin Toro Landivar	Team Leader (ADM Responsible)	Senior Disaster Risk Management Specialist		GSU09
Bobojon Yatimov	Team Leader	Sr Agricultural Spec.		GFA03
Ko Takeuchi	Team Leader	Senior Disaster Risk Management Specialist		GSU09

Dilshod Karimova	Procurement Specialist (ADM Responsible)	Procurement Specialist		GGO03
Niso Bazidova	Financial Management Specialist	Financial Management Analyst		GGO21
Angela Nyawira Khaminwa	Safeguards Specialist	Senior Social Development Specialist	Social Safeguards	GSU03
Cristobal Gonzalo Mena	Team Member	Consultant	Crisis Management System Consultant	GSU09
Darko Milutin	Team Member	Disaster Risk Management Specialist	Flood Risk Engineering Specialist	GSU09
Farangis Dakhte	Team Member	Program Assistant		ECCTJ
Faridun Sanginov	Team Member	Operations Officer		GSU09
Jasna Mestnik	Team Member	Finance Officer		WFALN
Marinos Skempas	Team Member	Consultant	Road and Bridge Engineer	GSU09
Maryia Markhvida	Team Member	Consultant	Seismic Risk Assessment	GSURR
Nikolai Soubbotin	Counsel	Lead Counsel		LEGLE
Philipp Leopold	Team Member	Consultant	Landslide Specialist	GSU09
Rustam Arstanov	Safeguards Specialist	Environmental Specialist	Environmental Safeguards	GEN03
Shahlo Norova	Team Member	Program Assistant	Program Assistant	ECCTJ
Svetlana K. Sharipova	Safeguards Specialist	Consultant	Social Safeguards	GSU03
Tatiana Skalon	Team Member	Consultant	DRM Analyst	GSU09
Yann Kerblat	Team Member	Disaster Risk Management Analyst		GSU09

Extended Team

Name	Title	Office Phone	Location

Locations

Country	First Administrative Division	Location	Planned	Actual	Comments

Consultants (Will be disclosed in the Monthly Operational Summary)					
Consultants Required ?	Consultants will be required				

I. STRATEGIC CONTEXT

A. Country Context

1. For the past decade, Tajikistan has been one of the youngest and fastest growing countries in the Europe and Central Asia Region. Landlocked and mountainous, this lower-middle-income country is home to 8.6 million people, with an estimated 27 percent living in urban areas (9.5 percent of them in the capital city, Dushanbe). In 2016, the gross domestic product (GDP) of Tajikistan was estimated at US$6.9 billion. The structure of GDP was represented by services at 47 percent, agriculture at 23.3 percent, industry at 17 percent, and construction at 12.6 percent.

2. **Tajikistan's economy has little capacity to absorb losses caused by major shocks.** With the export of commodities and remittances driving its economic growth, the country is vulnerable to world prices, market fluctuations, and external conditions.[1] Despite continued downward trend in remittances, net export growth and foreign-financed investments boosted real GDP output from 6 percent in 2015 to 6.9 percent in 2016. At the same time, Government debt grew, from 34.1 percent in 2015 to an estimated 41.4 percent of GDP in 2016, largely driven by the financial sector bailout at the end of the year[2].

3. **While poverty rates have fallen dramatically in Tajikistan in past years, they remain high.** With a GDP per capita of US$804 in 2016, Tajikistan is one of the poorest of the former Soviet republics, even though poverty rates declined from 73 to 30.3 percent between 2003 and third quarter of 2016, based on the national poverty line, and the decline is expected to continue, although dependent on continued increase in remittances. Poverty is particularly acute in rural areas, with four out of five poor persons living in rural households. The strong seasonality of rural poverty rates reflects fluctuating incomes, mostly in low-productivity sectors. National surveys indicate virtually no gender difference in relative poverty rates, but households headed by females are more at risk of falling into poverty and extreme poverty than those headed by males. Access to basic public services is low and decreasing due to a lack of investment, as well as to the difficulty of providing services to a dispersed population. At subnational levels, regional variations in poverty rates are currently large, with the Khatlon Oblast and Gorno-Badakhshan Autonomous Oblast (GBAO) among the poorest regions of the country. While the Khatlon Oblast is the most populated rural area, GBAO, with a population density of 7.3/km^2, is the most remote and difficult to access. In the future, poor people will be the most affected by extreme weather events induced by climate change and related natural hazards, as they tend to depend more directly on vulnerable land and water resources. Today, therefore, after at least fifteen years of poverty reduction and shared prosperity, this progress is at risk, as is the achievement of Tajikistan's national development goals—food and energy security, in particular.

B. Sectoral and Institutional Context

4. **Tajikistan ranks first among countries in the Europe and Central Asia Region in terms of vulnerability to climate change, a situation exacerbated by the country's lack of**

[1] Asian Development Bank, Tajikistan - Promoting Export Diversification and Growth, 2016.
[2] In December 2016, the GoT issued bonds for the recapitalization of the financial sector in the amount of 6.1 percent of GDP

adaptive capacity to respond to frequent shocks.[3] Its unique terrain and geological and hydrological features make it prone to many natural hazards, such as floods, earthquakes, landslides, mudflows, avalanches, droughts, and heavy snowfalls, and climate change is expected to increase the occurrence of events dependent on hydrometeorological conditions. Future rainfall patterns are projected to be irregular in terms of intensity, duration, volume, and geographical distribution. Mean annual temperatures are projected to be 2°C warmer by 2050, the number of "dry" days[4] will increase by three per year, and the number of "cold" days[5] will decrease by thirty-five per year.[6] The increase in annual temperature is already triggering stronger glacier melting, while droughts, floods, and heat and cold waves could occur more frequently. The current warming trends in the high-altitude areas of Tajikistan, for instance, are already causing significant changes to glaciers, one of the most vulnerable ecosystems, and many small glaciers will completely disappear within thirty to forty years, or even sooner, if the present rate of degradation continues. Overall, the cumulative effects of climate change factors are expected to make summers wetter and winters drier, which could result in both erratic unseasonal floods and intensified droughts.

5. **In Tajikistan, the social and economic impacts of natural disasters are significant.** In locally affected areas, natural disasters, particularly floods, earthquakes, and landslides, remain a persistent obstacle to sustainable development. From 1992 to 2016, disasters in Tajikistan caused economic losses in excess of US$1.8 billion and affected almost 7 million people.[7] Furthermore, a recent World Bank study on earthquakes and floods in the Europe and Central Asia Region estimated that average annual losses from floods in Tajikistan could reach 1.4 percent and from earthquakes 5 percent of GDP.[8] According to various scenarios tested in this same study, a major earthquake with a fifty-year return period could damage around 34 percent of Tajikistan's GDP, while the loss from a flood with a fifty-year return period could be around 7.6 percent of GDP.[9]

6. **As the most frequently occurring hazards in the country, floods and mudflows in Tajikistan are a recurrent threat, and they are expected to increase in both frequency and severity as a result of climate change.** Climate change is a serious concern for Tajikistan because the country is highly vulnerable and not very adaptable. Out of the 180 countries in Notre Dame Global Adaptation Initiative (ND-GAIN), Tajikistan is the 79th least vulnerable country and the 51st least ready country. Relative to other countries ranked by this index, its current state of

[3] The World Bank, Adapting to Climate Change in Europe and Central Asia, 2009.
[4] The Intergovernmental Panel on Climate Change (IPCC) defines "dry days" as the number of consecutive dry days that have a precipitation level lower than 1mm.
[5] The IPCC defines "cold days/cold nights" as the number of days where the maximum temperature, or nights where minimum temperature, falls below the 10th percentile, where the respective temperature distributions are generally defined with respect to the 1961-1990 reference period.
[6] IPCC, Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation: A Special Report of Working Groups I and II of the Intergovernmental Panel on Climate Change, ed. C. B. Field, V. Barros, T. F. Stocker, D. Qin, D. J. Dokken, K. L. Ebi, M. D. Mastrandrea, K. J. Mach, G.-K. Plattner, S. K. Allen, M. Tignor, and P. M. Midgley (Cambridge, UK, and NY: Cambridge University Press, 2012).
[7] CRED, International Disaster Database, http://www.emdat.be
[8] Losses expected per year from a given event averaged over many years.
[9] A return period is a common way to express the time interval between given events. In this case, for instance, a hundred-year return period means that an earthquake of a particular intensity has a 1 percent probability of occurring in any one year (regardless of whether a similar earthquake has happened recently; the next such event will not necessarily occur in one hundred years).

vulnerability is manageable. If it is to become better adapted to future climate change and climate-related difficulties, however, improved preparedness is essential.[10] Given its complex geography, settlements and economic activities in Tajikistan tend to be concentrated naturally in more fertile but also more disaster-prone areas, such as alluvial fans and floodplains along rivers. Each year, floods occur either in the spring following heavy rains or in the summertime during snowmelt, affecting not only mountainous and hilly rural areas that are sparsely populated but also major urban areas, while flash floods can be extremely destructive in the valleys.[11] As mentioned, unseasonal floods are expected to be among the extreme weather events climate change will bring.[12] The country experiences an annual average of over seventy flood events, occurring most frequently in the Pyanj, Vakhsh, and Zerafshan river basins. On smaller rivers, such as the Vanj and Yakhsu and tributaries, flows during flood periods can exceed the monthly average by a factor of five or more, while for larger rivers, such as the Pyanj, it is generally two times or less. For rivers with glaciers in their uppermost catchment areas, so-called Glacial Lake Outburst Floods can appear. In such an event, the average flow is exceeded even more.

7. **Earthquakes are less frequent than floods in Tajikistan, but their impacts are more severe.** From 2010 to 2015, 145 earthquakes were registered in the country, causing US$4.7 million in damage. With 74 percent of the population living in earthquake zones where earthquakes have magnitudes of 8 to 9 on the Richter scale, both urban and rural areas are endangered by the high seismicity, including such important facilities as hydropower plants.[13] Although almost all the territory of the country (96.8 percent) is exposed to some level of seismic threat, the threat to Dushanbe is the highest.[14] In less-populated areas, such as the Pamir Mountains, the impact of seismic events is exacerbated by the combination of exposure to high-seismic risks with extreme poverty and lack of resources for risk reduction and infrastructure maintenance. In 2015, a 7.2 magnitude earthquake that struck GBAO caused widespread damage to infrastructure, blocking transportation routes, displacing 652 people, and leaving 4,000 more in need of assistance. Emergency response to this event was significantly constrained by the remote location of the affected area and lack of alternative routes to it.

8. **Landslides also pose a serious threat to Tajikistan.** Landslides are usually triggered by heavy rains and floods and, periodically, by earthquakes. About 36 percent of Tajikistan's surface is exposed to landslides, with more than 50,000 landslide sites registered. Of these, 1,200 put human settlements, roads, irrigation, and other facilities at high risk and pose a threat to 728,000 people, or 11 percent of the total population.[15]

9. **The agricultural sector already suffers from low productivity and a lack of income diversification.** Tajikistan's total land area is 143,000 km^2, of which 93 percent comprises mountainous terrain with thousands of glaciers and rivers and only 7 percent is arable. Despite the limited arable land in the country and low productivity, agriculture offers a solid foundation for

[10] Notre Dame Global Adaptation Initiative Country Index (ND-GAIN Country Index). http://index.gain.org/country/tajikistan
[11] CARFFG, Final Report on the Planning Workshop, 2015.
[12] World Bank, Asian Development Bank, European Bank: Pilot Program for Climate Resilience - Tajikistan, Joint Mission Report, 2009.
[13] World Bank, UNISDR, CAREC, Risks Assessment for Central Asia and Caucasus Desk Study Review, 2009.
[14] The World Bank, UNISDR and CAREC, Central Asia and Caucasus Disaster Risk Management Initiative: Risks Assessment for Central Asia and Caucasus Desk Study Review, 2009.
[15] UNDP, Natural Disaster Risks in Central Asia: A Synthesis, 2010.

economic development. Even with the lowest compensation of any sector, it continues to dominate the labor market by accounting for almost 70 percent of total employment and 25 percent of the country's GDP. More than 60 percent of Tajikistan's population is solely dependent on agriculture as a source of livelihood, and cotton is one of the main commodities exported (others are aluminum and gold). Cotton fields, as well as other agricultural crops, are frequently exposed to extreme weather events, such as droughts, cold weather, hail, and floods. This is especially true for the Khatlon Oblast, where agriculture contributes to about 80 percent of the region's GDP and 40 percent of exports. Growing sensitivity to climate change and damage from the increasingly frequent natural disasters it brings can seriously impede the productivity of and yields from the limited arable land and affect people's livelihoods, particularly in mountainous areas. Climate change projections indicate that, by 2100, agricultural yields could drop by as much as 30 percent in some regions of the country.

10. **Tajikistan is Central Asia's least accessible, most isolated country, with low regional and international connectivity.** The transportation system of Tajikistan includes railways approximately 680 km in length and 14,000 km of roads. The country increasingly depends on external trade for its export-driven business in agriculture and importation of goods and for industrial development, both of which require reliable, safe, and affordable transportation and telecommunication connectivity. Furthermore, with a population density of 58.6 persons per km^2, Tajikistan depends heavily on its transportation network for providing access to services and facilities to its people—many of whom live in dispersed and remote settlements—through a mountainous terrain, where intense natural hazards frequently disrupt connectivity and damage assets, especially in winter. Such frequent disruptions impose an additional burden on populations whose access to district centers and nearby markets is already restricted. In GBAO, the international M41 route is Tajikistan's only link to China, one of its main trading partners. M41 is frequently exposed to avalanches, mudflows, landslides, floods, and rock falls, making the transportation of goods generally unsafe and, at times, dangerous. In 2015, disasters destroyed numerous assets (for example, bridges) and interrupted services along the M41 route in the Murghab and Vanj districts of GBAO. If increased resilience is not built into new or existing infrastructure, based on expected climate change effects and improved technical guidelines, future extreme weather events and related hazards could put it at further risk.

11. **Tajikistan's infrastructure is gradually deteriorating from insufficient maintenance and repeated exposure to natural hazards.** The country's infrastructure investment needs are acute, given that most of its capital assets, including irrigation channels, flood protection, and river embankments, as well as transportation infrastructure and dams, were built during the Soviet Union period. The resulting situation not only restricts access of the population to basic social and infrastructure services; it also accentuates the people's vulnerability to extreme weather events and seismic risks. In 2005, for instance, floods that hit the Khatlon Oblast destroyed or damaged already compromised flood protection dikes, irrigation infrastructure, and water supply networks, as well as roads, bridges, and hectares of agricultural lands, providing an illustration of what happens when recurrent disasters take away precious resources for responding to such events and reconstructing affected areas. In Tajikistan, scarce budgetary resources are frequently stretched over many competing needs, which tends to reduce options for budget allocations dedicated to ex-ante measures, such as risk prevention and infrastructure maintenance. This is especially the case in remote areas and for costly civil works projects undertaken in difficult terrains. As a result, the

need to monitor, preserve, and/or repair aging infrastructure and systematically invest in risk reduction is pressing and growing rapidly across the country.

12. **The needs are numerous, and the scarce resources of the Government of the Republic of Tajikistan (GoT) are needed for competing development projects.** Among many other needs, systematic investments in disaster risk reduction are necessary across various sectors in the country. If transportation infrastructure, for example, such as roads and bridges, is to withstand natural disasters, risk information needs to be integrated and robust resilience standards applied, so as to minimize disruption to infrastructure services and related socioeconomic activities. This need is made apparent every year by the accumulated effects of several disasters, such as the mudflows and floods that significantly disrupted access and services in GBAO in 2015. In addition, the GoT's financial capacity will need to be strengthened and made more agile. Bottlenecks and constraints in the recovery process caused by lack of funding are likely to amplify disaster impacts over time. The inability to restore public infrastructure rapidly not only causes immediate complications; it has long-lasting impacts on local communities and their livelihoods (in addition to the livelihoods lost to the disaster), limiting their ability to get access to aid and other resources during recovery and reconstruction.

13. **Tajikistan is gradually moving from disaster response to risk mitigation.** As in many other countries, civil protection in the Soviet Union was oriented primarily toward emergency response. Investments in risk reduction were usually the responsibility of line ministries and institutes separate from civil protection agencies. After the Soviet Union was dissolved, many institutions involved with disaster risk management (DRM)—such as the Institute of Seismology and Earthquake Engineering (IoSEE)—had both their human resources and the funds they needed to perform their activities considerably reduced, based on the available financing and shifting priorities. Thus, the DRM system Tajikistan inherited after gaining its independence had fewer possibilities and smaller human and resource capacities for mitigating such risks.

14. **The GoT has taken a number of steps to mainstream DRM into its development planning.** In 1994, the GoT formed under it the Committee for Emergency Situations and Civil Defense (CoESCD), which is directly authorized and responsible for management of emergency situations caused by disasters. The State Commission for Emergency Situations (SCES) is a national, multisectoral mechanism to coordinate plans for rehabilitation and reconstruction and a key platform for engaging in policymaking in this area. The GoT has been collaborating with donors and development partners to manage disaster risks proactively. In 2001, with support from the United Nations Office for the Coordination of Humanitarian Affairs, a coordinating structure for international disaster response to Tajikistan—the Rapid Emergency Assessment and Coordination Team (REACT)—was also established. REACT has since expanded and now serves to share information and experiences on disaster management, including preparedness, response, and mitigation, among the Tajikistan development partners and the CoESCD and other stakeholders.

15. **The GoT recently adopted the Sendai Framework for Disaster Risk Reduction in 2015 to replace its predecessor, the Hyogo Frameworks for Action.** In 2010, the GoT, with support from the United Nations Development Programme (UNDP), approved a National Disaster Risk Management Strategy for 2010–15. The strategy emphasized the importance of disaster risk reduction and preparedness and the need to establish a sustainable foundation for effective

prevention, mitigation, warning, and response to possible disasters. In 2012, the GoT established the National Platform for Disaster Risk Reduction (NPDRR) as part of the SCES, to serve as a consultative and advisory body for coordinating the activities of organizations working on DRM in Tajikistan. As of 2016, the National Strategy was being revised to align with the 2015 Sendai Framework for Disaster Risk Reduction.

16. **The GoT is currently strengthening its institutional DRM capacity, with a particular focus on early warning systems and preparedness.** The Central Asia Hydrometeorology Modernization Project (P120788), for example, is supporting efforts by the national hydrometeorological services of the five Central Asian countries to collaborate, share data and expertise, and rebuild infrastructure and human capacity to improve the accuracy and timeliness of weather and river flow forecasts for better hazard warnings and reduced risks of weather-related disasters. In 2015, following an earthquake and destructive landslide debris flow in GBAO (Tajikistan), the World Bank partnered with the CoESCD to undertake a rapid risk assessment and made recommendations for restoring transportation links and establishing an emergency management plan. Building on this collaboration, the Strengthening Early Warning of Mountain Hazards in Central Asia (P158373) project is also expected to provide support to Tajikistan to enhance its capacity to assess flash floods and landslides. More recently, the Japan-World Bank Program for Mainstreaming Disaster Risk Management in Developing Countries, administered by the Global Facility for Disaster Reduction and Recovery (GFDRR), began providing technical assistance by using hazard assessments to design more resilient transportation and flood protection infrastructure. Finally, the Capacity and Needs Assessment, which is currently taking place in coordination with donors and key development partners, is reviewing the CoESCD's current DRM status. Improving and modernizing the country's crisis management system was identified as the key priority to improve monitoring of hazards (including weather-related hazards exacerbated by climate change), improve interagency coordination, establish best international practices on decision-making models, issue timely early warnings, decentralize and add redundancy to the system, and reduce the overall emergency response time. Relevant capacity building, encompassing operation and maintenance plans for the improved crisis management system, will also occur under the ongoing Capacity and Needs Assessment to ensure the sustainability of the investments under this project.

17. **In addition, the GoT has also been upgrading infrastructure such as irrigation, road networks, and energy infrastructure.** The GoT is currently addressing important legacy issues, such as aging infrastructure and unsustainable land and water management. The Tajikistan Second Public Employment for Sustainable Agriculture and Water Resources Management Project (PAMP II) (P133327), for example, has provided initial support for rehabilitation of some of the flood protection infrastructure damaged during the July 2015 floods and mudflows. Phase II of the Central Asia Road Links–Tajikistan (CARs) program (P145634) currently helps increase connectivity between the Sugd Oblast in Tajikistan, the Batken and Osh Oblasts in the Kyrgyz Republic, and the Fergana Oblast in Uzbekistan. It also supports improvements in road operations and asset management practices.

18. **Despite recent efforts to enhance legal and institutional frameworks for DRM and a number of related programs undertaken by the World Bank and other development partners in Tajikistan, significant needs for improvement persist.** They include the following: (a) a need for systematic disaster risk reduction and risk-informed investments for critical

infrastructure; (b) a need to increase the country's response capacity by modernizing its crisis management systems to respond to emergencies more efficiently and by putting in place financial protection mechanisms; (c) a need to produce and share disaster risk information to inform planning and investments in various development sectors; and, (d) a need on the part of DRM stakeholders for further capacity. The project will establish a foundation to address these significant needs.

19. **The World Bank's experience in building resilience will be relevant in the proposed project:** (a) for consolidating global and regional experiences to finance and scale up DRM investments: (b) for coordinating and harmonizing the efforts of donors and development partners to leverage additional funding for DRM; and, (c) for utilizing previous experiences and work in Tajikistan to support flood protection, transport, and hydrometeorological services.

C. Higher-Level Objectives to which the Project Contributes

20. **Building disaster and climate resilience is essential to supporting the World Bank's twin goals of ending extreme poverty and promoting shared prosperity.** Disaster events can undermine hard-won development gains, potentially trapping vulnerable groups into poverty and preventing economic growth. Activities contributing to resilience are, therefore, directly linked to sustained development, allowing the poorest—the most affected by such disasters—to escape cycles of poverty. A recent World Bank report "Unbreakable: Building the Resilience of Poor in the Face of Disasters" (2016) discusses multiple reasons why the poor are often hit the hardest, including their inability to cope and recover and the permanent impact of disasters on their health and education. DRM interventions can significantly reduce the potential impacts of disasters and thereby protect existing development gains. The activities are also in line with the World Bank's corporate agenda, on which DRM was adopted as a priority item during the 2012 Annual Meetings in Tokyo (World Bank Sendai Statement).

