ASIAN DEVELOPMENT BANK **RRP:TAJ 35347**

REPORT AND RECOMMENDATION

OF THE

PRESIDENT

TO THE

BOARD OF DIRECTORS

ON A

PROPOSED LOAN

AND

TECHNICAL ASSISTANCE GRANT

TO THE

REPUBLIC OF TAJIKISTAN

FOR THE

EMERGENCY RESTORATION OF YAVAN WATER CONVEYANCE SYSTEM PROJECT

October 2001

CURRENCY EQUIVALENTS
(as of 9 October 2001)

Currency Unit	—	Somoni (TJS)
TJS1.00	=	$0.417
$1.00	=	TJS2.40

ABBREVIATIONS

ADB	—	Asian Development Bank
CLCND	—	Center for Liquidation of Consequences of Natural Disaster
EA	—	executing agency
EFRP	—	Emergency Flood Rehabilitation Project
GDP	—	Gross Domestic Product
ha	—	hectare
IOS	—	Interim Operational Strategy
km	—	kilometer
m	—	meter
mm	—	millimeter
m^3/sec	—	cubic meter per second
MWRLR	—	Ministry of Water Resources and Land Reclamation
O&M	—	operation and maintenance
PMO	—	project management office
RIRP	—	Rural Infrastructure Rehabilitation Project
TA	—	technical assistance

NOTES

(i) The fiscal year (FY) of the Government ends on 31 December.
(ii) In this report, “$” refers to US dollars.

CONTENTS

LOAN AND PROJECT SUMMARY

Borrower	Republic of Tajikistan
Project Description	The Project will restore the water conveyance system in Gozimalik, Khodzhamaston, and Yavan rayons (districts) of Khatlon Region. The system was damaged in May 2001 by an earthquake that disrupted water supplies to 56,000 people and 65,000 livestock. In addition, irrigation water supplies to 11,724 hectares of arable land were disrupted. About 90 percent of the people served by the system live below the poverty line. The system was completed in 1968, and consists of a tunnel, an open canal of about 28 kilometers (km), and three inverted siphons with a total length of about 3 km that convey water through three valleys. The earthquake damaged one siphon, disrupting the water supply. The Government agencies took immediate action and within a month had laid temporary pipelines partly restoring water supply. The Project will restore water supply by installing permanent replacement works, and rehabilitate facilities that pose a threat, thus safeguarding against failure risks. The project works include construction of bypass canals for two siphons, replacement of the third for which topography does not allow construction of a bypass canal, and some works on the main canal and tunnel that are necessary for safe operation of the system.
Classification	Core poverty intervention Human development
Environmental Assessment	Category B. An initial environmental examination was undertaken, a summary of which is attached as an appendix.
Rationale	The earthquake and consequent flooding of May 2001 caused significant damage to public and private infrastructure and disrupted potable and irrigation water supplies to predominantly poor communities. Although supplies were partly restored through