21. **Investments under the project will help reduce both the physical and socioeconomic vulnerabilities of Tajikistan's population to climate-related disasters.** Planned activities, such as the rehabilitation of bridges and flood protection, would reduce the population's vulnerability and would ensure business continuity, and sustainability of the GoT efforts in DRM, as well as economic development and poverty reduction, among other things. By addressing the cross-cutting theme of gender in the design of the components, the project will contribute to the broader goal of reducing the vulnerability of Tajikistan's women and girls.

22. **Furthermore, the project is aligned with the GoT's vision, as expressed in the World Bank Group's Country Partnership Strategy (CPS) for FY2015–18** (report #86372-TJ), discussed by the Executive Directors on June 10, 2014. In congruence with Pillar 2 of the CPS on regional connectivity, the project will support improvements to physical road and flood infrastructure and be instrumental to minimizing interruptions by poor road connectivity to facilitate trade, competitiveness of domestic products, and the potential for economic diversification. The project is also relevant to the CPS's social inclusion pillar, given its intent to adopt the "building back better" approach for rehabilitating transportation and flood protection infrastructure. This approach will underpin efforts to improve access to vulnerable and remote populations in targeted areas and limit potential damage to municipal infrastructure, such as schools, hospitals, and water supply systems, from flooding of the rivers. In addition, the project

is well aligned with the CPS cross-cutting theme of climate change, particularly in terms of enhancing DRM. This priority activity will be operationalized by supporting relevant counterparts in improving disaster risk preparedness, disaster risk financing, and solution-oriented capacity enhancement, such as the activities envisioned to modernize crisis management centers (CMCs) and systems for the CoESCD, and to prepare a financial protection strategy for the Ministry of Finance (MoF).

II. PROJECT DEVELOPMENT OBJECTIVES

A. PDO

23. The Project Development Objectives are to strengthen the recipient's disaster risk management capacities, enhance the resilience of its critical infrastructure against natural hazards, and improve its capacity to respond to disasters. It will be achieved by attaining a better understanding of disaster risks, improving disaster risk–informed planning, designing and reconstruction of critical infrastructure (including bridges and flood protection and riverbank erosion–prevention infrastructure), and improving recipient's capacity to respond promptly and effectively in emergencies.

B. Project Beneficiaries

24. Approximately 650,000 people live and work in the districts where the subprojects for strengthening bridges and flood protection and riverbank erosion–prevention infrastructure will be implemented. The roughly 260,000 people annually affected by emergencies who will have access to improved emergency response services (through the CMCs and systems) will be considered indirect beneficiaries of this investment. The direct beneficiaries will include approximately thirty-seven villages with a total population of around 110,000 in the Khatlon Oblast (where reconstruction of flood protection and riverbank erosion–prevention infrastructure will take place) and approximately twenty-three villages with a population of around 12,000 in GBAO (where bridges will be strengthened). The project will further benefit the country by contributing to restoration of the M41 route, which provides the only access to the capital of GBAO—Khorugh, in which around 30,000 people live—and is the main China–Tajikistan trade route, and by increasing the country's capacity to respond to natural disasters. Approximately 51 percent of the beneficiaries are expected to be women and girls. Representatives of the CoESCD and relevant ministries and agencies, such as the MoF, Ministry of Transport (MoT), Agency for Land Reclamation and Irrigation (ALRI), and the IoSEE, will also benefit from technical and institutional capacity building in planning, implementation, and monitoring.

25. The gender-specific indicators will be collected throughout project implementation. Once subprojects are identified, data collected by the Social Assessment conducted during project preparation will be updated through follow-up surveys to include, among other information, gender-disaggregated data on the project-affected population. The Social Assessment will examine the link between road usage and flood management and gender and support mainstreaming gender into natural hazard resilience.

C. PDO-Level Results Indicators

26. Progress toward achieving the development objectives will be measured through the following key performance indicators:

(a) Crisis management centers and systems becoming operational

(b) Improved understanding of seismic hazard

(c) Bridges reconstructed based on designs that consider multi-hazard disaster and climate change risks

(d) Number of people whose disaster risks are reduced through more resilient flood and riverbank erosion–prevention infrastructure

(e) Strengthened capacity to coordinate and respond to emergencies

III. PROJECT DESCRIPTION

A. Project Components

27. **Project overview.** The proposed project is envisioned to establish the foundation of the GoT's long-term DRM program and is based on a high demand for support for overall DRM and reconstruction of critical infrastructure in the country, such as bridges and flood protection and riverbank erosion–prevention infrastructure, through the "building back better" principle. As an initial step, the project will target areas in GBAO and in the Khatlon Oblast that were affected by floods and mudflows in July 2015 and finance reconstruction of infrastructure (including bridges and flood protection and riverbank erosion–prevention infrastructure) to reduce disaster risks and avoid potential damage in the long term, given the area's exposure to natural hazards. Finally, the project will strengthen the GoT's capacity for DRM to address countrywide disaster risks, including floods, mudslides, rock falls, avalanches, landslides, and earthquakes.

28. The project consists of the four components described in the following sections (see Annex 2 for details).

Component 1: Strengthening Disaster Risk Management Capacity (estimated cost: US$4 million)

29. This component is intended to strengthen the GoT's capacity for DRM through selected activities that focus on disaster risk identification, disaster preparedness, and financial protection against disasters. It will be implemented in coordination with UNDP, which has been continuously strengthening the capacities of the CoESCD at the national and regional levels, while building regional mechanisms for disaster risk management and mainstreaming disaster risk reduction into state policy at the national and subnational levels.

Subcomponent 1.1. Modernizing the Crisis Management Centers and Systems for Improved Disaster Preparedness

30. The project will finance (a) necessary works to build or renovate a facility to host the national CMC; (b) purchasing of required information and communication technology equipment to be installed within the national CMC, including equipment for dispatching early warnings, automated emergency call receiving system and dispatch services, disaster management information system, and robust crisis communications; (c) purchasing of mobile command and communication vehicles for the improved crisis management systems at the regional/local levels to perform as regional/local-level CMCs; (d) consultancy services for preparing an operations manual for the CMCs and systems; and (e) trainings for relevant staff and operators of the CMC and users of mobile command and communication vehicles. This activity will be implemented by the MoF Project Implementation Unit (PIU) with technical inputs and supervision from the CoESCD.

Subcomponent 1.2. Seismic Hazard Assessment for Improved Disaster Risk Identification

31. The project will finance the purchase of necessary equipment, such as seismic stations, seismic sensors, analytical software, and so on, for the IoSEE to conduct probabilistic seismic hazard assessment of the territory of Tajikistan and seismic micro zoning for Dushanbe and its surrounding area, based on the results of the national probabilistic seismic hazard assessment. This activity will be implemented by the MoF PIU, with technical inputs and supervision from the IoSEE.

Subcomponent 1.3. Preparation of a Financial Protection Strategy for Mitigating Fiscal Shocks Caused by Natural Disasters

32. As an initial step for increasing the financial protection of Tajikistan, the project will support detailed fiscal risk diagnostics and assessments that will help identify contingent liabilities, available resources, and funding gaps. Furthermore, based on the fiscal risk diagnostics, the project will support preparation of a financial protection strategy covering ways for Tajikistan to mitigate fiscal shocks caused by disasters. This strategy will also touch upon actions to improve existing financial instruments or introduce new ones. To conduct these activities, the project will finance consulting services for conducting the fiscal risks diagnostics, additional capacity-building activities, and preparation of the financial protection strategy. This activity will be implemented by the MoF PIU, with technical inputs and supervision from the relevant departments within the MoF.

Component 2: Making Critical Infrastructure Resilient against Natural Hazards (estimated cost: US$38 million)

33. This component will finance capital works and contingency planning (for example, equipment for emergency situations) for the transportation network in GBAO, which suffered the most significant damage in July 2015, as well as the flood protection infrastructure that has repeatedly been damaged in the Khatlon Oblast. Capital works for the transportation network will mainly include reconstruction and repair of a number of bridges, while works for flood protection

will include the strengthening of damaged existing infrastructure, complemented by adequate erosion prevention measures.

Subcomponent 2.1. Strengthening of Bridges (US$19 million)

34. The works to be financed under this subcomponent will mainly comprise the reconstruction of bridges in the districts of GBAO. Preliminarily identified target bridges include those in Rushon and Vanj districts in GBAO along the Chikhoh–Ravgada, Vanji–Bolo, and Vanj–Yazgulem roads and the Dushanbe–Kulyab–Khorog–Kulma (M41) routes. The subcomponent also includes procurement of heavy specialized machinery for MoT to prepare for emergency response and maintenance of its infrastructure assets.

Subcomponent 2.2. Strengthening of Flood Protection and Riverbank Erosion–Protection Infrastructure (US$19 million)

35. The project will support the strengthening of selected flood protection infrastructure in the Khatlon Oblast. Preliminarily identified target catchments for intervention include the Dahana, Kofarnikhon, Kyzylsu, Surkhob, Yakshu, and Ziraki rivers in the Khatlon Oblast. Capital works for flood protection will include the reconstruction and strengthening of damaged river embankments, flood protection dikes, and infrastructure for the prevention of riverbank erosion and will potentially include irrigation, as well as drainage intakes and outlets. The subcomponent also includes procurement of heavy specialized machinery for ALRI to prepare for emergency response and maintenance of its infrastructure assets.

Component 3: Contingent Emergency Response Component (estimated cost: US$6 million)

36. The objective of this component is to enhance Tajikistan's capacity to respond to disasters.[16] An emergency eligible for financing is an event that has caused, or is likely imminently to cause, a major adverse economic and/or social impact to the Borrower, associated with a disaster. Rapid disbursement will allow the GoT to request a reallocation of project funds to partially cover emergency response and recovery costs. This component could be used to reallocate project funds or channel additional funds to fully or partially replenish funds reallocated to the CERC should they become available as a result of an eligible emergency.[17] The initial allocation of US$6 million under this component is partially based on the imminent risks of floods, mudflows, and so on during the summer of 2017, stemming from heavy snowfall during the winter of 2016 and delayed snow melting during the spring of 2017.

[16] To compensate for the absence of a fast-disbursing instrument for IDA countries, the World Bank encourages the introduction of a Contingent Emergency Response Component (CERC) in all IDA operations. A CERC is a financing mechanism to strengthen a borrower's country response and recovery capacity by allowing World Bank investment project funds to be quickly reallocated to emergency recovery activities after an eligible emergency has occurred or is about to occur. This financing mechanism averts the need for time-consuming project restructuring because the budget line is already there.

[17] Once the requirements for activating it are met, uncommitted funds from the project are reallocated to the CERC and made available for crisis or emergency response. To facilitate a rapid response, a formal project restructuring is deferred to within six months after the CERC is activated.

Component 4: Project Management (estimated cost: US$2 million)

37. This component will support incremental operating costs for the implementing agencies (IAs)—the MoF, the MoT, and ALRI—for project execution, including overall project administration and management, prioritization of subprojects, management of social and environmental safeguard issues, financial management (FM), procurement, contract administration, project reporting, and monitoring and evaluation (M&E).

B. Project Financing

38. Financing for the proposed project will be in the amount of US$50 million. No counterpart funding is expected. The lending instrument will be Investment Project Financing (IPF), and the project implementation period is six years. An IPF provides the flexibility to build human and institutional capacity and construct infrastructure. This instrument also allows for close follow-up of defined activities and procedures and for adjustments, where necessary, on the part of the government and the International Development Association (IDA).

39. A summary of the allocation of IDA financing per component, in addition to IDA financing amount and percentage of financing, is provided in Table 1.

Table 1. Project components, costs and financing

Project Components	Project Cost (US$, millions)	IDA Financing (US$, millions)	% Financing
1. Strengthening Disaster Risk Management Capacity	4	4	100
2. Making Critical Infrastructure Resilient against Natural Hazards	38	38	100
2.1. Strengthening of Bridges	19	19	100
2.2. Strengthening of Flood Protection and Riverbank Erosion–Protection Infrastructure	19	19	100
3. Contingent Emergency Response Component	6	6	100
4. Project Management	2	2	100
Total Costs	50	50	100
Total Project Costs	50	50	100
Front-End Fees			
Total Financing Required	50	50	100

C. Lessons Learned and Reflected in the Project Design

40. The proposed project incorporates lessons learned from both international and local projects implemented in Tajikistan, specifically in the areas of DRM, flood risk management, and resilient critical infrastructure. The key lessons learned were incorporated into the design of the proposed project and are discussed in the following paragraphs.

41. **Applying risk information to enhance the design of the critical infrastructure to be rehabilitated is crucial.** A central theme of the proposed project is to mainstream the application of hazard information (hazard recurrence, for example) and ensure that rehabilitated and/or constructed assets are less susceptible to damage caused by the recurrence of natural hazards in their vicinity. As seen from the current condition of the infrastructure for which rehabilitation is proposed, previous technical designs did not take into consideration natural hazard impacts, either present or prospective.

42. **Preventive maintenance can significantly reduce risk and minimize operational/maintenance costs in the long term.** Experience shows proactive maintenance can significantly reduce medium- and long-term operation and maintenance costs for most infrastructure. Additionally, effective preventive maintenance can prolong the life of the design and reduce the risk of infrastructure failure.

43. **Coordination among key stakeholders is essential to developing adapted and cutting-edge solutions.** The MoF plays a vital role in coordinating the project with relevant stakeholders in terms of feasibility and detail design, as well as institutional strengthening activities. The same structured principle will be applied during the project implementation phase. The advantage of coordination efforts led by the MoF is that they will ensure adequate involvement of all relevant stakeholders in key activities, both within the scope of the project and with reference to broader DRM matters. Furthermore, the MoF's central role in triggering any CERC activities will also be informed by inputs from these stakeholders.

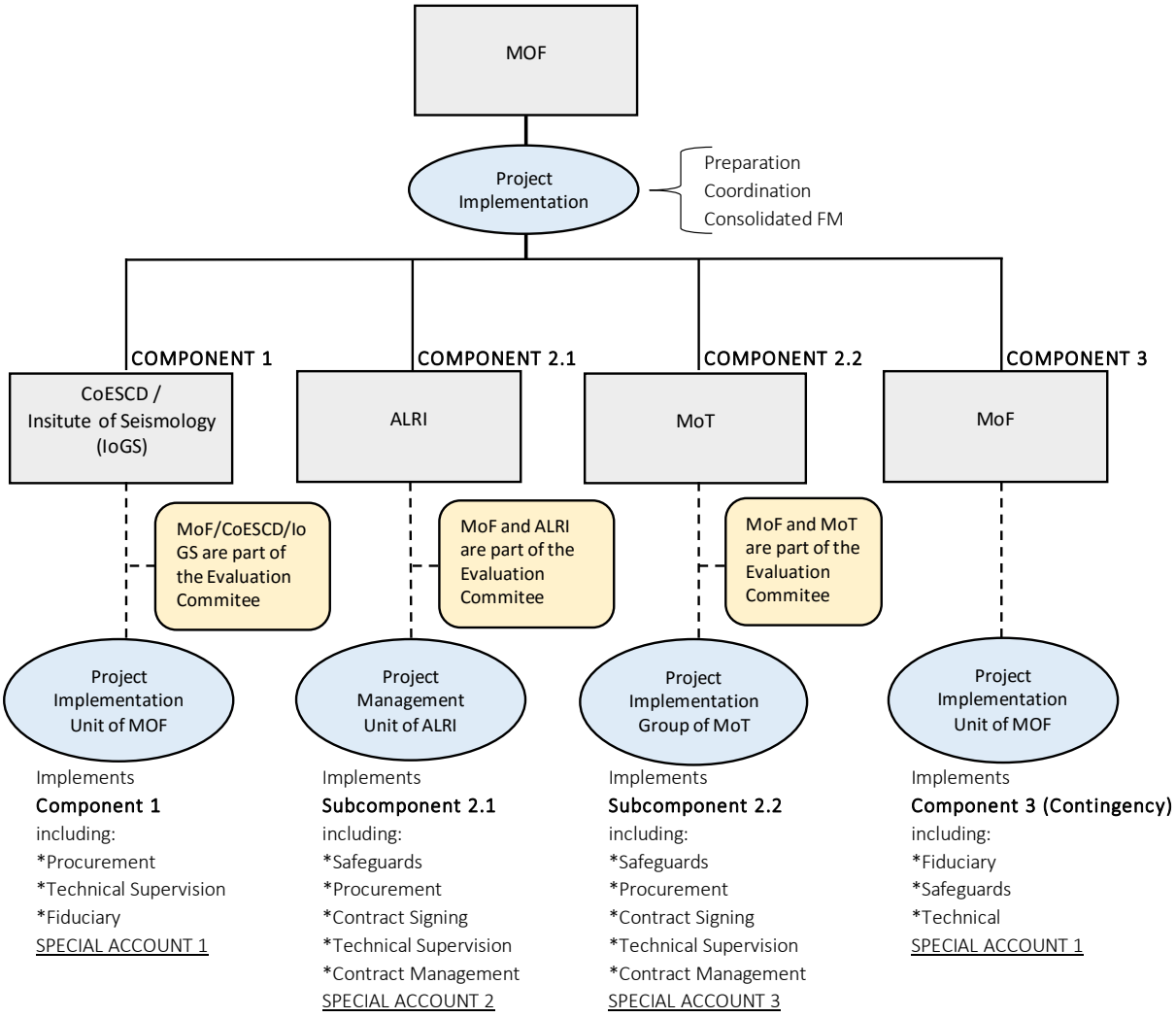
44. **Meeting a GoT's immediate liquidity needs is essential to ensuring timely post-disaster response.** In the aftermath of a catastrophe, most governments in affected regions experience difficulty in quickly raising emergency funds. Resources are often sourced from other line ministry budgets, which disrupts existing development programs. The GoT has some contingent funds available at both national and local levels, but they may be insufficient. To cope with this risk, the proposed project includes a CERC to finance immediate response and recovery needs.

IV. IMPLEMENTATION

A. Institutional and Implementation Arrangements

45. The MoF PIU will lead the overall supervision and coordination of the project implementation, FM consolidation, and monitoring and reporting consolidation. The MoF PIU will also execute Component 1 (Strengthening of DRM Capacity) and Component 3 (Contingent Emergency Response), including procurement and safeguard-related aspects, with technical inputs and supervision from such relevant agencies as the CoESCD and IoSEE and relevant departments within the MoF. Component 2 will be implemented by the MoT with regard to activities related to the reconstruction of bridges and by ALRI for those related to the reconstruction of infrastructure for flood protection and riverbank erosion prevention. Both the MoT and ALRI will be in charge of the procurement, FM, technical inputs and supervision, and safeguard-related aspects of their respective activities. Detailed implementation arrangements are provided in Annex 3.

Figure 1. Institutional and Implementation Arrangements



46. **Financial management (FM).** The MoF PIU will have overall responsibility for FM and disbursement functions, including consolidation and submission of the interim financial reports (IFRs) and audit reports, while the MoT and ALRI, through their financial and accounting units, will have overall responsibility for FM of Subcomponent 2.1 and Subcomponent 2.2 and will provide information to the MoF PIU for consolidation. The FM assessment found that staff from the MoF PIU, the Project Implementation Group (PIG) of MoT, and the ALRI Project Management Unit (PMU) had acquired experience under existing World Bank projects. The FM staffing capacity in terms of numbers was not adequate, however, and dedicated consultants will need to be contracted for project FM and disbursement functions. Accounting and financial reporting at the agencies will need to be modified, with controls built in to ensure financial reports produced by the accounting system are reliable and that the system can generate the IFRs required under the project. The MoF PIU will prepare and submit to the World Bank consolidated unaudited IFRs, in form and content satisfactory to the World Bank. Project financial statements will be

subject to independent audit by auditors satisfactory to the World Bank, with the MoF PIU responsible for the audit.

B. Results Monitoring and Evaluation

47. The Results Framework, presented in Annex 1, was developed in coordination with the GoT, and the World Bank's core indicators have been included where applicable. The MoF PIU will be responsible for monitoring and reporting of the performance indicators defined for this project, which will be reported to the World Bank periodically. The PIU will assign a dedicated staff to coordinate M&E with line ministries in keeping track of progress and the outcomes of project activities (financed by Component 4). The Project Operational Manual (POM) will provide specific details regarding M&E responsibilities, including data collection requirements, timing, and use of the information.

48. Thematic areas that will be supervised and monitored include (a) social and environmental compliance, (b) regular technical quality supervision, and (c) periodic monitoring of physical and financial progress.

C. Sustainability

49. **Physical and financial sustainability.** The introduction of cost-effective disaster-resilient principles will improve the sustainability of the critical public infrastructure in need of rehabilitation or reconstruction. The GoT recognizes that the sustainability of infrastructure investments and physical development planning depends on better understanding adaptation options to strengthen resilience to disaster and climate risks. Optimal quality of infrastructure works will be guaranteed by the use of best practices for preparation and engineering design, construction supervision, and technical audits. The MoF is, for example, paying close attention in ensuring investments under the project are risk-informed by applying natural hazard assessment information to improve sustainability. Similarly, the MoT has expressed strong interest in utilizing this information, not only as part of the design for current bridges but more systematically—for example, by integrating it into its road assets database (currently under development with the support of a parallel World Bank transportation project). Specialists working with ALRI are also looking into developing more holistic approaches to flood protection involving technical solutions aimed at greater stretches of rivers, although these investments will need to be prioritized based on the urgency of interventions and consideration of hazard information. Finally, the critical infrastructure that will be strengthened under this project is expected to support local socioeconomic development, including local trade and access to public services.

50. **Institutional sustainability.** Project activities are part of a broader strategic dialogue on DRM that the World Bank is supporting in Tajikistan. A key outcome of the project will be the improved capacity of the GoT and relevant line ministries to engage in long-term planning to build and maintain climate-resilient infrastructure investments. Of particular emphasis is analytical and technical support to improve the GoT's approach to strengthening critical infrastructure against natural hazards, focused specifically on data-driven decision-making that involves long-term planning while enhancing understanding of the effects of short-term events. To ensure long-term sustainability of the public infrastructure reconstructed or rehabilitated under this project, the GoT will be required to furnish adequate plans for routine and periodic asset maintenance.

V. KEY RISKS

Overall Risk Rating and Explanation of Key Risks

51. The overall risk rating for the project is Substantial, as indicated by the Systematic Operations Risk-Rating (SORT) tool. This rating is based on potential political and governance risks and increasing economic volatilities in the region, as well as existing gaps in sector strategies and policies.

52. **Political and governance risks.** Political and governance risks are Substantial. Since the proposed project is being prepared at the request of the GoT, it is expected to benefit from the client's continued commitment and ownership. Tajikistan's limited capacity for DRM, however, imposes a risk that in the event of another natural disaster, the GoT's priorities may shift in favor of immediate relief and response rather than continued support for project activities intended to support institutional development. The project design has taken this into consideration by allowing for resource allocation to the CERC in case of such an occurrence. The team will also ensure that agreed-upon project components and subproject selections continue to adhere to specific principles and criteria, which should not be amended.

53. **Macroeconomic risks.** Macroeconomic risks are Substantial. Ongoing volatility in the macroeconomic environment due to declining labor remittances from Russia and slow economic growth forecasts for Tajikistan's partners (China, Kazakhstan, and Turkey) are likely to exert growing fiscal pressures and increase constraints on the GoT's spending priorities, including those for DRM. On the other hand, since earthquake damage alone results in an annual average loss of about 4.68 percent of Tajikistan's GDP,[18] dialogue with government counterparts should continue to emphasize the importance of strengthening DRM and the resilience of critical infrastructure to reduce contingent liabilities and fiscal risks and pressures and sustain gains in poverty reduction.

54. **Sector strategies and policies risks.** Sector strategies and policies risks are Substantial. Substantive sectoral challenges are posed both by an unclear division of responsibilities among the local executive structures, the CoESCD, and relevant ministries and agencies and a lack of fiscal planning for natural hazards at the national level. The project will, therefore, provide technical support to the GoT for establishing a national CMC to improve coordination for disaster response, as well as for preparing a financial protection strategy. These activities are expected to benefit as well from the ongoing GFDRR-funded technical assistance, which will provide a capacity-building plan for the CoESCD on disaster identification, preparedness, and response.

55. **Institutional capacity for implementation and sustainability risks.** Institutional capacity for implementation and sustainability risks are Substantial. Among the three IAs for this project, the MoF and ALRI have the benefit of longer-standing engagement with the World Bank, whereas the MoT has only recently begun collaborating with the Bank in a project that is ongoing. Through its engagement in this project, the MoT has shown sufficient capacity to implement similar activities and investments. With more work resulting from the investments under it, however, additional specialists will need to be hired for all three IAs. In addition, other relevant government stakeholders, such as the CoESCD and IoSEE, will be involved in a broader sector

[18] World Bank and IMF, Earthquake Damage Estimation, 2014.

dialogue on strengthening DRM and promoting sustainability of investments in this area, in close coordination with the REACT platform or the NDRRP.

56. **Environmental and social risks.** Environmental and social risks are Substantial. The long-term environmental impacts of activities under Component 2 are expected to be positive due to the restoration of the streambeds and better protection of the riverbanks from erosion. The main social risks are related to possible delays in civil works or land acquisition carried out without following the Resettlement Action Plan (RAP). Additional risk may be attributable to the labor influx for civil works; this risk appears to be low, however, given the past experience of the communities, as indicated in the Social Assessment. In view of the borrower's limited social safeguards capacity, timely implementation of safeguard requirements and monitoring of social impacts are expected to be challenging. Coordination between designers and safeguard consultants will need to be properly managed, and an approach to implementing safeguards and social mitigation measures will need to be agreed on with the contractors.

57. **Fiduciary risk.** Fiduciary risk is Substantial. Although the proposed project implementation entities (the MoF, the MoT, and ALRI) have experience in managing past and ongoing World Bank projects, the project involves different sectors and three separate agencies. It will be essential, therefore, to ensure sound fiduciary coordination and control. Specific mitigation actions and measures are described in further detail under section C of the Appraisal Summary (Financial Management), section D (Procurement), and Annex 3 (Implementation Arrangements).

VI. APPRAISAL SUMMARY

A. Economic and Financial (if applicable) Analysis

58. The proposed project is expected to contribute to the World Bank Group's twin goals of ending extreme poverty and promoting shared prosperity by financing improved infrastructure and strengthening public sector management capacity to mitigate the negative effects of natural disasters that disproportionately affect the poor and force households to fall into poverty due to loss of incomes and livelihoods.

59. Based on the information existing during project preparation, the Economic Analysis focused on assessing the rate of return on capital investments for Component 1, for improving CMCs and systems, and Component 2, for strengthening critical infrastructure for the transportation and flood protection sectors. A probabilistic model was tailored to assess the project's economic performance, using relevant modeling techniques -such as DRM annual average loss calculations based on return period of hazards - and assessment of exposure, vulnerability, and Highway Development and Management 4 (HDM4) to evaluate the improvement of road network connectivity. Key assumptions and inputs are based on several expert judgments, collection of field data, available statistics, and other literature, as relevant. The assessment was deliberately biased toward conservative values to avoid overestimating the benefits.

60. The analysis yielded satisfactory conclusions: the most likely value of the net present value (NPV) of the investment, its benefit over cost ratio (B/C), and its economic rate of return (ERR) were calculated at US$71 million, 2.1, and 9.4 percent, respectively (the mean values were even

higher). These economic indicators are considered well above acceptable thresholds, and only 1.3 percent of the simulations resulted in unsatisfactory economic indicators—that is, negative NPV or ERR below 5 percent, which is the discount rate in use at the World Bank since 2016. The benefits are, by decreasing order of magnitude, liable to flood protection infrastructure (84.3 percent of the mean NPV), bridges (15.3 percent), and CMCs (0.4 percent).

61. Component 3 will be activated and defined only if an eligible disaster occurs. For this component, the specific type of investments to be financed is uncertain. Activities will depend on the nature of the disaster, the magnitude of the event, and the scale of the damage. For this reason, an economic analysis cannot be conducted at the time of project preparation. Based on the review of Emergency Recovery projects (including similar activities), however, the benefits of such post-disaster investments are linked to specific types of activities. These could include, for example, providing immediate access to financing for the GoT to respond to a disaster, streamlining emergency activities following the disaster, and rehabilitating damaged infrastructure that is key to the social and economic activity of the affected area (access to health services, access to water, restored connectivity to growth poles, and so on). The Independent Evaluation Group has consistently evaluated these types of emergency recovery investments as having a substantial level of development effectiveness.

62. Other expected benefits of the project, not monetized, are a reduction in casualties and injuries caused by disasters, increased access of the local population to local and regional markets, services, and employment opportunities, improved well-being stemming from less uncertainty about the changing patterns of the riverbed that put local assets at risk, and raising the population's awareness on the role played by effective disaster preparedness measures and risk-informed investments.

B. Technical

63. Proposed works and institutional strengthening activities have been evaluated to ensure consistency with the project's objectives. During preparation of the project, all proposed activities were reviewed for technical merit, and a detailed assessment was conducted with each respective ministry or agency to refine them. In all cases, clear relationships between proposed activities and the project objectives were identified, and supporting engineering and safeguard activities were accounted for in the proposed budget.

64. The ongoing capacity and needs assessment for the CoESCD, including the planning of improvements in the CMCs and systems for Component 1, will ensure the compatibility of the physical investments with the existing systems in the country, along with the necessary building and staffing capacity. The CoESCD is considering budget plans for operation and maintenance. The planning of the investments under Component 1 is also based on a gradual, step-by-step approach so the physical investments will not exceed the institutional, technical, and financial capacity of the CoESCD to operate and maintain them.

65. The physical investments to be supported under Component 2 have been identified from a broad set of proposed subprojects prepared by the MoT and ALRI, based on their damage assessments and/or priority planning. Several common characteristics were identified for both the bridge and flood protection infrastructures, including, for example, their including structures built

in the fairly distant past (fifty to even eighty years ago) based on outdated technical standards; deficient technical documentation for individual structures; structures with highly erratic or inadequate maintenance systems; and deficiencies in structural integrity and the overall state of infrastructure, some of which is even severely compromised. All the infrastructure in question has suffered substantial damage through normal exploitation wear-and-tear over long periods, the destructive effects of natural hazards, such as floods, mudflows, or heavy torrential bedload, and/or erosion and scour affecting unprotected parts of the infrastructure and riverbanks. Consequently, potential interventions will be selected to ensure engineering standards are applied to design and feasibility studies and that construction technologies respond to these issues, while at the same time providing recommendations for advancement to the national standards in the sectors considered.

66. A prefeasibility, site-specific hazard assessment study has been prepared, which, apart from providing historical climatic and hazard-specific data, will ensure that projected climate change impacts are considered in the development of the hazard scenarios that will inform the designs for transportation and flood infrastructure (Component 2). Such scenarios also drew information from a glacier-monitoring database based on a geographic information system (GIS), to be combined with prediction-based results from current, state-of-the-art climate models, like the Intergovernmental Panel on Climate Change. In addition, recommendations for hazard assessment data monitoring requirements will be developed as part of this study. The aim of the study is to contribute to a more appropriate and comprehensive hazard assessment approach supporting the design of more resilient transportation and flood protection infrastructure.

C. Financial Management

67. The FM arrangements for all three IAs (the MoF PIU, the PIG of the MoT, and the ALRI PMU) were reviewed in March 2017 as part of an FM assessment for the project, and they have been deemed adequate for the project's implementation. The assessment confirmed the following:

(a) The FM /accounting staff at all three IAs have experience in World Bank–financed projects.

(b) The internal control and filing systems are adequate overall.

(c) The latest annual audit of the World Bank–financed projects implemented by these IAs yielded satisfactory results.

(d) The IFRs on the other World Bank–financed projects implemented by these IAs were mostly received on time and in general found acceptable by the World Bank.

68. In terms of capacity-building actions, it was agreed that within thirty days after project effectiveness, the MoF PIU, the PIG of the MoT, and the ALRI PMU would (a) hire additional FM/accounting staff, acceptable to the World Bank, to manage the increased workload and (b) modify or upgrade existing accounting software to meet the project's accounting and reporting requirements. Additionally, by project effectiveness, the MoF PIU will develop, to a standard acceptable to the World Bank, the FM manual that is part of the POM, to reflect the FM arrangements and controls under the project at all three IAs.

69. The MoF PIU will also prepare and submit to the World Bank consolidated unaudited IFRs satisfactory in form and content to the World Bank. Such reports will be submitted within forty-five days after the end of every quarter.

70. No audits are pending for the projects implemented by the IAs. The auditor issued unmodified (clean) opinions on the financial statements of projects implemented by the IAs with no crucial recommendations in the management letters. The audit of the project will be conducted (a) annually, (b) by independent auditors and on terms of reference (ToRs) acceptable to the World Bank, and (c) according to the International Standards on Auditing (ISA) issued by the International Auditing and Assurance Standards Board of the International Federation of Accountants (IFAC). The annual audited project financial statements will be provided to the World Bank within six months of the end of each fiscal year and at the closing of the project. The MoF PIU will be responsible for the preparation and submission of the consolidated audit reports for the project. In accordance with the World Bank's Access to Information Policy, audited project financial statements will be made publicly available. Upon receipt of the audited FM statements, the World Bank will also make them publicly available.

71. **Disbursement.** For the portion of credit/grant funds allocated to the project, the recipient will open three Designated Accounts (DAs) under each IA, in a commercial bank/financial institution acceptable to the World Bank. The ceiling for the DAs and other disbursement details will be specified in the Disbursement Letter. Disbursements from the IDA accounts will follow the transaction-based method—that is, traditional World Bank procedures—including advances to the DA, Direct Payments, Special Commitments, and reimbursement (with full documentation and against Statements of Expenditures (SOEs)). For payments above the minimum application size, as will be specified in the Disbursement Letter, IAs may submit withdrawal applications to the World Bank for payments to suppliers and consultants directly from the Credit/Grant Account.

D. Procurement

72. Procurement for the proposed project will be carried out in accordance with the World Bank's "Guidelines: Procurement of Goods, Works and Non-Consulting Services under IBRD Loans and IDA Credits and Grants by World Bank Borrowers" (January 2011; revised July 2014), and consulting services will be procured following the World Bank's "Guidelines: Selection and Employment of Consultants under IBRD Loans and IDA Credits and Grants by World Bank Borrowers" (January 2011; revised July 2014) and the provisions stipulated in the Financing Agreement. The World Bank's "Guidelines on Preventing and Combating Fraud and Corruption in Projects Financed by IBRD Loans and IDA Credit and Grants" (October 15, 2006; revised July 2016) will also apply. Detailed information regarding procurement arrangements for CERC will be provided in the specific Annex of the POM.

73. **Procurement Plan.** An initial Procurement Plan has been developed by the MoF with participation of ALRI and the MoT and is presented in Annex 3. The Procurement Plan will be finalized and agreed to by the World Bank by completion of the project negotiations. A positive list of goods, works, and services under the CERC, as referenced in Annex 2, paragraphs 15–21, and acceptable procurement procedures to be followed under this list will be agreed upon with the GoT.

74. **Procurement risk rating.** The overall procurement risk under the project is currently assessed as Substantial. The key issues and risks concerning procurement include the following:

(a) Procurement in the project area not attracting adequate competition due to its remote location (geographical, social, and economic isolation from the rest of the country)

(b) Substantial scope of civil works in remote areas, whose execution could lead to quality issues in reconstruction and rehabilitation of bridges and flood protection infrastructure

(c) Limited contract monitoring and management skills and tools to ensure efficient and timely contract implementation

(d) Overall high-risk public procurement environment

75. Given the above risks, the following measures are proposed to strengthen the capacity of PIU/PIG/PMUs and ensure effective project implementation:

(a) Consolidation of procurement packages, as feasible, to maximize interest from reputed bidders; wide and advance advertising, including announcements through the agencies' regional branch offices

(b) Quality assurance of civil works

(c) Establishment of contract management system, with training of staff in appropriate areas related to procurement and contract management

(d) Enforcement of public oversight and Citizen Engagement programs, with due diligence on winning bidders

E. Social (including Safeguards)

76. **Citizen Engagement**. The project will integrate several mechanisms that strive to encourage Citizen Engagement (CE). To increase transparency and improve accountability to project beneficiaries, two main activities are put forward. First, the monitoring, collecting, and following up on any project-level data on beneficiary feedback and grievances specific to land acquisition and other project-related issues, so the scope of the Grievance Redress Mechanism (GRM), which is also part of the RPF, will be applied to broader project activities beyond resettlement impacts; and, second, the monitoring of impacts on sections of rehabilitated critical infrastructure and campsites covered by the subcontracts. The POM specify in detail how these activities for CE and transparency, will be applied during project implementation. The POM will also provide as much as detail as possible regarding the application of GRM, including the number of levels, channels, and uptake locations for grievances and the approximate time for their resolution and monitoring protocols for wider social impacts of the project. Furthermore, to ensure transparent and collaborative engagement with communities, local *khukumats*, and *jamoats* at all project sites, efforts will be made to build on a positive experience of public consultations held during the project's preparation stage to discuss the Social Assessment and safeguard-related documents. In addition, feedback on training and self-employment opportunities will be collected and addressed.

77. **Poverty, gender, inclusion.** The Social Assessment conducted for the project found that female participation in the labor force is relatively low. Women in the surveyed areas are engaged in a small range of income-generating activities, mostly in agriculture, the marketing sector, and needlework, with limited earning capacity. The construction sector and transportation infrastructure management in Tajikistan are, in general, male-dominated, and women face unequal opportunities. The project will pay particular attention to ensuring women benefit from project interventions, and public outreach will be targeted to ensure participation of women in the project-related activities. During the design stage, for instance, women were included as key participants in the consultation processes (such as focus group discussions for the Social Assessment and public consultations), and separate discussions were held with them to allow them to express their views and needs freely. The specific needs of women and children will help inform the design of the resilient infrastructure and ancillary features (for example, footpaths, road crossings, and signage).

78. During the implementation stage, both genders and vulnerable groups—if/when affected by the resettlement impacts—will receive compensation pertaining to their livelihoods and activities. Women who are household heads, however, will be specifically listed as beneficiaries of compensation and rehabilitation proceedings. Along with including them as impact enumerators, women and vulnerable households will receive training for new employment opportunities, including opportunities related to the project. Furthermore, emphasis will be given to questions, queries, and complaints or grievances lodged by women or vulnerable households and feedback duly provided. The participation of women will be monitored and reflected in quarterly reports.

79. **Social safeguards.** The project triggers the World Bank's OP 4.12 (Involuntary Resettlement). The policy is triggered due to potential land acquisition and resettlement activities related to construction works associated with the CMC under Component 1 and the disaster-resilient bridges and flood protection and riverbank erosion–prevention infrastructure under Component 2. Additional impacts might result from temporary land acquisition for ancillary activities, such as stockpiling materials, setting up construction camps, diverting traffic, and operating borrow pits. The GoT prepared an RPF covering the entire project. Physical resettlement is not anticipated until designs are finalized and land acquisition is necessary. For any impacts involving land acquisition and physical and economic displacement, the RAPs must be prepared by the GoT and approved by the World Bank in accordance with the provisions of the RPF. The client will not commence works on any subproject site without RAP(s) approved by the World Bank and fully implemented by the borrower. The RPF was disclosed in-country on March 7, 2017, and public consultations were held in the Khatlon Oblast and GBAO that same month.

F. Environment (including Safeguards)

80. The project was assigned Safeguard Category B due to anticipated environmental and social impacts. The safeguard policies triggered are OP 4.01 (Environmental Assessment), OP 4.12 (Involuntary Resettlement), and OP 7.50 (Projects on International Waterways).

81. Component 1 includes the creation of CMCs in Dushanbe and, possibly, other regions of Tajikistan. The CMCs will be created either in new buildings specifically constructed for that purpose or in existing buildings renovated/retrofitted for them. Associated civil works will likely pose minor environmental and health and safety risks, including risks from dust, noise, and

vibration, risks related to improper management of construction waste, health and safety risks during construction, and others. Contractors, who will work in accordance with site-specific environmental management plan checklists, will manage such risks and ensure use of good construction practices.

82. Project activities under Component 2 will include two major subcomponents: the reconstruction and rehabilitation of around fifteen existing bridges in the GBAO region and the reconstruction and strengthening of flood protection and riverbank erosion prevention infrastructure at five sites in the Khatlon Oblast.

83. Environmental impacts related to bridge works will include temporary water siltation during construction, air pollution from machinery and equipment, river slopes erosion, the dumping of excavated rock material, and the debris from dismantled old bridges and road sections. Some adverse environmental and health and safety impacts are anticipated from the operation of construction camps (discharges of wastewater, generation of domestic waste); vehicle parking; and maintenance areas (spills).

84. The capital works for flood protection may include, but will not be limited to, reconstruction and/or reinforcement of dikes and river embankments and improvements to the flow and bedload transportation capacities of flow channels. Associated environmental impacts will include the cutting of trees and shrubs, noise and generation of dust from construction, and temporary worsening of the quality of water due to erosion and sedimentation during construction. Activities associated with flood protection will include the transportation of material and the operation of borrow pits.

85. In the longer term, environmental impacts of activities under Component 2 are expected to be positive following restoration of the streambeds and better protection of the riverbanks from erosion.

86. The client has prepared a project Environmental Management Framework (EMF), consisting of three parts corresponding to project components and related environmental impacts. The development of the framework document in this case is justified by the fact that the scope and locations of interventions under Components 1 and 3 were not defined by the time of appraisal. Also, as regards Component 2, new bridges were added to the project scope just before appraisal. The location of some of the bridges is known, but an overall list of bridges was not finalized by the time of appraisal and needs further prioritizing. The feasibility studies and detailed designs with integrated, site-specific EMPs will be developed during the project implementation.

87. Part 1 of the EMF describes the environmental hazards and risks that may arise during the construction of the administrative building for the CMC. The contractor will have to follow the Environmental Management Plan checklist, which includes mitigation measures typical for construction works, such as construction waste management, control of noise and dust pollution, measures to avoid/mitigate air and water pollution, and others.

88. Part 2 of the EMF describes the current state of the environment at the areas and sites where the flood protection works and bridge construction are foreseen. It also provides a step-by-step description of the proposed operations and the sources of environmental impact, followed by

mitigation measures and the monitoring plan. While many of the project sites are already known, the feasibility studies and the detailed design will not be completed before the project appraisal. The details of the bridge construction and flood protection works are, therefore, unknown, including the precise amounts of the materials required, the number of people and amount of machinery, the locations of construction camps and borrow pits, the locations of access points and roads, and, in some cases, parameters such as the lengths and widths of the bridges and flood protection structures. Thus, the design consultant will prepare the detailed environmental impact assessment and site-specific environmental management plans in parallel with the detailed design studies. The project EMF contains a detailed description of the site-specific Environmental Monitoring Plan (EMP).

89. Component 3 will be triggered following paragraph 13 of OP 10.00 (Investment Project Financing). It will be difficult to describe potential risks and mitigation measures associated with emergency response and likely vulnerable locations and/or groups in the EMF at this stage. Thus, a special chapter will describe a screening process for the potential activities, the institutional arrangements for environmental and social due diligence, and monitoring and required capacity-building measures. The screening process will allow indicating which kinds of emergency response actions can proceed with no additional environmental or social assessment and which ones will require assessment (and at what level) before being initiated. Component 3 will not finance any activities that will be categorized as Category A, according to the World Bank OP 4.01 (Environmental Assessment).

90. The project triggered OP.7.50 (Projects on International Waterways). The proposed interventions will, however, focus mainly on the rehabilitation and improvement of existing schemes. The interventions will not involve works or activities that will exceed the original schemes, change their nature, or alter or expand their scope and extent to make them appear new or different. Given the nature of the works envisaged under the proposed project, therefore, (a) the project will not adversely affect the quality or quantity of water flows to other riparian areas, and (b) it will not be adversely affected by other riparian areas' water use.

91. Given the general scope and nature of works proposed for financing, as well as the expected impacts under the proposed project, it is the assessment of the task team that the project falls within the riparian notification exceptions under paragraph 7(a) and (b) of OP 7.50 and, therefore, no riparian notification is required. The Memorandum on the Exception to the Riparian Notification Requirement was prepared by the task team, cleared by the Environmentally and Socially Sustainable Development and International Law Practice Group (LEGEN), and submitted to the Regional Vice President through the Country Director.

G. World Bank Grievance Redress

92. 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 World Bank'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/GRS. For information on how to submit complaints to the World Bank Inspection Panel, please visit www.inspectionpanel.org.

Annex 1: Results Framework and Monitoring

Country: Tajikistan

Project Name: Strengthening Critical Infrastructure against Natural Hazards (P158298)

Results Framework

Project Development Objectives

PDO Statement

The Project Development Objectives are to strengthen the Recipient's disaster risk management capacities, enhance the resilience of its critical infrastructure against natural hazards, and improve its capacity to respond to disasters.

These results are at	Project Level

Project Development Objective Indicators

		Cumulative Target Values						
Indicator Name	Baseline	YR1	YR2	YR3	YR4	YR5	YR6	End Target
Crisis management centers and systems become operational (Percentage)	0.00	0.00	0.00	0.00	50.00	100.00	100.00	100.00
Understanding of seismic hazard is improved (Text)	Seismic hazard maps are outdated			National probabilistic seismic hazard assessment conducted		Seismic micro-zoning for Dushanbe conducted		Seismic hazard maps are updated and understanding of seismic hazard is improved

Bridges reconstructed based on designs considering multi-hazard disaster and climate change risks (Number)	0.00	0.00	0.00	0.00	9.00	15.00	15.00	15.00
Number of people with reduced disaster risks through more resilient flood protection and river bank erosion prevention infrastructure (Number)	0.00	0.00	0.00	556900.00	556900.00	556900.00	556900.00	556900.00
Strengthened capacity to coordinate and respond to emergencies (Text)	No crisis management centers or systems with modern functions to coordinate response among relevant agencies.			New operational procedure for Crisis Management Centers and Systems completed and endorsed for use.	Training completed on use of new equipment and systems based on new procedure.	Facility and equipment for crisis management center and systems become operational.	Regular annual emergency response drills being held based on new procedure.	Emergency response capacity improved through new facilities, equipment and procedures.

Intermediate Results Indicators

Indicator Name	Baseline	Cumulative Target Values						
		YR1	YR2	YR3	YR4	YR5	YR6	End Target
Operational Procedures for Crisis Management Center and Systems are prepared (Yes/No)	No	No	No	Yes	Yes	Yes	Yes	Yes
National Crisis Management Center is established and tested (Yes/No)	No	No	No	No	Yes	Yes	Yes	Yes
Mobile command and communication vehicles are procured and tested (Yes/No)	No	No	No	Yes	Yes	Yes	Yes	Yes
National Crisis Management Center and mobile command and communication vehicles users are trained to operate the emergency management system (Percentage)	0.00	0.00	0.00	50.00	100.00	100.00	100.00	100.00
Financial protection strategy is developed to	No	No	No	Yes	Yes	Yes	Yes	Yes

facilitate response and recovery in the event of an emergency (Yes/No)								
Equipment for seismic hazard monitoring and assessment procured and installed (Yes/No)	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Bridge designs informed by multi-hazard disaster and climate change risks are prepared (Number)	0.00	9.00	15.00	15.00	15.00	15.00	15.00	15.00
Heavy machinery for the MoT is installed and dispatched based on operational plan (Yes/No)	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Target project sites have more resilient flood protection and/or river bank erosion prevention infrastructure through disaster risk-informed designing (Number)	0.00	0.00	0.00	5.00	5.00	5.00	5.00	5.00

Heavy machinery for ALRI is installed and dispatched based on operational plan (Yes/No)	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Grievances raised by stakeholders are addressed and closed (Percentage)	0.00	0.00	0.00	0.00	0.00	0.00	95.00	95.00
Locally-hired jobs (Percentage)	0.00	0.00	0.00	0.00	0.00	0.00	20.00	20.00
Out of which female (Percentage - Sub-Type: Breakdown)	0.00	0.00	0.00	0.00	0.00	0.00	51.00	51.00
Direct project beneficiaries (Number) - (Core)	0.00	0.00	0.00	556900.00	610200.00	646000.00	646000.00	646000.00
Female beneficiaries (Percentage - Sub-Type: Supplemental) - (Core)	0.00	0.00	0.00	51.00	51.00	51.00	51.00	51.00

Indicator Description

Project Development Objective Indicators

Indicator Name	Description (indicator definition etc.)	Frequency	Data Source / Methodology	Responsibility for Data Collection
Crisis management centers and systems become operational	Percentage of national crisis management center and mobile command and communication vehicles performing as regional/local crisis management centers, that have become fully operational including collecting/monitoring hazard information, communicating with relevant institutions and supporting emergency response decision making.	Quarterly	Project Progress Reports	MoF PIU with support from CoESCD
Understanding of seismic hazard is improved	Seismic hazard maps are systematically updated.	Quarterly	Project Progress Reports	MoF PIU with support from IoSEE
Bridges reconstructed based on designs considering multi-hazard disaster and climate change risks	Number of bridges reconstructed and strengthened than existing ones, by considering multi-hazard disaster risks, such floods, landslides, mud flows, rock falls, erosion, earthquakes, etc., as well as climate change scenarios.	Quarterly	Project Progress Reports	MoF PIU with support from MoT PIG
Number of people with reduced disaster risks through more resilient flood protection and river bank erosion prevention infrastructure	No description provided.	Quarterly	Project Progress Reports	MoF PIU with support from ALRI PMU
Strengthened capacity to coordinate and respond to emergencies	No description provided.	Quarterly	Project Progress Reports	MoF PIU with support from CoESCD

Intermediate Results Indicators

Indicator Name	Description (indicator definition etc.)	Frequency	Data Source / Methodology	Responsibility for Data Collection
Operational Procedures for Crisis Management Center and Systems are prepared	No description provided.	Quarterly	Project Progress Reports	MoF PIU with support from CoESCD
National Crisis Management Center is established and tested	No description provided.	Quarterly	Project Progress Reports	MoF PIU with support from CoESCD
Mobile command and communication vehicles are procured and tested	No description provided.	Quarterly	Project Progress Reports	MoF PIU with support from CoESCD
National Crisis Management Center and mobile command and communication vehicles users are trained to operate the emergency management system	Total number of staff and operators required for the full functioning of the Crisis Management Center and mobile command and communication vehicles will be estimated/quantified and agreed to between CoESCD and the World Bank team during first year.	Quarterly	Project Progress Reports	MoF PIU with support from CoESCD
Financial protection strategy is developed to facilitate response and recovery in the event of an emergency	No description provided.	Quarterly	Project Progress Reports	MoF PIU with support from MoF departments
Equipment for seismic hazard monitoring and assessment procured and installed	No description provided.	Quarterly	Project Progress Report	MoF PIU with support from IoSEE
Bridge designs informed by multi-hazard disaster and climate change risks are prepared	Accumulative number	Quarterly	Project Progress Reports	MoF PIU with support from MoT PIG

Heavy machinery for the MoT is installed and dispatched based on operational plan	No description provided.	Quarterly	Project Progress Reports	MoF PIU with support from MoT PIG
Target project sites have more resilient flood protection and/or river bank erosion prevention infrastructure through disaster risk-informed designing	Cumulative number	Quarterly	Project Progress Reports	MoF PIU with support from ALRI PMU
Heavy machinery for ALRI is installed and dispatched based on operational plan	No description provided.	Quarterly	Project Progress Reports	MoF PIU with support from ALRI PMU
Grievances raised by stakeholders are addressed and closed	Percentage of grievances addressed and closed, out of total number of grievances received.	Quarterly	Project Progress Reports	MoF PIU with support from MoT PIG and ALRI PMU
Locally-hired jobs	Percentage of locally-hired jobs out of total hired jobs in civil works contracts under components 1 and 2. "Locally-hired" refers to those hired from within the same Oblast as where the sub-project is situated.	Quarterly	Project Progress Reports	MoF PIU with support from MoT PIG and ALRI PMU
Out of which female	No description provided.	Quarterly	Project Progress Report	MoF PIU with support from MoT PIG and ALRI PMU
Direct project beneficiaries	Direct beneficiaries are people or groups who directly derive benefits from an intervention (i.e., children who benefit from an immunization program; families that have a new piped water connection). Please note that this indicator requires supplemental information. Supplemental Value: Female beneficiaries (percentage)	Quarterly	Project Progress Reports	MoF PIU with support from MoT PIG and ALRI PMU

	Based on the assessment and definition of direct project beneficiaries, specify what proportion of the direct project beneficiaries are female. This indicator is calculated as a percentage.			
Female beneficiaries	Based on the assessment and definition of direct project beneficiaries, specify what percentage of the beneficiaries are female.	No description provided.	No description provided.	No description provided.

Annex 2: Detailed Project Description

TAJIKISTAN: Strengthening Critical Infrastructure against Natural Hazards

1. **Project overview.** The proposed project is envisioned to establish the foundation of the GoT's long-term DRM program and is based on a high demand for support to overall DRM and reconstruction of critical infrastructure in the country, such as bridges and flood protection and riverbank erosion–prevention infrastructure, through the "building back better" principle. As an initial step, the project will target areas in GBAO and in the Khatlon Oblast that were affected by floods and mudflows in July 2015 and finance reconstruction of infrastructure (including bridges and flood protection and river bank erosion–prevention infrastructure) to reduce disaster risks and avoid potential damage in the long term, given the area's exposure to natural hazards. Finally, the project will strengthen the GoT's capacity for DRM to address countrywide disaster risks, including floods, mudslides, rock falls, avalanches, landslides, and earthquakes.

2. The project consists of the four components described in the following paragraphs.

Component 1: Strengthening Disaster Risk Management Capacity (estimated cost: US$4 million)

3. This component is intended to strengthen the GoT's capacity for DRM through selected activities that focus on disaster risk identification, disaster preparedness, and financial protection against disasters. The activities within this component will aim to strengthen the capacity of the CoESCD, as the main coordinating agency for crisis management and DRM, to prepare and respond better to emergencies; of the IoSEE to understand better the seismic hazard of Dushanbe; and of the MoF to strategize its financial response to disasters by combining and improving various ex-ante financial instruments. This component will be implemented in coordination with UNDP, which has been continuously strengthening the capacities of the CoESCD at the national and regional levels, while building regional mechanisms for DRM and mainstreaming disaster risk reduction (DRR) into state policy at the national and subnational levels.

Subcomponent 1.1. Modernizing the Crisis Management Centers and Systems for Improved Disaster Preparedness

4. Based on the ongoing Capacity and Needs Assessment of the CoESCD's DRM status as part of the GFDRR-funded technical assistance, improvements to and modernization of the crisis management system of the country (including CMCs and unified emergency communication systems) were identified as the key priority, so as to better monitor hazards (including weather-related hazards exacerbated by climate change), improve interagency coordination, establish best international practices on decision-making models, issue timely early warnings, decentralize and add redundancy to the system, and reduce the overall emergency response time. Relevant capacity building, encompassing operation and maintenance plans for the improved crisis management system, will also be produced under the ongoing Capacity and Needs Assessment to ensure the sustainability of the investments under this project.

5. The project will finance the following:

(a) Necessary work to build or renovate a facility to host the national CMC

(b) The purchase of required information and communication technology equipment to be installed within the national CMC, including equipment for dispatching early warnings, an automated emergency call receiving system and dispatch services, a disaster management information system, and robust crisis communications

(c) The purchase of mobile command center and communication vehicles for the improved crisis management systems at the regional and local levels to perform as regional/local-level CMCs

(d) Consulting services for preparing an operations manual for the CMCs and systems

(e) Trainings for relevant staff and operators of the CMC and users of the mobile command center and communication vehicles

This activity will be implement by the MoF PIU with technical inputs and supervision from the CoESCD.

Subcomponent 1.2. Seismic Hazard Assessment for Improved Disaster Risk Identification

6. Currently, seismic hazard assessments of individual specific sites within Dushanbe territory are performed using existing maps of seismic micro zoning. These maps were developed in the mid-1970s in accordance with the old standards of seismic hazard assessment, measured in grades of intensity of earthquakes defined in microseismic scale MSK-64, and within the territory defined by the master plan of Dushanbe city development approved for that period. Since then, expansion of the city boundaries, intensive construction of high-rise buildings, and the application of new and unique design solutions and technologies in construction have created a vital need for reassessment of seismic hazard for Dushanbe territory and its surrounding area and an updated assessment of seismic risk for its development to inform construction norms, standards, and practices for improved safety. Hence, the project will support the development of new seismic hazard maps of the territory of Dushanbe, measured both in grades of seismic intensity and in units of peak ground acceleration, based on the latest achievements of seismological science and technology.

7. The project will finance the purchase of necessary equipment, such as seismic stations, seismic sensors, analytical software, and so on, for the IoSEE to conduct probabilistic seismic hazard assessment of Tajikistan and seismic micro zoning for Dushanbe and its surrounding area, based on the results of the national probabilistic seismic hazard assessment. This activity will be implement by the MoF PIU, with technical inputs and supervision from the IoSEE.

Subcomponent 1.3. Preparation of a Financial Protection Strategy for Mitigating Fiscal Shocks Caused by Natural Disasters

8. Tajikistan has to face both frequent and destructive natural disasters, with the occurrence and severity of hydrometeorological hazards rising as a result of climate change. Contingent liabilities[19] of the GoT due to disasters have also been increasing with changing conditions:

(a) The growing exposure of the population and economic assets

(b) Increasing vulnerability of the economic activities to disasters

(c) Aging infrastructure that requires maintenance, including assets that protect against disasters, such as river dikes

9. To provide preliminary evaluation of the adverse financial effects of natural disasters and related contingent liabilities in Tajikistan, a Disaster Risk Financing Country Note was prepared with GFDRR-funded technical assistance. The Country Note studied current mechanisms of disaster risk financing and revealed an overreliance on donor aid and ex-post solutions, such as budget reallocation; lack of resources for ex-ante instruments, such as contingent funds; and lack of significant capacities of existing risk transfer mechanisms, including disaster insurance. It also revealed a gap in comprehensive information on and evaluation of fiscal risks. The Country Note, therefore, proposed the following steps to increase financial protection of Tajikistan:

(a) The performance of detailed fiscal risk diagnostics and assessment that will help identify contingent liabilities, available resources, and funding gaps

(b) The preparation of a financial protection strategy that will cover ways for Tajikistan to mitigate fiscal shocks caused by disasters

(c) The improvement of existing financial instruments and/or introduce new ones

(d) The improvement of existing institutional and regulatory frameworks, together with capacity building for the stakeholders

10. As an initial step, the project will support the detailed fiscal risk diagnostics and assessment that will help identifying contingent liabilities, resources available and funding gaps. Furthermore, based on the fiscal risk diagnostics, the project will support preparation of the financial protection strategy that will cover ways for Tajikistan to mitigate fiscal shocks caused by disasters. This strategy will also touch upon actions to improve existing financial instruments or introduce the new ones. The project will finance consulting services for conducting the fiscal risk diagnostics, additional capacity-building activities, and preparation of the financial protection strategy. This activity will be implement by the MoF PIU, with technical inputs and supervision from the relevant departments within the MoF.

[19] Contingent liabilities are fiscal obligations that may be triggered by the occurrence of an uncertain event (Olivier Mahul, David Cummins, Catastrophe Risk Financing in Developing Countries: Principles for Public Intervention, the World Bank, 2009, http://www.preventionweb.net/files/15924_54291.pdf).

Component 2: Making Critical Infrastructure Resilient against Natural Hazards (estimated cost: US$38 million)

11. This component will finance capital works and contingency planning (for example, equipment for emergency situations) for the transportation network in GBAO, which suffered the most significant damage in July 2015, as well as the flood protection infrastructure that has repeatedly been damaged in the Khatlon Oblast. Capital works for the transportation network will mainly include reconstruction and repair of a number of bridges, while works for flood protection will include the strengthening of damaged existing infrastructure, complemented by adequate erosion prevention measures. A prefeasibility, site-specific hazard assessment study has been prepared, which, apart from providing historical climatic and hazard-specific data, will ensure that projected climate change impacts are considered in the development of the hazard scenarios that will inform the designs for transportation and flood infrastructure.

Subcomponent 2.1. Strengthening of Bridges (US$19 million)

12. The works to be financed under this subcomponent will mainly comprise the reconstruction of bridges in the districts of GBAO. Preliminarily identified target bridges include those in Rushon and Vanj districts in GBAO along the Chikhoh–Ravgada, Vanji–Bolo, Vanj–Yazgulem roads and the Dushanbe–Kulyab–Khorog–Kulma (M41) routes (see Table A2-1). The subcomponent also includes procurement of heavy specialized machinery for MoT to prepare for emergency response and maintenance of its infrastructure assets.

13. Taking the "build back better" (BBB) approach, the capital works will aim to increase the span and height of the bridges and deepen foundations to improve resistance to scouring (see Table A2-1). They will also include river training and bank protection upstream and downstream of the bridges' location, as well as slope and embankment protection of the access roads to the bridges for appropriate lengths. The results and recommendations of the hazard assessment study will be considered for the detailed design of the bridges and incorporated where appropriate.

Table A2-1. List of bridges to be constructed in the Vanj and Rushon district of GBAO

Bridge No.	Description of Bridge Location	Length of Existing Bridge (m)	Length of New Bridge (m)
Bridge 1	Bridge over Yazgulem on road Vanj-Yazgulem, near Andarvit Jamag village	14.0	33.0
Bridge 2	Bridge over the Obi Andarvak River on road Vanj-Yazgulem, near Andarvak village	11.0	18.0
Bridge 3	Bridge on Obi Andarvak River on road Vanj-Yazgulem, near Vishkharv village	24.0	33.0
Bridge 4	Bridge over Udob River on road Vanj-Bolo, near Udob village	6.0	24.0
Bridge 5	Bridge over Obi-Chikhoh River on road Chikhoh-Ravgada, near village Chikhoh of Vanj district	5.0	12.0
Bridge 6	Bridge over River Udob on road Vanj-Bolo, near Chikhoh village	36.0	60.0
Bridge 7	Bridge over Obi-Sed River on road Vanj-Bolo, near Sed village	23.0	30.0
Bridge 8	Bridge over Ardobak River on road Vanj-Bolo, near Ardobak village	7.0	18.0
Bridge 9	Bridge over Barushondara in 538km of road Dushanbe-Kulyab-Khorog-Kulma	9.0	18.0

Subcomponent 2.2. Strengthening of Flood Protection and Riverbank Erosion–Protection Infrastructure (US$19 million)

14. During the preparatory stages, the project identified a series of potential flood protection interventions in the Khatlon Oblast, and it selected sites for consideration. As a result, project support will be extended to the highest priority flood protection infrastructure in the catchments of the Dahana, Kofarnikhon, Kyzylsu, Surkhob, Yakshu, and Ziraki rivers. Capital works for flood protection will include the strengthening of damaged river embankments, flood protection dikes, and infrastructure for the prevention of riverbank erosion, including irrigation as well as drainage intakes and outlets. The preliminary project preparation activities include natural hazard assessment (as prefeasibility), feasibility, and preliminary, as well as detailed design studies to rank the proposed interventions by priority. The subcomponent also includes procurement of heavy specialized machinery for ALRI to prepare for emergency response and maintenance of its infrastructure assets.

Component 3: Contingent Emergency Response Component (estimated cost: US$6 million)

15. The objective of this component is to improve Tajikistan's capacity to respond to disasters. An emergency eligible for financing is an event that has caused, or is likely imminently to cause, a major adverse economic and/or social impact to the Borrower, associated with a disaster. Rapid disbursement will allow the GoT to request a reallocation of project funds to partially cover emergency response and recovery costs. This component will be triggered if:

(a) the Recipient has determined that an Eligible Crisis or Emergency has occurred, has furnished to the Association a request to include said activities in the CERC in order to

respond to said Eligible Crisis or Emergency, and the Association has agreed with such determination, accepted said request and notified the Recipient thereof;

(b) the Recipient has prepared and disclosed all Safeguard Instruments required for said activities, and the Recipient has implemented any actions which are required to be taken under said instruments, all in accordance with the provisions of Section I.E of Schedule 2 to the Financing Agreement; and

(c) the Recipient's Coordinating Authority has adequate staff and resources, in accordance with the provisions of Section I.E of this Schedule 2 to the Financing Agreement, for the purposes of said activities.

16. This component could be used to reallocate project funds or channel additional funds to fully or partially replenish funds reallocated to the CERC should they become available due to an eligible emergency.[20] The initial allocation of US$6 million under this component is partially based on the imminent risks of floods, mudflows, and so on during the summer of 2017, stemming from heavy snowfall during the winter of 2016 and delayed snow melting during the spring of 2017.

17. Once triggered, the contingent funds can be mobilized following procedures in World Bank's Policies on Rapid Response to Crises and Emergencies, which minimize upfront processing steps and the fiduciary and the safeguard requirements. Disbursements will be made against a positive list of goods, works, and services that are required to support the mitigation, response, recovery, and reconstruction needs of the GoT. All expenditures under this component, should it be triggered, will be made in accordance with OP 10.00 and will be appraised, reviewed, and found to be acceptable to the International Development Association (IDA) before any disbursement is made. In accordance with OP 10.00, this component will provide immediate, quick-disbursing support to finance goods (positive list agreed with the GoT), works, and services needed for response, mitigation, recovery, and reconstruction activities. Operating costs eligible for financing will include the incremental expenses incurred by the GoT for early recovery efforts arising from the impact of major disasters.

18. Goods, works, and services under this component will be financed based on review of satisfactory supporting documentation presented by the GoT, including documentation of adherence to appropriate procurement practices for emergencies. All supporting documents for reimbursement of such expenditures will be verified by the Internal Auditors of the GoT and by the Project Director, certifying that the expenditures were incurred for the intended purposes and to enable a fast recovery from the damage caused by adverse natural events, before the Application is submitted to the Association. This verification should be sent to the Association together with the Application.

19. Specific eligible expenditures under the category of goods include the following:

[20] Once the requirements for activating the CERC are met, uncommitted funds from the project are reallocated to the CERC and made available for crisis or emergency response. To facilitate a rapid response, a formal project restructuring is deferred to within six months after the CERC is activated.

(a) Construction materials and water, land, and air transport equipment, including supplies and spare parts

(b) School supplies and equipment

(c) Medical supplies and equipment

(d) Petroleum and fuel products

(e) Construction equipment and industrial machinery

(f) Communications equipment

(g) Seeds and fertilizer

(h) Food and water containers

Also included are any other items that may be acceptable to the World Bank and are agreed to by the GoT and the World Bank.

20. Specific eligible expenditures under the category of works may include urgent infrastructure works (repairs, rehabilitation, construction, and so on) to mitigate the risks associated with the disaster for affected populations, while specific eligible expenditures under services may include urgent studies (technical, social, environmental, and so on) necessary as a result of the effects of the disaster, including identification of priority works, feasibility assessments, delivery of related analyses, and so on.

21. The POM will include a specific annex for the CERC, which lays out the provisions for activating and implementing the CERC.

22. If an adverse natural event does not occur during the lifetime of the project or the component is not fully disbursed twelve months before its closing date, whatever amount remains will be reallocated to finance activities under other components, based on the priorities of the GoT and the World Bank's approval.

Component 4: Project Management (estimated cost: US$2 million)

23. This component will support incremental operating costs for the implementing agencies (IAs)—the MoF, the MoT, and ALRI—for project execution, including overall project administration and management, prioritization of subprojects, management of social and environmental safeguard issues, financial management (FM), procurement, contract administration, project reporting, and monitoring and evaluation (M&E).

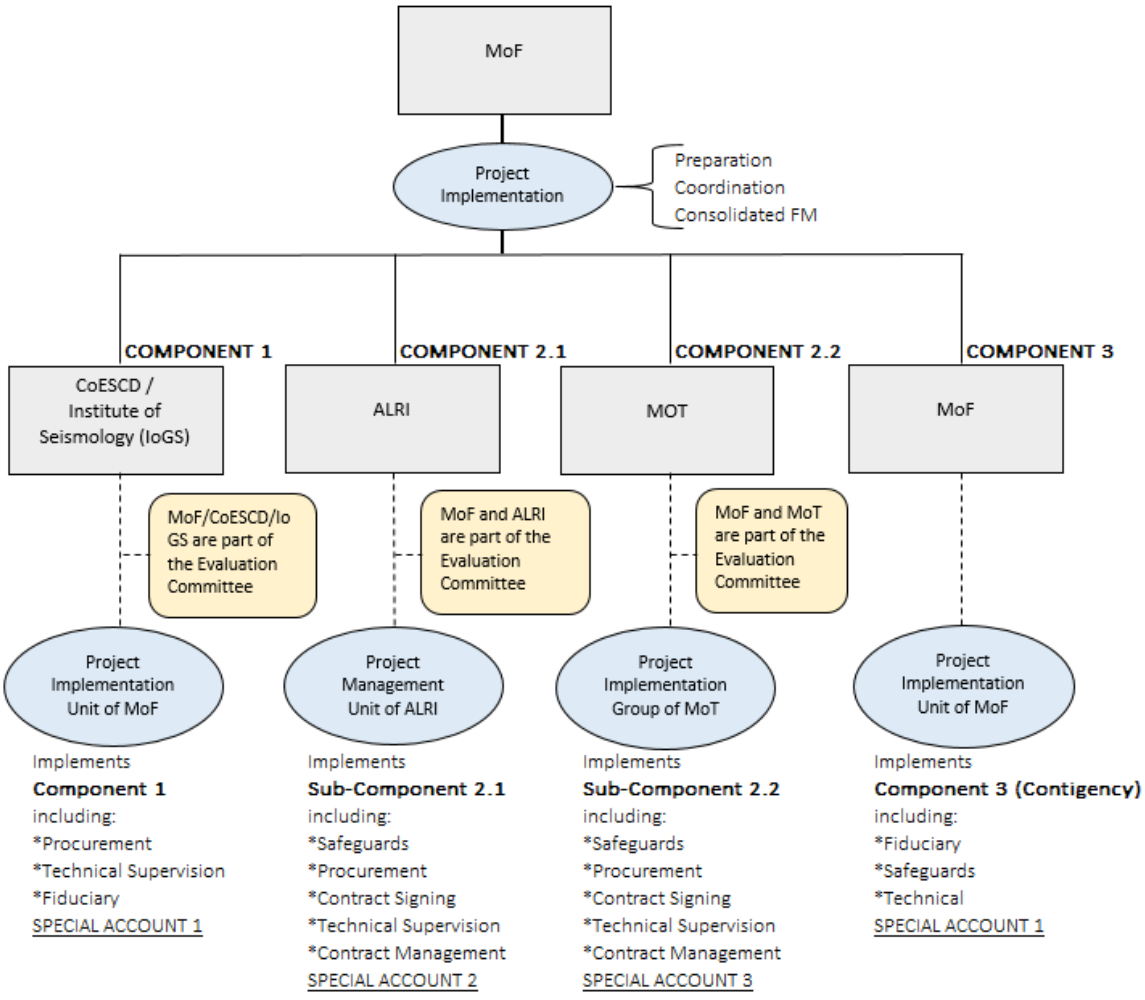
Annex 3: Implementation Arrangements

TAJIKISTAN: Strengthening Critical Infrastructure against Natural Hazards

Project Institutional and Implementation Arrangements

1. The MoF PIU will lead the overall supervision and coordination of the project implementation, FM consolidation, and monitoring and reporting consolidation. The MoF PIU will also execute Component 1 (Strengthening of DRM Capacity) and Component 3 (Contingent Emergency Response Component), including aspects related to procurement safeguard, with technical inputs and supervision from relevant agencies, such as the CoESCD and IoSEE, and relevant departments within the MoF. Component 2 activities related to the reconstruction of bridges will be implemented by the MoT and those related to the reconstruction of flood protection and riverbank erosion–prevention infrastructure by ALRI. Both the MoT and ALRI will be in charge of the procurement, FM, technical inputs and supervision, and safeguard-related aspects for their respective activities.

Figure A3-1. Institutional and Implementation Arrangements



Ministry of Finance

2. The MoF will serve as the primary GoT counterpart and the overarching institution responsible for project implementation. The MoF is experienced in executing World Bank–financed projects, as well as coordinating various line ministries and technical agencies. This implementing arrangement—with the MoF as the overarching institution—was determined to be optimal, given the multisectoral nature of the project.

3. The PIU within the MoF will be responsible for tasks for all components and activities of the project. This will include the following:

(a) Overall project management and coordination

(b) Consolidation of FM reports from the MoT and ALRI

(c) Consolidation of audited financial statements under the project

(d) Administration of third-party audits, ensuring quality of project activities

(e) Semiannual project progress reports, consolidating all components and activities

(f) Monitoring of the Results Framework

(g) Hiring and management of consultants, as needed, for the overall project management and coordination

The PIU will also be the entity primarily responsible for coordinating with the World Bank and other IAs.

4. As indicated, the MoF will be responsible for executing components 1 and 3. Specific tasks undertaken by the PIU for these components, in addition to those for all components and activities mentioned above, include the following, among others:

(a) Procurement, including preparation of ToRs/bidding documents, evaluation reports, contract management, and so on

(b) Hiring and management of consultants, as needed

(c) Management of environment and social safeguard aspects

(d) FM

(e) Reporting and monitoring of project progress

5. The relevant departments within the MoF will be responsible for providing technical inputs and supervision for the preparation of a financial protection strategy for mitigating fiscal shocks caused by natural disasters under Component 1, to be executed by the MoF PIU.

6. Detailed procedures for the implementation for Component 3 will be described in the annex of the POM.

Ministry of Transport

7. The MoT PIG will be the agency responsible for implementing, coordinating, and managing all activities under Subcomponent 2.1, including tasks relevant to procurement, contract management, safeguards, and technical inputs and supervision. FM, reporting of project progress, and monitoring of activities under the subcomponent will be conducted by the MoT PIG and consolidated by the MoF PIU for the entire project. The MoT PIG may also hire management consultants, as needed, for the subcomponent.

ALRI

8. The ALRI PMU will be the agency responsible for implementing, coordinating, and managing all activities under Subcomponent 2.2, including relevant tasks for procurement, contract management, safeguards, and technical inputs and supervision. FM, reporting of project progress, and monitoring of activities under the subcomponent will be conducted by the ALRI PMU and consolidated by the MoF PIU for the entire project. The ALRI PMU may also hire management consultants, as needed, for the subcomponent.

Committee for Emergency Situations and Civil Defense

9. The CoESCD will be responsible for providing technical inputs and supervision for the procurement of necessary works, goods, consultancy, and training to be executed by the MoF PIU for modernizing the CMCs and systems for improved disaster preparedness under Component 1. In addition, the CoESCD will be responsible for all necessary administrative procedures, including obtaining relevant permits and clearances, and for the full operationalization of the CMCs.

Institute of Seismology and Earthquake Engineering

10. The Institute will be responsible for providing technical inputs and supervision for the procurement of necessary goods. Procurement will be executed by the MoF PIU and the goods used for the seismic hazard assessment for improved disaster risk identification under Component 1. In addition, the Institute will be responsible for the implementation of the seismic hazard assessment, using the procured equipment.

Capacity Assessment and Staffing Recommendations for Project Units

11. **The PIU at MoF, namely the PIU for Access to Green Finance, is currently in charge of implementing World Bank–financed projects, including the Agriculture Commercialization Project and the regional Climate Adaptation and Mitigation Program for the Aral Sea Basin Project for Central Asia (CAMP4ASB).** The PIU's current organizational structure includes a Director, Deputy Director, Chief Accountant, Financial Specialist, and Procurement Specialist, as well as other relevant staff and technical specialists, to ensure adequate implementation of these projects. The MoF PIU has also mobilized a number of technical specialists to ensure the Strengthening Critical Infrastructure against Natural Hazards Project (SCINHP) is adequately prepared with financing from the Project Preparation Advance

(PPA). These include Bridge and Flood Specialists, Social and Environmental Specialists, and a Project Coordinator. The Project Coordinator's task can be extended from the preparation phase into implementation to ensure overall project coordination. A relevant DRM Consultant could assist him or her with the implementation of activities under components 1 and 3. The current Procurement Specialist of the MoF PIU will be in charge of coordinating procurement for components 1 and 3. The PIU's procurement staff has significant experience, which it gained through on-the-job training during implementation of the abovementioned projects and the PPA implementation and through attendance at several regional trainings on World Bank Procurement Guidelines; its overall procurement capacity is rated Satisfactory. Given the need for closer coordination of project activities, however, the MoF PIU could benefit from hiring an additional FM consultant to help the PIU Chief Accountant manage consolidated reporting requirements under the project, with inputs from relevant project units under the MoT and ALRI, as well as an additional Safeguards Coordinator to manage safeguard activities, particularly for components 1 and 3. An additional specialist can be hired as the project implementation progresses, and as deemed necessary.

12. **The PIG at MoT is currently in charge of implementing World Bank–financed projects, including the CARS—Second Phase (CARs 2).** The PIG has dedicated staff for CARS 2 procurement and FM, as well as safeguards. To ensure additional works under the proposed SCINHP do not overburden the PIG staff, however, and ensure the quality of the implementation, one Technical Bridges Specialist and one Safeguards Specialist could be hired to manage the activities under Subcomponent 2.1. The PIG could also choose to engage additional specialists and consultants as necessary during the implementation phase. The involvement in the implementation of the proposed subcomponent activities of an experienced Procurement Consultant currently with the PIG, whose workload under the CARs 2 project will be further assessed, may be considered. Additionally, the PIG would need to recruit an FM Consultant to support the respective Chief Accountant and be responsible for the subcomponent's FM and disbursement functions.

13. **The PMU at ALRI, namely the Fergana Valley Water Resources Management Project (FVWRMP) Unit, also has a wealth of experience in managing World Bank projects.** Like previously mentioned institutions, it should benefit from hiring one dedicated Technical Specialist and one Safeguards Specialist to ensure smooth project implementation for activities under Subcomponent 2.2. Additional consultants and/or specialists can also be engaged as necessary during implementation. Given the likely increase in procurement workload because of the subcomponent activities, additional procurement capacity for the ALRI PMU will be required. Likewise, recruitment of an FM Consultant to support the respective Chief Accountant and be responsible for the subcomponent's FM and disbursement functions will also be needed.

14. **The CoESCD and IoSEE will be involved in technical review supervision of relevant Component 1 activities.** The MoF PIU will be in charge of implementing equipment procurement and construction works on behalf of the CoESCD and IoSEE under Component 1. The critical role of the Project Coordinator and a potential DRM Consultant under the MoF PIU will be to ensure the bidding documents for civil works and technical specifications for equipment receive technical inputs from the relevant CoESCD and IoSEE specialists and are subsequently cleared by the relevant managements of these institutions before proceeding with bidding or tendering processes. Both the CoESCD and IoSEE must ensure provision of technical inputs and clearances, as well as personnel, so procurement processes will be adequate.

Financial Management, Disbursements, and Procurement

Financial Management

15. The FM arrangements of the MoF PIU, MoT PIG, and ALRI PMU were reviewed as part of the FM assessment for the project and deemed acceptable for its implementation. The assessment, undertaken in March 2017, confirmed the following:

(a) The FM/accounting staff at all three IAs have experience in World Bank–financed projects.

(b) The internal control and filing systems are adequate overall.

(c) Results from the latest annual audit of the World Bank–financed projects implemented by those IAs were satisfactory.

(d) The IFRs on the other World Bank–financed projects implemented by the IAs were mostly received on time and, in general, found to be acceptable by the World Bank.

16. Nevertheless, the Action Plan described in Table A3-1 was agreed on and will need to be implemented to incorporate additional FM requirements for the proposed project. The plan consists of capacity-building actions that must be in place before the project implementation starts.

Table A3-1. Action Plan for FM and Procurement

Action	Responsibility	Deadline
Recruitment of FM consultants to support respective chief accountants and be responsible for project FM and disbursement functions	MoF PIU/MoT PIG/ALRI PMU	Within 30 days after project effectiveness
FM Manual that is part of POM developed, including project accounting and reporting, funds flow, audit arrangements, disbursement procedures, and so on	MoF PIU	By effectiveness
Upgrade/modify automated accounting system with capacity to generate IFRs	MoF PIU/MoT PIG/ ALRI PMU	Within 30 days after project effectiveness

17. The overall FM risk for the proposed project is considered Substantial before mitigation and Moderate after mitigation of the abovementioned measures.

18. All three IAs are capable of preparing relevant budgets. The project plans and budgets are developed in close collaboration between the GoT representatives and the PIU's management. The annual budgets are based on the Procurement Plan, which is regularly updated by the Procurement Specialist. All changes in the Procurement Plan are reviewed by the Project Director and agreed on with the World Bank, and only then are they incorporated in the annual budget. Once reviewed and endorsed by the MoF, the project budget is included in the State Budget.

19. For financial reporting purposes, the IAs use cash-based International Public Sector Accounting Standards for project reporting. The accounting policies and procedures are documented for the ongoing World Bank–financed projects, and the Chart of Accounts used for

them can be adapted for use with this project. The MoF PIU will develop an FM Manual that will become part of the POM by project effectiveness. The accounting at all three agencies is automated using the 1 C accounting software, which has the capability to produce IFRs in accordance with formats that will be agreed on with the World Bank. All transactions recorded on a cash basis in terms both of accounting and supporting documentation will be maintained in files for ready access by auditors and during implementation support missions of the World Bank. The Chart of Accounts for the project is based on the Chart of Accounts developed by the MoF and modified to allow tracking of project transactions and reporting by source of financing, project component, and type and category of expenditure. The systems are used for the ongoing World Bank–financed projects and considered adequate. The IAs will need to upgrade/modify the automated accounting system to give it capacity to generate IFRs under the upcoming project; the modification needs to be completed before the project implementation and within thirty days after project effectiveness.

20. All IAs have an internal control system in place that is adequate overall for implementation of the project, including adequate segregation of duties among the FM/accounting staff. It was agreed that within thirty days after project effectiveness, the MoF PIU would develop an FM Manual that is part of the POM and will reflect the FM arrangements and controls under the project at all three IAs.

21. The MoF PIU, MoT PIG, and ALRI PMU have access to the World Bank's Client Connection system, and they download disbursement data from the system for reconciliation purposes. The project accounts are reconciled with the World Bank's Client Connection system after each withdrawal application is sent or funds are received. The accounting data are backed up every week on an external hard disk.

22. Project management–oriented, unaudited IFRs will be used for monitoring and supervision of the project. All three agencies have significant experience in IFR preparation, with their IFRs of projects implemented always received on time and found, in general, acceptable to the World Bank. The format of the IFRs was confirmed during the assessment and included the following:

(a) Reporting of project sources and uses of funds

(b) Reporting of uses of funds by project activity

(c) DA statements

(d) Statement of the financial position

(e) SoE withdrawal schedule

23. These consolidated financial reports will be submitted to the World Bank within forty-five days of the end of each quarter, with the first reports under the proposed project submitted after the end of the first quarter of initial disbursement. The MoF PIU will be responsible for preparation of consolidated IFRs under the project.

24. The IAs' current auditing arrangements are satisfactory to the World Bank—no audits are pending for the projects implemented by them, and no major issues arose in the latest audits of these projects—and it has thus been agreed that similar audit arrangements will be adopted to cover

the financial statements for this project. The project audit will be conducted (a) by independent private auditors acceptable to the World Bank, on ToRs acceptable to the World Bank and procured by the State Committee on Investment and Management of State Property of the Republic of Tajikistan (SIC), and (b) according to the ISA issued by the IFAC.

25. The MoF PIU will be responsible for annual consolidated audits of the project financial statements that will be provided to the World Bank within six months after the end of each fiscal year and for the project at its closing. If the period from the date of effectiveness of the loan to the end of the recipient's fiscal year is no more than six months, the first audit report may cover financial statements for the period from effectiveness to the end of the second fiscal year. The recipient has agreed to disclose the audit reports for the project within one month of their receipt from the auditors and acceptance by the World Bank, by posting the reports on its official website. Following its formal receipt of these reports from the recipient, the World Bank will make them publicly available according to the World Bank Policy on Access to Information. The cost of the audit will be financed from the proceeds of the project.

Disbursements

26. The FM/accounting staff of the MoF PIU, MoT PIG, and ALRI PMU are well aware of World Bank disbursement policies and procedures. Each IA will establish a DA, in U.S. dollars, specifically for this project, in a commercial bank/financial institution acceptable to the World Bank. The respective IAs will manage the project's DAs. The SOE-based disbursement method will be applied.

27. Project funds will flow from the World Bank, either (a) via the DAs to be maintained in the commercial bank/financial institution, which will be replenished based on SOEs, or (b) on the basis of direct payment withdrawal applications and/or special commitments received from the IAs. Withdrawal applications documenting funds utilized from the DAs will be sent to the World Bank at least once every three months. The following disbursement methods may be used under the project: Reimbursement, Advance, Direct Payment, and Special Commitment. The DA's ceiling to be established is proposed at US$500,000, which will be finalized and reflected in the Disbursement Letter. Detailed instructions for withdrawal of loan proceeds are provided in the Disbursement Letter.

28. Table A3-2 specifies the categories of Eligible Expenditures that may be financed out of the proceeds of the Loan ("Category"), the allocation of the amounts of the Loan to each Category, and the percentage of expenditures to be financed for Eligible Expenditures in each Category.

Table A3-2. Eligible Expenditures financed by SCINH

Category	Amount of the Credit Allocated (expressed in US$)	Amount of the Grant Allocated (expressed in SDR)	Percentage of Expenditures to be Financed (exclusive of VAT and customs taxes, including imposts, levies, fees, excise and duties of any nature, whether in effect at the date of the Financing Agreement or imposed after that date)
(1) Goods, works, non-consulting services, consultants' services, including audit, Training and Operating Costs under Parts A and D (i) of the Project	2,200,000	1,600,000	100%
(2) Goods, works, non-consulting services, consultants' services, Training and Operating Costs under Parts B.1 and (D) (ii) of the Project	9,900,000	5,065,000	100%
(3) Goods, works, non-consulting services, consultants' services, Training and Operating Costs under Parts B.2 and D (iii) of the Project	9,900,000	5,065,000	100%
(4) Emergency Expenditures under Part C of the Project.	3,000,000	2,190,000	100%
(5) Refund of Preparation Advances	0	4,380,000	Amount payable pursuant to Section 2.07 of the General Conditions
TOTAL AMOUNT	**25,000,000**	**18,300,000**	

29. The GoT has requested the Association for retroactive financing for payments made prior to the date of the Financial Agreement but on or after August 1, 2016 for Eligible Expenditures under Categories (1), (2), (3) and (4), up to an aggregate amount of the Credit not to exceed US$ 5 million, and up to an aggregate amount of the Grant not to exceed SDR 3,660,000. The expenditure must be backed by adequate documentation including evidence of payment and will have been procured according to the World Bank procurement guidelines.

30. Project funds will be transferred electronically to a Transit Account, which will need to be opened at the same commercial bank/financial institution to facilitate immediate payments in local

currency, based on expenditures already incurred or immediately to be incurred. The Component Directors appointed by each IA, or its designate, and the Chief Accountants—after the verification by FM Consultants—will approve all payment orders.

31. Payments in foreign currency will be made either from the DAs or directly from the Credit/Grant Account as Direct Payment, depending on the threshold for such payments, to be determined in the Disbursement Letter. The Component Directors of each IA will approve payment orders from the DAs, prepared by the FM Consultants and signed by the Chief Accountants. Withdrawal applications for Direct Payments will be submitted directly to the MoF, where they will be reviewed and forwarded to the person authorized to sign withdrawal applications on behalf of the recipient.

Procurement

32. **General.** Procurement for the proposed project will be carried out in accordance with the World Bank's "Guidelines: Procurement of Goods, Works, and Non-Consulting Services under IBRD Loans and IDA Credits and Grants by World Bank Borrowers" (January 2011; revised July 2014), and consulting services will be procured following the World Bank's "Guidelines: Selection and Employment of Consultants under IBRD Loans and IDA Credits and Grants by World Bank Borrowers" (January 2011; revised July 2014) and the provisions stipulated in the Financing Agreement. The World Bank's "Guidelines on Preventing and Combating Fraud and Corruption in Projects Financed by IBRD Loans and IDA Credit and Grants" (October 15, 2006; revised July 2016) will also apply. The general descriptions of various items under different expenditure categories are provided in the following sections. For each contract to be financed by the Credit, the Procurement Plan will reflect the different procurement methods or consultant selection methods, the need for prequalification, cost estimates, the World Bank's review requirements, and time schedules. Detailed information regarding procurement arrangements for CERC will be provided in the appropriate annex of the POM.

33. **Procurement of goods, works, non-consulting services, and consulting services.** Goods to be procured under the project will include equipment for dispatching early warnings, an automated emergency call-receiving system, a disaster management information system, communication vehicles, seismic stations, seismic sensors, and heavy machinery. Works will mainly include reconstruction and rehabilitation of bridges and flood protection and construction or renovation of CMC buildings. Consulting services will include feasibility studies and detailed designs for civil works; fiscal risks diagnostics, capacity building, and preparation of the financial protection strategy; and project audit, along with the services of individual consultants to support project coordination and implementation. A positive list of goods, works, and services under the CERC are referred to in paragraphs 15–22 in Annex 2, and acceptable procurement procedures to be followed under this list will be agreed upon with the GoT.

34. Procurement of works, goods, and non-consulting services will be conducted using the World Bank's Standard Bidding Documents for all International Competitive Bidding (ICB) and an ECA Sample Bidding Document for Procurement of Works and Goods following National Competitive Bidding (NCB). The standard NCB provisions for Tajikistan, as included in the Financing Agreement, will be applied to all the NCB contracts. Selection methods for consulting firms will depend on the nature and complexity of assignments, their interest to foreign firms, and

the need for international expertise, together with the estimated budget of the services. The selection methods used will be Quality- and Cost-Based Selection (QCBS), Quality-Based Selection (QBS), Least-Cost Selection (LCS), Selection Based on Consultant's Qualification (CQS), Selection under a Fixed Budget (FBS), and Single-Source Selection (SSS). Short lists of consultants for services estimated to cost less than US$300,000-equivalent per contract may be composed entirely of national consultants, in accordance with the provisions of paragraph 2.7 of the Consultant Guidelines.

35. **Operating costs.** Operating costs will include all expenses necessary to ensure proper implementation of the project. The quarterly budget for them will be prepared by the MoF and cleared with the World Bank. The GoT's procurement procedures will apply.

36. **Assessment of the agency's capacity to implement procurement.** The capacity of the the MoF, the MoT, and ALRI to implement procurement activities was assessed in February 2016, and the assessment was updated in March 2017 and documented in the P-RAMS.

37. Procurement activities for the project will be carried out through the PIU/PMU/PIGs functioning in three ministries: the MoF PIU, namely the PIU for Access to Green Finance; the MoT PIG; and ALRI PMU, namely, the Fergana Valley Water Resources Management Project Unit. The PIU/PMU/PIGs have been handling several donor-funded projects in their respective sectors and have experience with implementation of World Bank projects. The PIU/PMU/PIGs have established internal procurement procedures that conform with World Bank's procedures and policies. Performance of the delivered World Bank operations has been rated as Satisfactory. The institutional capacity of the three bodies varies, however, based on their past and current exposure to World Bank projects, as well as projects of other development partners.

38. The ALRI PMU has a long-standing engagement with both the World Bank and other donors. Currently it is implementing World Bank–funded PAMP II (P133327) and is preparing the Zarafshon Irrigation Rehabilitation and River Basin Management Project (P158576); its large scope of procurement includes civil and public works scattered across the country. The PMU includes the Chief Procurement Specialist, who is to be supported by a Procurement Consultant and Procurement Assistant for implementation of these projects. Given the additional workload associated with the proposed project, additional procurement capacity for the ALRI PMU will be required.

39. The MoT PIG became an IA for the World Bank–funded CARs 2 (P145634) project in 2015 and gained exposure to larger-scale contracts both for works and consulting services. The PIG includes an experienced Procurement Consultant whose workload under the CARs 2 project will be further assessed before appraisal; his involvement in implementation of the proposed project may be considered.

40. The MoF PIU is currently handling several World Bank–funded projects, such as the Tajikistan Agriculture Commercialization Project (P132652), CAMP4ASB (P151363), and the Tajikistan: Extractive Industries Transparency Initiative Implementation (P126997), but the scope of procurement for all of them is limited. The MoF PIU has advanced procurements with financing from the PPA. The preparation activities for this project—which include a natural hazard assessment, feasibility studies, a Social Assessment, and detailed designs—aim to rank the

proposed interventions in order of priority and ensure project readiness. The MoF PIU hired a number of Technical Specialists, including bridge, flood, social, and environmental specialists, and a Project Coordinator to ensure adequate preparation of the SCINHP. Since major procurements planned for Component 1 have already been advanced, not many new activities will be added under the component. In case Component 3 is triggered according to paragraph 12 of OP 10.00 (Investment Project Financing), operating procedures with agreed-on streamlined approval processes and use of simple selection/procurement methods will apply. The existing MoF PIU Procurement Consultant could manage this set of activities.

41. The MoF PIU will be receiving technical inputs from the CoESCD and IoSEE during review of procurement documents and supervision of the activities related to their areas of expertise.

42. The overall project risk for procurement is rated Substantial. After mitigation measures are implemented, the residual risk would be Moderate. The risk ratings are based on experience from past and ongoing World Bank–financed projects in Tajikistan, the general public procurement environment, and the current capacity of the PIU/PMU/PIGs to handle procurement. The risks associated with the procurement and the relevant mitigation measures identified are described in the risk management plan in Table A3-3.

Table A3-3. Risk Management Plan

Description of Risk	Risk Rating	Mitigation Measures	Residual Risk Rating
Inadequate competition: Procurement in the project area, which is isolated geographically, economically, and socially from the rest of the country, may not attract adequate competition.	S	Consolidation of procurement packages as feasible to maximize interest from reputed bidders; wide and advance advertising, including announcements through the agencies' regional branches	M
Procurement of civil works: There is a major scope of civil works in the remote areas. The execution of civil works could lead to quality issues in reconstruction and rehabilitation of bridges and flood protection infrastructure.	S	Quality assurance of civil works through hiring of a construction supervision firm to ensure quality of civil works; regular physical inspections by PMU/PIGs' engineers.	M
Limited contract monitoring and management skills and tools: Contract administration procedures may not be adequate to ensure efficient and timely contract implementation; contract amendments are not processed diligently.	S	Establishment of contract management system; training for PIU/PMU/PIGs, CoESCD, and IoSEE staff in appropriate areas related to procurement and contract management.	M
Overall high public procurement risk environment	H	(a) Enforcement of public disclosure (b) Public oversight and citizen engagement programs, including onsite supervision contracts (c) Due diligence on winning bidders (d) Publication of Procurement Plans, notification, and advertising, and contract awards on publicly accessible websites, such as website of State Agency on Procurement of Goods, Works, and Services and SIC's portals (e) Establishment of a simple database for recording, monitoring, and following up on complaints (f) Close implementation supervision by the World Bank.	S
OVERALL	S		H

43. **Procurement Plan.** The Procurement Plan for the entire project will be finalized and agreed to by the World Bank by completion of the project negotiations. After the Board approves the project, the plan will be published on the website of each agency and the World Bank's external website. It will be updated in agreement with the World Bank at least annually, or as required to reflect the actual project implementation needs and improvements in institutional capacity. The prior review thresholds set out in the Procurement Plan will be reviewed from time to time and revised as needed during the project implementation. The thresholds for methods of procurement and prior review limits are detailed in Table A3-4.

Table A3-4. Thresholds for Procurement Methods and Prior Review Limits

Expenditure Category	Contract Value (US$)	Procurement Method	Bank Prior Review
Goods, Information Technology, and Non-Consulting Services	≥1,000,000	ICB	ICB contracts above US$2,000,000
	< 1,000,000	NCB	None
	≤ 100,000	Shopping	None
	n.a.	DC	Contracts above US$2,000,000
Works	≥5,000,000	ICB	ICB contracts above US$10,000,000
	< 5,000,000	NCB	None
	≤ 200,000	Shopping	None
	n.a.	DC	Contracts above US$10,000,000
Consulting Services	Irrespective of Value	QCBS, QBS, FBS, LCS, CQS[a]	All contracts above US$1,000,000 for firms; and all contracts above US$300,000 for individuals
	n.a.	SSS	
	n.a.	IC	

Note: a. CQS will be followed depending on type of assignments for estimated value less than US$300,000; DC = Direct Contracting; IC = Individual Consultant selection procedure.

44. **Frequency of procurement supervision.** In addition to prior review supervision, to be carried out from the World Bank Country Office, the capacity assessment of the IAs has recommended two supervision missions per year during which ex-post reviews will be conducted on a sample basis (20 percent in terms of number of contracts) for the contracts that are not subject to the World Bank's prior review. One post review report, which will include physical inspection of sample contracts, will be prepared each year. At least 10 percent of the contracts will be physically inspected.

45. **Disclosure.** The following documents will be disclosed on the websites of the MoF, the MoT, and ALRI:

(a) Procurement Plan and updates

(b) Invitation for bids for goods and works for all ICB and NCB contracts

(c) Request for expression of interest for selection/hiring of consulting services

(d) Contract awards of goods and works procured following ICB/NCB procedures

(e) List of contracts/purchase orders placed following shopping procedure on quarterly basis

(f) Short list of consultants

(g) Contract award of all consulting services

(h) List of contracts following DC or SSS on a quarterly basis

(i) Action-taken report on the complaints received on a quarterly basis

The following details will be sent to the World Bank for publishing on its external website and in United Nations Development Business online:

(a) Invitation for bids for procurement of goods and works using ICB procedures

(b) Request for expression of interest for consulting services with estimated cost greater than US$300,000

(c) Contract award details of all procurement of goods and works using ICB procedure

(d) Contract award details of all consulting services with short list, including any foreign firms and all SSS contracts awarded to foreign firms

Environmental and Social (including safeguards)

46. **Environmental safeguards.** The MoF PIU has involved three people who will bear responsibility for the implementation of the environmental safeguards:

(a) The PIU Project Coordinator is responsible for the overall safeguards implementation.

(b) The PIU Environmental Specialist is responsible for environmental safeguards implementation in strengthening of bridges (Subcomponent 2.1).

(c) The PIU Environmental Specialist is responsible for safeguards implementation in strengthening of flood protection (Subcomponent 2.2).

47. These three people have developed a comprehensive EMF document that covers all components of the project. In addition, the feasibility study and detailed design consultants have provided their inputs to the EMF, as specified in their ToR.

48. The EMF describes the requirements for the site-specific EMPs. According to the project design and the implementation timeline, the site-specific EMPs for the construction works will be developed by detailed design consultants in parallel with the detailed design study. The site-specific EMPs will be included in the bidding documents for construction contractors. The site supervision will be implemented by the contractors' responsible people onsite and during the site supervision visits of the PIU Environmental Specialists. Table A3-5 shows the distribution of environmental responsibilities among the involved stakeholders during the project implementation.

Table A3-5. Distribution of Environmental Responsibilities during Project Implementation

Participant	Activity	Supporting Documentation
Construction Contractor, site-specific	• Allocates adequate budget for environmental mitigation during the bidding process based on the Environmental Management Plan (EMP) • Assigns person responsible for environment health and safety at every site	• Inclusion of the EMP in the tender documents • Copies of the regular reports • Copies of permits/licenses

Participant	Activity	Supporting Documentation
	• Ensures the implementation of the site-specific EMP • Obtains clearance from authorized body or local executive authority if required • Obtains required permits/licenses • Reports regularly (once a month) to Supervision Contractor and PIU Environmental Specialists on the implementation of the mitigation measures and immediately in case of incidents • Ensures that complaints by the public are recorded and taken care of following the GRM	• Clearance statements from the Supervision Contractor and the PIU Environmental Specialists • Periodic reports and subproject completion report • EMPs/EMP checklists • Decision on the need for EIA from the authorized body or local executive authority (if applicable) • GRM instructions and log onsite.
Supervision Contractor	• Ensures the implementation of the site-specific EMP by regular (weekly) supervision visits to the construction site • Ensures that Construction Contractor reports regularly on mitigation measures and monitoring • Checks the quality of the environmental reports • Ensures the Contractor obtains all required permits/licenses • Ensures the Contractor implements the GRM	• Clearance statements from the Supervision Contractor • Copies of regular reports • Copies of permits/licenses
Feasibility study and detailed design contractors	• Develops site-specific EMPs according to requirements specified in the national regulations, the World Bank requirements, and ToRs specified in the EMF • Presents site-specific EMPs at the public consultation meetings	• EMPs/EMP checklists (where relevant) • Minutes of the public consultation meetings
PIU Environmental Specialists	• Provide inputs to site-specific EMPs • Ensure the quality of site-specific EMPs • Conduct regular site supervision (no less than once a month) • Provide quarterly reports to the World Bank on Environmental Mitigation and Monitoring • Review project design and other documentation in the application package for required environmental documentation and permits/licenses from the authorized body or local executive authority • Maintain complete files of environmental documentation for review by the World Bank • Monitor compliance with mitigation plans (if necessary) • Conduct environmental screening when the emergency response (Component 3) is triggered • Prepare EIA and EMP documentation for emergency response activities in Component 3 (if required)	• Inputs to the EMPs or EMP checklists • Site supervision reports • Quarterly reports to the World Bank • Environmental screening and categorization forms for Component 3 • EIA and EMP documentation for emergency response activities
World Bank	• Organize training for PIU staff on environmental safeguards requirements	• Document status of project implementation in Implementation

Participant	Activity	Supporting Documentation
	• Identify problems/issues and propose solutions • Review and clear EMF document • Review and clear selected site-specific EMPs • Review and clear EIA and EMP documentation for emergency response activities in Component 3 (if required)	Status and Results Reports and the mission Aide Memoirs • Training records

49. **The overall social risk rating is Substantial**. In view of the borrower's limited social safeguard capacity, timely implementation of safeguard requirements and monitoring of social impacts is expected to be challenging. A properly managed coordination between designers and safeguard consultants is required, as well as an approach mutually agreed on with the contractors in implementing safeguards and social mitigation measures, including those related to the outside labor influx.

50. Training, along with continuous guidance from the Bank team, will be organized for the PIU safeguard consultants placed at the MoF, the MoT, and ARLI. Training will also be organized for local concerned authorities on land acquisition, resettlement, and social impacts, including the GRM, to ensure compliance with the Bank's policies. Provisions in the Social Assessment on culturally sensitive issues, including those related to the establishment of mutual accord between communities and contractors related to bringing in the outside labor force, will be integrated into the civil works contracts. Timely implementation of RAPs (if any) and mandatory quarterly reporting of social impacts and grievances will be crucial. Specific citizen engagement mechanisms will also be included in site supervision contracts.

51. **Social Assessment rationale.** The borrower has prepared a Social Assessment to evaluate the socioeconomic situation in the potential project sites in GBAO and the Khatlon Oblast, with a considerable focus on the types and frequency of natural disasters, damage cost, early warning systems, emergency resettlement plans, the existing compensation system, readiness of institutions, willingness of communities to participate in the project implementation, and risks to the population associated with labor influx. Its findings will be incorporated into the design of project interventions at the community level.

52. **Potential effects of project.** The overall project effect will be positive. The reconstruction of bridges in GBAO will help improve transportation links between settlements, reduce transportation costs, allow *dehkan* farms and households to sell their products outside their regions, improve school attendance and the safety of schoolchildren, and provide better access to health care facilities for women and children. In the Khatlon Oblast, the positive effects of the riverbank protection works are primarily associated with reducing the impact of natural disasters and floods on household safety and farming activity and, thus, on food security, including for households headed by women.

53. **Natural hazards and vulnerable groups.** The natural disasters occurring most frequently in the surveyed districts of GBAO (Rushan and Vanj) have included earthquakes, avalanches, rock falls, and floods, while the Khatlon Oblast has most often been subject to mudflows, floods, and strong sandstorms. Beneficiaries cite climate change, along with human (anthropogenic) factors, as mainly responsible for the recent higher incidences of natural disasters. Households headed by

women, households with adult members working abroad as labor migrants, families with no grown-up children, large families with many children, and families with disabled members have been among the most vulnerable to the effects of the natural hazards. The project will keep focus on and reach out to communities with such vulnerable groups so they will share the benefits of its activities.

54. **Emergency preparedness and response.** The project activities will take into account local communities as an important resource for managing emergencies. In particular, knowledge of warning and evacuation procedures could ensure smooth and efficient evacuation, saving more lives and reducing losses and damage. The Social Assessment indicates that the local population receives training on behavior in emergencies caused by natural hazards; however, the level of public awareness is still fractional because the workshops and roundtables focused on public emergency preparedness and response are conducted for a narrow circle of people, and the information obtained is not disseminated to all members of the community. At the community level, warning of an approaching natural disaster comes mainly by means of portable radio transmitters, cell phones, mobile loudspeakers, and metal sound signals. The existing rapid response teams that are expected to act in case of emergencies are technically ill equipped to provide adequate support in emergencies, while in many communities where such response teams have been established formally, the local population is unaware of the numbers and identities of the people forming them.

55. Trainings will be organized to improve community knowledge and skills to comply effectively with the security measures required to cope with natural hazards when they occur. These trainings will focus on basic, though existentially important, methods to protect population and territories and will cover provision of first aid to the victims of disasters, assistance in search-and-rescue efforts, proper response to early warnings, and cooperation in evacuation procedures, among other things. Trainings will also be organized for local district-level staff responsible for rapid response in emergencies, including on how to warn and evacuate people effectively and in a timely manner using all available means of communication, such as television, radio, newspapers, and sound signals.

56. **Resettlement and evacuation.** The districts have resettlement plans for moving their populations to safer places in case of natural disasters. These plans are implemented on a voluntary basis, and the affected village representatives participate in the selection of sites for future resettlement when displaced. Commissions for the resettlement and evacuation of people are also in place. At the community level, however, people are not always appropriately aware of resettlement or evacuation plans, nor can they distinguish between them. The people, in general, have little knowledge of their legal rights when affected by emergencies. The GoT and local authorities provide material assistance to displaced households in the form of construction materials, fuel and lubricants, labor, and monetary compensation. The success of natural hazards response largely depends on the population's being aware of the whole range of measures, including evacuation plans for emergencies, safe haven routes, designated meeting places, and evacuation zones. As part of community outreach, the project will work with local communities and relevant authorities to increase the awareness of all segments of population, including disabled, frail, and other persons in need of extra assistance, of their lawful rights and obligations in emergencies. In addition, this effort will impart knowledge of their right to compensation for

damage that results from such impacts as voluntary or involuntary resettlement brought about by the natural hazards.

57. **Employment.** Despite the current crisis in the economy of the Russian Federation, the level of labor migration in the potential project areas is high. Remittances from migrant workers continue to remain the main source of income for most local households, though increasing numbers of returning migrants in the surveyed districts of the Khatlon Oblast have been taking up agriculture as a main source of income. Women's employment is mainly associated with agricultural production in *dekhkan* and private farms, selling products in the markets, and doing needlework at home, with limited income. Data on unemployment lack precision because many are reluctant to register as unemployed to collect the very small unemployment allowances. The project opens up employment opportunities for a local labor force of both genders to participate in subproject activities. The POM will include specifics on the rules of engagement with contractors, including quotas disaggregated by gender for employing local labor.

58. **Labor influx.** The temporary construction camps that will be set up are not viewed as negatively affecting local livelihoods in terms of social interaction and implications for the health of men and women, since not all of the bridges and riverbank reinforcement sites are located close to population settlements. Still, the potential project beneficiaries believe the recruitment of local labor, mobilizations of communities for public works through *khashars*,[21] and public awareness activities among the population could significantly reduce the social risks associated with possible labor influx. Among other mitigation measures to reduce the risk level is the establishment of mutual control over a mutually acceptable code of conduct.[22] This control could be implemented through permanent contact groups comprising representatives of *jamoat* and *makhalla* committees of both genders who will mediate between the contractors' and subcontractors' construction workers and the local communities. As a way of helping to increase the level of trust and social interaction between communities and contractors, communities are also willing to render assistance by providing temporary room and board to workers for a marginal fee. For grievances related to the labor influx, the feedback mechanism, as suggested by the Social Assessment, in most cases has to be a hotline, since almost all households have mobile phones. Complaint boxes, which will be installed in almost every village as part of the project-wide GRM, will also be used for this purpose.

59. **Monitoring and evaluation.** The Results Framework, presented in Annex 1, was developed in coordination with the GoT, and the World Bank's core indicators have been included where applicable. The PMU will be responsible for monitoring and reporting on the performance indicators defined for this project, which will be reported to the World Bank periodically. The PMU will assign a dedicated staff (financed by Component 4) responsible for coordinating M&E with line ministries to keep track of progress and the outcomes of project activities. The POM will provide specific details regarding M&E responsibilities, including data collection requirements, timing, and use of the information. Project monitoring will be periodic. Thematic areas that will

[21] *Khashar* is a community self-mobilization tradition in which people come together voluntarily to contribute free labor to small-scale infrastructure projects, such as road and bridge repairs, cleanup of irrigation canals, and so on.
[22] Under the updated Standard Procurement Document that reflects the World Bank's Procurement Regulations for IPF Borrowers ("Procurement Regulations," July 2016), bidders will be required to provide the Code of Conduct that will apply to their employees and subcontractors to ensure compliance with the Environmental, Social, Health, and Safety requirements.

be supervised and monitored include the following: (a) social and environmental compliance, (b) regular technical quality supervision, and (c) periodic physical and financial progress monitoring.

60. **Social and environmental monitoring.** This will comprise two sets of activities: (a) monitoring compliance with environmental regulations, social safeguards, and Environment and Social Assessment provisions and (b) continuous monitoring of social impact at the community level and oversight at the project level. The respective PMU/PIG/PIUs implementing the activities will be in charge of this monitoring.

61. **Regular supervision of technical quality.** This will be carried out by the respective PMU/PIG/PIUs and agencies.

62. **Periodic physical and financial progress monitoring.** Physical progress monitoring will be carried out monthly by the PMU/PIG/PIUs and reported to the PMU, which will in turn share the reports semiannually with the World Bank. Financial progress will be reported by the PMU through the quarterly IFRs.

Annex 4: Implementation Support Plan

TAJIKISTAN: Strengthening Critical Infrastructure against Natural Hazards

Strategy and Approach for Implementation Support

1. The proposed implementation support plan is focused on ensuring proactive and efficient assistance to the client institutions throughout project implementation. In this regard, the project implementation will benefit from supervision missions by the World Bank team at least twice a year, with appropriate recommendations and guidance from technical staff on the team.

Implementation Support Plan

2. To ensure adequate support and supervision, the World Bank team will extend the following expertise during implementation.

3. **Technical.** Technical Flood Protection and Bridge Engineers will provide support to the team during the finalization of design and technical solutions and the bidding process for relevant infrastructure under Component 2. Similar Technical Specialists will be involved to ensure adherence of the feasibility and design of the construction of the proposed CMC to support the CoESCD and equipment procurement to support the IoSEE. In aggregate, the main task of proposed Technical Experts will be ensuring that development of the final designs is optimal, with due consideration of technical and financial implications. Furthermore, these experts will separately and periodically supervise the works and equipment procurement to re-confirm adherence to overall agreed-on technical specifications and design parameters.

4. **Procurement.** A procurement specialist will be engaged to ensure compliance of procurement plans, packages, and processes to agreed standards and norms. To avoid delays, this specialist will also take proactive measures to work closely with stakeholder institutions to identify any possible bottlenecks early and resolve them. In particular, procurement support will consist of assisting with technical reviews of bidding and tendering documentation, oversight of implementation of the procurement plan, and contract post review activities.

5. **FM.** An FM specialist will ensure compliance of financial reporting and management procedures. To avoid delays, this specialist will also take proactive measures to work closely with stakeholder institutions to identify any possible bottlenecks early and resolve them. As part of its project implementation support and supervision missions, the Bank will provide risk-based FM implementation support and supervision within a year from the Project effectiveness, and then at appropriate intervals. During the Project implementation, the Bank will supervise the Project's FM arrangements in the following ways:

(a) It will review the project's quarterly IFRs as well as its annual audited financial statements and auditor's management letters and the remedial actions recommended in the auditor's management letters;

(b) During the Bank's on-site missions, review the following key areas:

(1) Project accounting and internal control systems;

(2) Budgeting and financial planning arrangements;

(3) Disbursement arrangements and financial flows, including counterpart funds, as applicable;

(4) Any incidences of corrupt practices involving project resources.

6. As required, a Bank-accredited FM Specialist will participate in the implementation support and supervision process.

7. **Social Safeguards.** A social safeguards specialist will be responsible for monitoring and confirming compliance of project activities with the RPF and/or RAPs. Furthermore, this specialist will ensure social accountability elements are adequately addressed in the project, and will address any social safeguards concerns that may arise on the part of the clients or beneficiaries.

8. **Environmental.** An environmental Specialist will be responsible for monitoring and confirm compliance of project activities with the EMF and/or Environmental Action Plans. This specialist will also ensure that environmental aspects are adequately addressed in the project, and will address any environmental concerns that may arise on the part of the clients or beneficiaries.

9. **Others.** Other relevant specialists will be engaged throughout the project implementation process, depending on the dynamics of project progress, and on needs that might arise. They may include but not be limited to Macro Economics Experts, Financial Experts, M&E Experts, Specific Technical Specialists and so on.

Table A4-1. Implementation Support

Time	***Focus***	***Skills Needed***	***Resource Estimate***
First twelve months	*Ensure initiation of bidding/tendering processes for: (a) civil works under component 2; (b) equipment under Component 1 and 2; and subsequent commencement of said equipment and/or works* *+ General supervision*	*Task Team Leaders* *Bridge Engineer* *Flood Specialist* *Technical (DRM Specialist)* *Procurement Specialist* *FM Specialist* *Social Safeguards Specialist* *Environmental Specialist*	*5 weeks* *4 weeks* *4 weeks* *2 weeks* *3 weeks* *2 weeks* *2 weeks* *2 weeks*
	Ensure initiation of design works for construction of the proposed CMC under Component 1, and initiation of	*Task Team Leaders* *Technical (DRM Socialist)* *Procurement Specialist*	*4 weeks* *3 weeks*

Time	*Focus*	*Skills Needed*	*Resource Estimate*
	the tendering/bidding process for the construction *+ General Supervision*	*FM Specialist* *Social Safeguards Specialist* *Environmental Specialist*	*2 weeks* *1 week* *2 weeks* *2 weeks*
	Exploration and proposal for a potential roll out of a Disaster Risk Financing tool *+ Incremental supervision*	*Task Team Leaders* *Macro Economist*	*4 weeks* *1 week*
12-48 months	*Ensure adequate project supervision and support*	*Task Team Leaders* *Bridge Engineer* *Flood Specialist* *Technical (DRM Specialist)* *Procurement Specialist* *FM Specialist* *Social Safeguards Specialist* *Environmental Specialist* *Others*	*25 weeks* *20 weeks* *20 weeks* *15 weeks* *12 weeks* *12 weeks* *10 weeks* *10 weeks* *12 weeks*
Other			

Table A4-2. Skills Mix Required

Skills Needed	*Number of Staff Weeks*	*Number of Trips*	*Comments*
Task Team Leader/s	*34 weeks*	*8*	*Based in HQ and Region*
Bridge Engineer	*24 weeks*	*6-7*	*Based in the Europe and Central Asia Region*
Flood Specialist	*24 weeks*	*6-7*	*Based in the Europe and Central Asia Region*
Technical (DRM) Specialist	*20 weeks*	*5-6*	*Based in the Europe and Central Asia Region*
Procurement Specialist	*17 weeks*	*3-4 (and as required)*	*Based in Dushanbe*
FM Specialist	*15 weeks*	*3-4 (and as required)*	*Based in Dushanbe*
Social Safeguards Specialist	*14 weeks*	*6*	*Based in HQ*
Environmental Specialist	*14 weeks*	*6*	*Based in the Europe and Central Asia Region*
Others (Macro Economist, M&E Specialist, Technical Specialists)	*8 weeks*	*4-5 (and as required)*	*Varies*

Annex 5: Economic Analysis

TAJIKISTAN: Strengthening Critical Infrastructure against Natural Hazards

Approach and Methodology

1. The objective of the project is to strengthen DRM capacities, enhance the resilience of critical infrastructure against natural hazards and improve capacity to respond to disasters. The activities focus mainly on three types of investments: reconstruction and strengthening of bridges (in GBAO); reconstruction and strengthening of flood protection and riverbank erosion prevention infrastructure (in the Khatlon Oblast); and establishment of Crisis Management Centres (CMCs) with emergency communication systems at both national and regional levels. They aim at protecting assets from hazards and / or enhancing productive activities as summarized below in Table A5-1.

Table A5-1. Overview - Role of each activity resulting from the project's investments

Infrastructure/Functions	Productive purpose	Protective purpose
Bridges	- Maintain regional connectivity (with China) - Maintain local connectivity of Vanj and Yazgulom valleys	- Hazards: mudflows, landslides - Exposed assets: land (crops) and dwellings
Flood protection	- Maintain land and irrigation water available for agriculture	- Hazards: floods and erosion - Exposed assets: land (crops) and dwellings
Crisis Management Centre	- N/A	- Monitor all hazards - Manage emergency rescuing services

2. The purpose of the economic analysis is to quantify, to the extent possible, these various benefits, and weight them against the project costs, that is, the capital investment and the infrastructures' operational expenses (O&M). Capacity building or institutional strengthening are not financed for their own sake, but as components that will enable the project—and hopefully others—to be implemented smoothly and become fully operational and functional, thus contributing to the above mentioned objectives. As such, their cost is accounted for, while the benefits they yield in this specific project, though hard to quantify, and is part of the overall benefits claimed by the infrastructures themselves, inasmuch as these 'softer' activities are a necessary condition for the expected benefits to materialize.

3. The economic analysis entails a speculation on the future under two scenarios: one without the project, which serves as a baseline, and one assuming the project implementation. The difference between the two, in terms of costs and benefits, are the key ingredients of the project economic evaluation. However, it is impossible to fully grasp all implications resulting from a given project. There is thus the need to set the extent of the expected benefits to count, bearing in mind the following trade-off: the larger the scope of the analysis, the better (the model is more realistic), but also the harder to perform (which can weaken the robustness of the conclusions).

4. Any speculation on the future entails uncertainty, and even more so in early stages of a project. This analysis explicitly acknowledges the uncertainty of many of the project variables by computing probability distributions instead of raw numbers, through Monte Carlo methods. We below present the methodology to value the expected benefits for each of the project infrastructures as well as the setting of two intertwined parameters affecting all economic flows: the horizon and the discount rate.

Project Time Horizon and Discount Rate

5. In line with the technical note on discounting costs and benefits in economic analysis of World Bank projects, (a) the project is evaluated over the infrastructures' expected lifetime (bridges, flood protections and CMC), and (b) the discount rate is flat for 20 years at 5 percent, then decreasing at an average rate of 0.4 percent per decade, thus reaching the lowering limit of 3.8 percent the last year of the horizon. This is consistent with the profiling of the various flows over time, notably the GDP (cf. below).

Bridges

6. **Regional connectivity.** Bridges 9, 10, 11 and 12 are on M41, the main road used for imports and exports to China. It makes a detour through GBAO to avoid coming in and out of Kyrgyzstan and have the goods taxed twice. In July 2015, a rare event of mudflow destroyed bridge 9 and blocked the traffic for some 7 days. Though functional again, the bridge is today of much lower quality (foundations are tilted) and thus more vulnerable to local hazards (rock falls, mudflows, earthquakes, and so on).

7. The project will rebuild bridge 9 better than before July 2015 and retrofit bridges 10, 11 and 12, as they are equally critical in terms of connectivity. The associated benefits are valued as the avoided costs resulting from the difference in the rate of breach of connectivity on M41, as a function of the difference in vulnerability to hazards between the future and the current bridge.

8. This valuation was performed with a model coupling the likelihood of breaches of connectivity, with and without a new bridge, together with the monetization of the additional vehicle operating costs and time losses in case of connectivity breaches –the Highway Development and Management Tool (HDM4) was used to evaluate these two latter variables.

9. **Local connectivity.** Ten of the bridges are located in western GBAO: in the Vanj valley (bridges 4 to 8), the Yazgulom valley (bridges 1 to 3), both eastwards M41, and in the very bottom of the Darvoz district (bridges 14 and 15). Theses bridges are key to the connectivity of surrounding rural communities: if a bridge fails, the inhabitants are isolated due to their remote location, which is not only very inconvenient but risky too, in case of medical emergency for example.

10. Beyond the risk of a bridge failure due to local hazards, the poor standards of the bridges are much limiting the load they can bear. This leads to numerous operations of unloading and (re)loading goods on both sides of the bridges, creating a bottleneck to the valleys' traffic and economic development.

11. The retrofit and upgrading of the bridges would not only reduce their vulnerability to hazards, but also allow for a more fluid traffic, which in turn will contribute to unlocking the local economic potential. This benefit is measured as a differential of productivity resulting from the lifting of this bottleneck to the local traffic.

12. **Protective purpose.** During the event of July 2015, Bridge 9 collapsed, which resulted in a chokepoint on the mudflow running down the riverbed. The mudflow expanded from there in a cone shape, damaging surrounding houses and crops instead of flowing down the riverbed. The new bridge design and the counter-measures around it will lower its vulnerability and allow for a greater capacity of flow (water or mud) to pass the bridge and thus better hedge for such risks.

13. From the particular case of the July 2015 event, the savings (that is, avoided damages) that would result were a similar hazard to strike at the upgraded bridge 9 are derived, and similarly to the other bridges sites (only inasmuch as they entail asset exposure in their surroundings).

Flood Protection Infrastructure

14. **Flooding.** The flood sites 1 (Kulyab district), 2 (Vosse district), 4 (Kabodiyon district), and 5 (Shaartuz district) involve protections against flooding. For all these sites, an annual average loss due to flooding was computed, in both the project situation (if the project infrastructures are in place) and the current one (without). The claimed benefits are the avoided losses between the two scenarios.

15. **Erosion.** Flood site 6 (Vosse district) entails works that prevent an intense erosion that has led to the loss of dwellings. Anti-erosion measures benefits are valued as the avoided losses of further dwellings.

16. **Irrigation.** Flood site five (Shaartuz district) faces another issue in addition to flooding (above): the movements of the riverbed have disturbed the intake and the channeling of some of the river stream for irrigation purposes, resulting in a loss of cropping area. The benefits are valued according to the expected yields and selling price for the irrigation surface that would be recovered when the project is implemented.

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17. **Hazard monitoring.** The CMC, through an improved coordination with scientific agencies and an enhanced management of early warning systems, will monitor hazards and, if possible, provide hazard information prior to their occurrence – this is mostly valid for slow onset floods, resulting from an overall basin dynamic as opposed to localized flash floods, though the latter are also predictable to some extent. This information will allow for evacuation, resulting in life saving, and vulnerability reduction measures, such as placing sandbags, or exposure reduction (for example, taking away valuable assets or placing them higher). This will result in the decrease of losses a given flood is liable for, which are valued in this analysis.

18. **Better emergency response.** A significant benefit of the CMC is the improvement of the response time for emergencies, through an enhanced management of the chain starting with the pick-up of an emergency call to adequate dispatching of emergency services and handover to health services. This input is particularly salient in terms of life savings.

19. The reduction of related health costs resulting from the shortening of the response time of the emergency teams, from the in call to the CMC to the handover to health services, has been valued.

Key Assumptions and Inputs of the Model

Bridges

20. **Regional connectivity.** The difference of traffic patterns between a M41 with a more sustainable connectivity pattern (through the retrofit of bridges 9, 10, 11 and 12) and the current situation can be expressed as an average number of days of connectivity saved a year. Such calculation is based on subject matter experts (SMEs) judgment (hazard specialists, geologists, both local and international) to assess the return period of the 2015 event, the return period that would lead to the same damages now (which is shorter since the standard of bridge 9 has gown down), as well as these return periods with the new bridges (which would be higher than before 2015 as their standard is higher). The simulations suggest a 90 percent probability of an average saving of connectivity between 1.6 and 2.4 days per year.

21. If a loss of connectivity takes places, the common assumption is that the traffic would occur on the shortest alternative route. The detour, in this case, is very lengthy (515 km) and the traffic relatively low: the records provided by the MoT, believed to be conservative, suggest an average daily traffic of some 300 vehicles (both ways).

22. The conversion of this extra mileage into a cost requires outputs from the HDM4 tool, namely the vehicle operating costs (VOC) and their speed. The main inputs of the model are reported below in Table A5-2.

Table A5-2. Data inputs used for the regional connectivity model

	Car Medium	Goods Vehicle	Bus Light	Bus Medium	Bus Heavy	Truck Light	Truck Medium	Truck Heavy	Truck Articulated
Economic Unit Costs									
New Vehicle Cost ($/vehicle)	17816	22141	18382	21626	24870	22965	26260	36043	76411
Fuel Cost ($/liter for MT, $/MJ for NMT)	0.95	0.95	1	0.89	1	0.89	0.89	0.89	0.89
Lubricant Cost ($/liter)	2.73	2.73	2	2.73	3	2.73	2.73	2.73	3.73
New Tire Cost ($/tire)	49.00	69.00	72	85.00	98	77.00	109.00	241.00	241.00
Maintenance Labor Cost ($/hour)	5.14	5.14	4	5.14	6	5.14	5.14	5.14	5.14
Crew Cost ($/hour)	3.86	5.65	5	5.65	6	6.94	6.94	6.94	6.94
Interest Rate (%)	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
Utilization and Loading									
Kilometers Driven per Year (km)	23000	30000	28900	34000	39100	40000	40000	86000	86000
Hours Driven per Year (hr)	550	1300	723	850	978	1300	1200	2050	2050
Service Life (years)	10	8	7	8	9	8	12	14	14
Percent of Time for Private Use (%)	100.00	0.00	0	0.00	0	0.00	0.00	0.00	0.00
Gross Vehicle Weight (tons)	1.20	1.80	2	2.50	3	3.00	7.50	13.00	28.00

23. Given the state of the roads and their type, that is, mountainous in GBAO and of poor quality, the roughness coefficient is expected to range from 20 to 25 m/km, which leads to a fleet VOC ranging from US$0.78 to US$0.83 per vehicle-km and a speed between 23.8 to 28 km per hour. These data were compared to other sources and their plausibility confirmed. Statistical findings about the labor market in Tajikistan led to monetize the hourly wage as a normal distribution of mean US$1.32 and standard deviation of 0.5 - Value of Time (VOT).

24. Future traffic was projected as a tracker of the national growth, with a premium of 1 percent, as a common practice, while VOC and VOT were indexed on the growth with a discount

(of mean respectively of 40 percent and 25 percent). However, the International Monetary Fund (IMF) or other renowned financial institutions do not provide growth perspectives beyond 5 or 10 years, let alone 50. Furthermore, growth rates in developing countries are expected, as their economies mature, to slow down. Consequently, the GDP profiling was initially set from the existing projections (a conservative value of 5.5 percent was chosen for the first decade) and decreased linearly (0.1 percent per year).

25. **Local connectivity.** Growth perspectives for the Vanj and Yazgulom valleys were estimated by SME following on-site field data collection at 0.9 percent and 2 percent for respectively the current situation and the scenario where bridges are upgraded and thus traffic smoothed both ways, notably allowing local extractive industries to flourish (marble and gold). A distribution of economic production 20 percent below the national average was assumed to account for the relative low productivity in GBAO (though relative to GBAO, these valleys are well developed).

26. Benefits attributed to local connectivity for bridges 14 and 15 are based on the results of the neighboring Vanj and Yazgulom valleys where more data was available and derived using conservative assumptions to avoid overestimating benefits.

27. **Protective measures**. The benefits of bridges are calculated based on the 2015 event, associating the estimation of the return period of this event by various SMEs (33 years was chosen as a relatively conservative estimate in the range of 20-50 suggested by various experts) with the damages, as estimated by local reports and localized GIS analysis. The method is replicated on other sites and adapted to local exposure of assets, whether dwellings of cultivated land. The claimed benefits are the avoided losses between two scenarios: one with the new upgraded bridge and another one with the existing ones.

Flood Infrastructure

28. **Floods.** The flood damages were computed as a differential between the Annual Average Losses (AAL) under the two scenarios—with and without project. In turn, AAL are derived from the association of various return periods of flooding events to the damages they caused.

29. The evaluation of return periods is based on both international and local expertise, as well as local maps and satellite images analysis. The damages result from extensive reporting of local hazard and various valuation exercises of items, as well as the use of vulnerability functions fitted according to SME best judgement.

30. Probability ranges were used to characterize uncertainties and always set toward conservative values as to avoid overestimation of benefits. For example, houses were valued at an average of US$16,600, while values reported ranged from US$10,000 to 30,000, and the annual production of a hectare of land was valued, on average, at US$1,000 whereas collected values from various sources would range between US$750 and US$5,000.

31. This modelling was performed on sites 1 and 2. It was used to fit a pseudo-linear model for the evaluation of the damages of the 5-year return period damages flood as a power law of population density and a tailored exposure indicator reflecting the proximity of dwellings to the riverbed and the gradient in its vicinity. This model purpose is to evaluate damages where no such

data was available, that is, on flood sites 4 and 5. Results were checked against other relevant data and proved relatively robust.

32. It resulted that under the project situation, there was a 95 percent probability to save from 30 percent to 40 percent of AAL. This is found consistent with the risk structure of this environment where most of the damages stem from a high frequency of relatively low damages and relatively high density for a rural milieu.

33. **Erosion.** The losses associated to erosion on flood site 6 are valued at the average of 3 houses per year, as field reports suggest. The lost land is (partially) compensated by newly available surfaces of land from which the riverbed moved away, and is now used for pasture or cropping purposes.

34. **Irrigation.** Flood site 5 also entails an erosion issue that jeopardizes irrigation. The project notably aims to protect an intake that channels water to 6,000 hectares of crops, out of which some 600 are currently compromised by the changing pattern of the stream. The valuation of these surfaces, for which a conservative mean of 520 hectares was set, leads to an annual flow of average US$530,000.

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35. **Hazard monitoring.** A better monitoring of hazard was valued through applying a 2 percent discount to the flood vulnerability function. This is thought to be a conservative value: in case of flood, an early warning to the population would allow them to protect their most valuable assets in very limited time.

36. **Reduction of emergency response time.** There is no standard method to assess the economic value of CMCs. An attempt is made here to uncover some of its benefits in terms of added value of a reduced emergency response. This analysis is based on the following variables: (a) the amount of all incoming calls to emergency services, (b) the share of these calls that will benefit of a time reduction (in minutes) of the emergency services due to the value added of the CMC, (c) the average time saved per beneficiary, and (d) the reduction in health costs stemming from the saving of time in reaching the emergency health services.

37. The amount of incoming calls was computed from the evaluation of Road Traffic Accidents (RTA). Reliable statistics are available for casualties and were converted into injuries using estimates available from the literature and statistics on the injury to casualty ratio. Since the RTA are a significant share of the total emergencies, the later was derived from the RTA using ratio from the literature.

38. The share of calls that would benefit from a time reduction was modelled as a beta (PERT) distribution of min value 5 percent, most likely value 15 percent and maximum value 45 percent, resulting in a mean of 18 percent.

39. The time discount per beneficiary was set as a distribution ranging from 1 to 4 minutes and mean 2.2.

40. An estimate of saving of US$16 per minute in Tajikistan was computed by adjusting similar indicators available in the literature for the USA, accounting for the difference in wealth with Tajikistan.

41. An O&M rate of 15 percent the overall investment (US$3 million) was assumed—a common value for CMCs.

42. Benefits were profiled with a 2 percent rate, as a conservative tracker of the population growth in Tajikistan (2.4 percent), as it forms the basis of the benefits. All assumptions were set to be conservative and were reviewed by a SME in emergency management and checked against available literature on the matter.

Results

43. The Table A5-3 (cf. below) summarizes the results of the simulations[23] for key economic indicators (the NPV, the B/C, and the ERR) for a total investment of US$40 million[24] broken down as follows: flood infrastructures (18.5), bridges (18.5), CMC (3).

44. Values highlighted in red are below the usual acceptable threshold[25] (that is, negative for the NPV, below 1 for B/C, and below 5 percent for the ERR); those uncoloured are typically acceptable (that is, above threshold); and those in green are above what is considered very good returns (twice the capital investment for the NPV, 2 for B/C, and 10 percent for the ERR).

Table A5-3. Overview of results based on economic simulations

NPV (USD Mln)	1%	5%	10%	Mode	Median	Mean	75%
Flood infrastructures	11.8	23.8	32.1	53.1	75.6	86.1	111.4
Bridges	- 11.7	- 8.5	- 6.4	- 2.0	7.1	15.7	22.4
CMC	- 10.3	- 9.0	- 8.0	- 4.3	- 2.0	0.3	3.8
All	4.6	20.9	31.7	71.1	88.3	102.1	134.4

B/C	1%	5%	10%	Mode	Median	Mean	75%
Flood infrastructures	1.40	1.82	2.11	2.95	3.64	4.01	4.90
Bridges	0.55	0.67	0.75	0.86	1.28	1.63	1.90
CMC	0.25	0.35	0.42	0.69	0.85	1.02	1.27
All	1.06	1.30	1.46	2.07	2.31	2.51	2.99

[23] The Monte Carlo method was applied using 100,000 iterations with the @risk software version 7.5.1 industrial edition.
[24] The budget allocation for CERC and small portion of component 2 for which detailed design of infrastructure are yet to be finalized are deducted.
[25] In a risk analysis perspective, an emphasis was put on the lower quantiles (1 percent, 5 percent, and 10 percent); the mode is the most likely value (that is, where the probability distribution is most concentrated), and the median represents the 50th quantile.

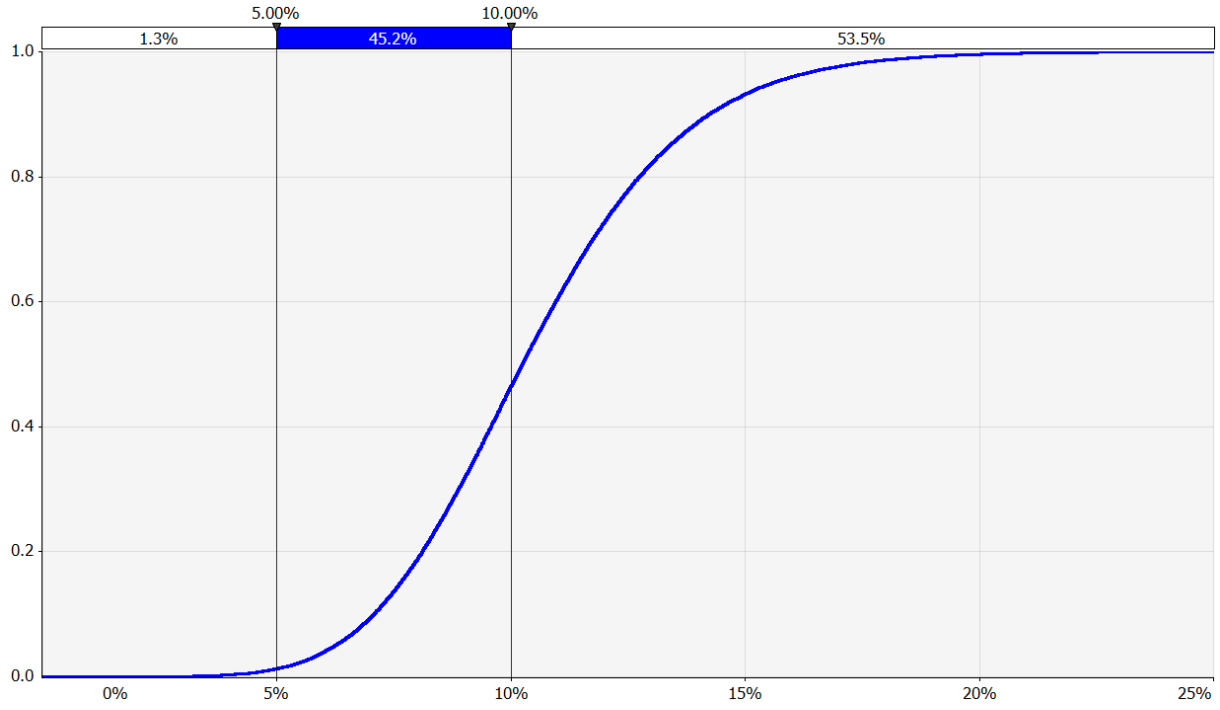
EIRR	1%	5%	10%	Mode	Median	Mean	75%
Flood infrastructures	6.7%	8.6%	9.8%	13.4%	14.8%	15.6%	18.4%
Bridges	0.6%	2.0%	2.7%	4.9%	5.4%	5.5%	7.1%
CMC	-11.0%	-8.4%	-6.6%	-0.8%	1.2%	3.1%	6.9%
All	4.8%	6.2%	7.1%	9.4%	10.2%	10.5%	12.2%

45. It appears that the overall project has satisfactory economic indicators except for the 1 percent worst-case scenario and only for the ERR indicator, while in all other cases it yields satisfactory economic indicators. Moreover, in more than 50 percent of the simulations, it performs well above what is considered acceptable (for all indicators).

46. The profitability of projects is ranked as follows (decreasing order): (a) flood protection infrastructures, (b) bridges, and (c) CMC. The very profitable flood infrastructures can be considered to "subsidize" the weakest components (CMC and to a lesser extent bridges). Bridges on their own can be considered economically profitable, since in more than 50 percent of the simulations the economic analysis yields satisfactory (or very satisfactory) indicators, in spite of the very rural, poor, and low density environment of GBAO—it is easier, from the sheer economic perspective, to yield benefits in urban, dense and wealthier environments. Only CMC merely breaks even (the mean of B/C is bigger than 1) and this is believed to be related to the rather conservative assumptions on the benefits they would yield, in absence of an existing well renowned framework of analysis.

47. Below in Figure A5-1 is the cumulative distribution of the ERR (shape for B/C or NPV would be very similar) for the whole investment:

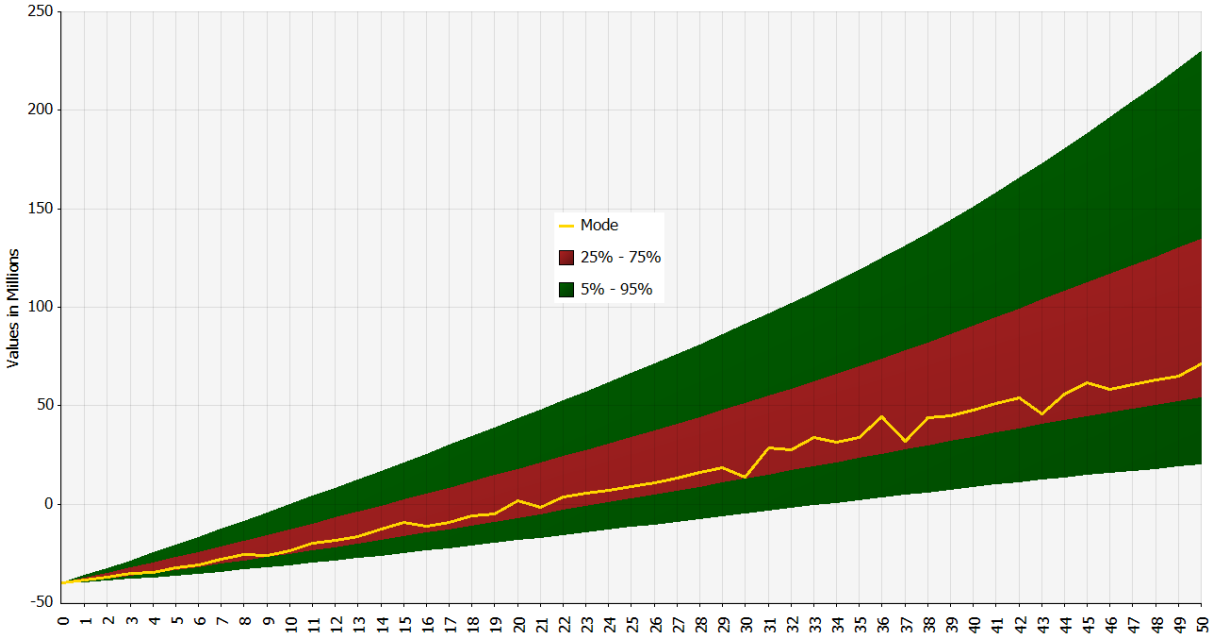
Figure A5-1. Cumulative distribution of ERR



48. There are 1.3 percent of simulations that lead to an ERR below 5 percent - a threshold since the discount rate is initially set at 5 percent by the World Bank. 45.2 percent of simulations have an ERR ranging between 5 percent and 10 percent while nearly 53.5 percent of the cases yields a very high rate of return (above 10 percent).

49. The NPV profile throughout the project time horizon is useful to gain insight on the project economics. In the plot below (Figure A5-2), a probability distribution representing the NPV at each point in time is represented through its 5-95 and 25-25 quantiles (respectively in green and brown) and mode (in yellow):

Figure A5-2. Probability distribution of NPV overtime



50. The increasing spread is not surprising: the further away one speculates, the more uncertainties there are. The bigger spread on the high values of the distribution (the upper green band is thicker) together with a relatively low mode reflect that the NPV distributions are lopsided on the right, even the more so as time passes. This stems from the uncertainty structure of the data (many of the input variables have an uncertainty of a full order of magnitude) as well as the choice of picking consistently conservative assumptions to avoid the overestimation of the benefits (the modes of the input distributions tend to heavily bend toward the left lower side).

51. The slightly erratic behavior of the mode is also expected: this parameter is harder to estimate and intrinsically more unstable than quantiles, which in turn are more unstable than the mean. However, given the nature of the uncertainties of the project as well as the shapes of the economic discounted cash flows, it is believed that the mode is the safest indicator to focus on for decision-making since it provides the most risk averse orientation in terms of investment. Since even then, the economic indicators of the project are above acceptable thresholds, it leaves no doubt about its profitability.

Other Benefits

52. The rationale behind the previous analysis is to show that even taking conservative assumptions to evaluate only a share of the project benefits, it proves profitable enough from a sheer economic perspective. As such, other benefits, real but hard to quantify, were not valued. Among these are the following:

53. It is expected that the project will lead to improvements in transport connectivity between the Republic of Tajikistan and China and thus increase access of local population to local and regional markets, services and employment opportunities. This is particularly salient in the Vanj and Yazgulom valleys where the poverty rate was estimated at 54 percent[26]. Moreover, the bridges, inasmuch as they enhance connectivity, can contribute to saving lives and improve health services (for example, in case of emergency or medical transfer). There are further benefits in maintaining connectivity: since the alternative road from Dushanbe to China goes in and out of Kirgizstan, there would be two extra custom fees applied on all diverted goods, which would result in an increase of their price on the market. Conversely, there have been consistent reports of increase of food prices of 20 percent to 30 percent in GBAO following avalanches that further isolate remote villages of the oblast.

54. The flood protection infrastructures are expected to reduce the number of casualties and injuries that floods can cause. These works are also expected to bring a sense of stability and security regarding the preservation of human, capital and productive assets, whereas nowadays, the uncertainty about the movement of the riverbed, the resulting erosion and flooding are affecting people behavior and likely the local real estate market too. The project is therefore expected to yield some well-being to the inhabitants of the concerned districts and to bring a positive input to the fostering of local investments and maintenance of other existing infrastructures (for example, through volunteering in *Khashar* activities). This is particularly salient in Kuliab and Vosse (flood sites 1, 2 and 6) where poverty rates are particularly high even by Tajik standards—it ranges between 50 percent and 60 percent.[27]

55. The CMCs are also expected to reduce the number of casualties, injuries, and their adverse consequences (amount of DALY notably). Beyond this direct positive impact, it is expected to further raise awareness among the population related to DRM, thus further enhancing prevention and preparation at the community and the nuclear level.

Public Sector Financing and World Bank Added Value

56. The World Bank's role is justified because of the project's economic and social benefits and because of the value added it brings beyond financing in areas such as: risk informed design of the bridges and the flood infrastructures, construction quality control, sustainability of infrastructures, technical support in managing the CMC, environmental risk management, safeguards, procurement, and FM.

57. Public sector financing is an appropriate vehicle for financing the upgrade of the bridges in the Vanj and Yazgulom valleys because the construction costs cannot be recovered through

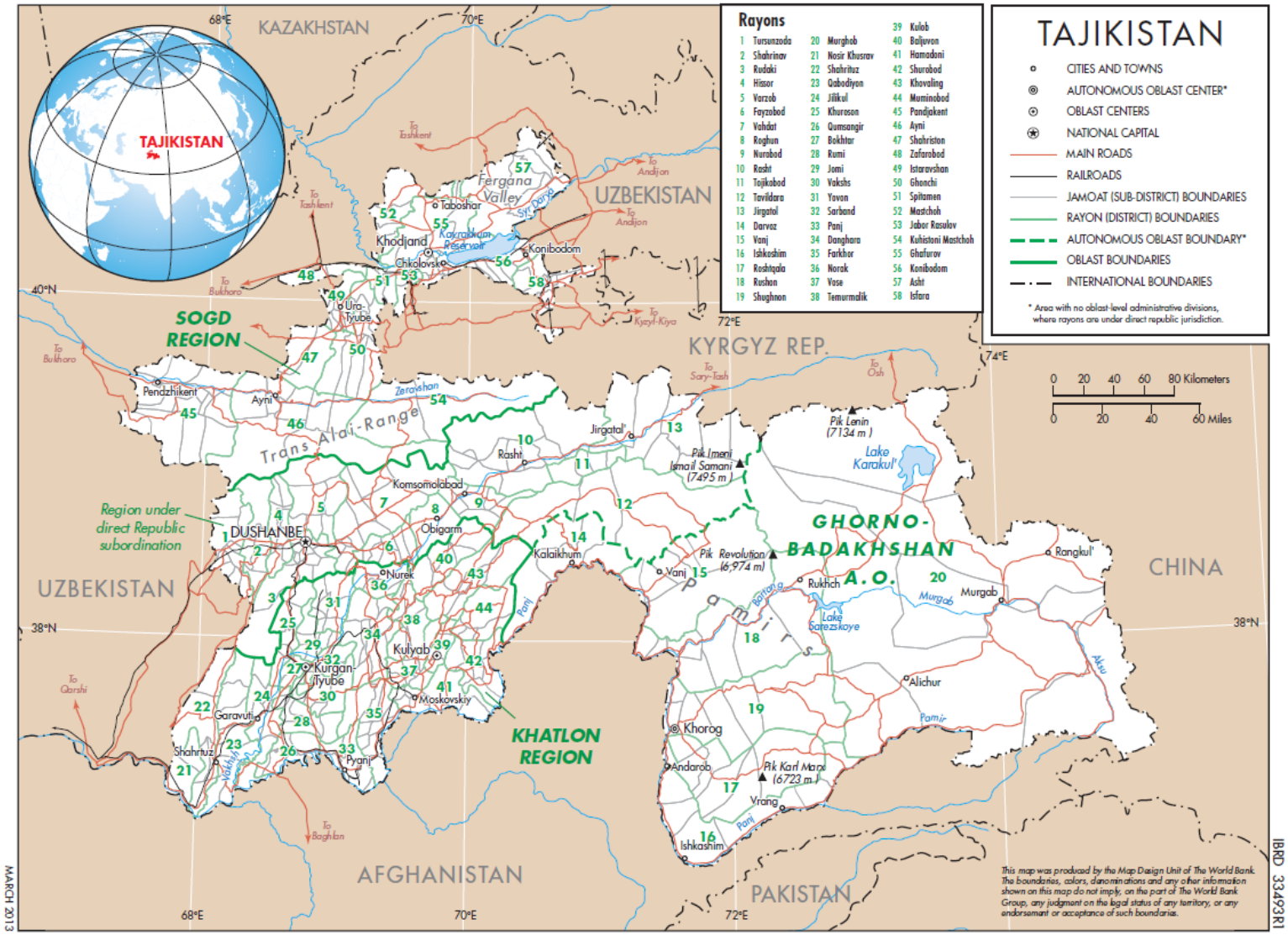
[26] See: World Bank Report No. 104003-TJ: Poverty mapping in Tajikistan: method and key findings, April 25, 2016.
[27] World Bank Report No. 104003-TJ: Poverty mapping in Tajikistan: method and key findings, April 25, 2016.

tariffs due to relatively low levels of traffic along these roads. Public investment in such infrastructure is desirable because it is a way for the GoT to ensure continuity on its territory and play a key role in rural development, as a tool for integrated and sustainable land planning. It also ensures a greater sense of security and confidence, all of which significantly matter for wellbeing and development.

58. From a wider perspective, the benefit of the World Bank support is based on its experiences in: consolidating global and regional experiences to finance and scale up DRM investments; coordinating and harmonizing the efforts of donors and development partners to leverage additional funding for DRM; and utilizing previous experiences in Tajikistan to support flood protection, transport and hydrometeorological services.

59. In this regard, some of the flood protection infrastructure damaged during the July 2015 floods/mudflows has already been covered and will be rehabilitated through restructuring of the PAMP II (P133327). Phase II of the CARs (P145634) is being implemented to increase connectivity between the Sugd Oblast in Tajikistan, the Batken and Osh Oblasts in the Kyrgyz Republic, and the Ferghana Oblast in Uzbekistan and to support improvements in road operations and asset management practices. Finally, the Central Asia Hydrometeorology Modernization Project (P120788) is being implemented to improve the accuracy and timeliness of weather and river flow forecasts to help provide better hazard warnings and to reduce the risks of weather-related disasters.

MAP


TAJIKISTAN
KAZAKHSTAN
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CHINA
AFGHANISTAN
PAKISTAN
SOGD REGION
KHATLON REGION
GHORNO-BADAKHSHAN A.O.
Region under direct Republic subordination
DUSHANBE
Khodjand
Konibodom
Ura-Tyube
Pendzhikent
Ayni
Jirgatal
Rasht
Komsomolabad
Obigarm
Nurek
Kulyab
Kurgan-Tyube
Moskovskiy
Garavutia
Shahrtuz
Pyanj
Kalaikhum
Vanj
Rukhch
Murgab
Alichur
Khorog
Andarob
Vrang
Ishkashim
Lake Karakul'
Lake Sarezskoye
Pik Lenin (7134 m)
Pik Ismoni Ismail Samani (7495 m)
Pik Revolution (6,974 m)
Pik Karl Marx (6723 m)
Trans Alai Range
Pamirs
Fergana Valley
Kayrakkum Reservoir
Zeravshan
Panj
Pamir
Vakhsh
Bartang
Murgab
Aksu
Rangkul'
Taboshar
Chkalovsk
Syr Darya
To Tashkent
To Andijon
To Bukhara
To Kyzyl-Kiya
To Sary-Tash
To Osh
To Qarshi
To Baghlon
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74°E
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0 20 40 60 Miles
Rayons
1 Tursunzoda
2 Shahrinav
3 Rudaki
4 Hissor
5 Varzob
6 Fayzobod
7 Vahdat
8 Roghun
9 Nurobod
10 Rasht
11 Tojikobod
12 Tavildara
13 Jirgatol
14 Darvoz
15 Vanj
16 Ishkashim
17 Roshtqala
18 Rushon
19 Shughnon
20 Murghob
21 Nosir Khusrav
22 Shahrituz
23 Qabodiyon
24 Jilikul
25 Khuroson
26 Qumsangir
27 Bokhtar
28 Rumi
29 Jomi
30 Vakshs
31 Yovon
32 Sarband
33 Panj
34 Danghara
35 Farkhor
36 Norak
37 Vose
38 Temurmalik
39 Kulob
40 Baljuvon
41 Hamadoni
42 Shurobod
43 Khovaling
44 Muminobod
45 Pandjakent
46 Ayni
47 Shahriston
48 Zafarobod
49 Istaravshan
50 Ghonchi
51 Spitamen
52 Mastchoh
53 Jabor Rasulov
54 Kuhistoni Mastchoh
55 Ghafurov
56 Konibodom
57 Asht
58 Isfara
TAJIKISTAN
CITIES AND TOWNS
AUTONOMOUS OBLAST CENTER*
OBLAST CENTERS
NATIONAL CAPITAL
MAIN ROADS
RAILROADS
JAMOAT (SUB-DISTRICT) BOUNDARIES
RAYON (DISTRICT) BOUNDARIES
AUTONOMOUS OBLAST BOUNDARY*
OBLAST BOUNDARIES
INTERNATIONAL BOUNDARIES
* Area with no oblast-level administrative divisions, where rayons are under direct republic jurisdiction.
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MARCH 2013
IBRD 33493R1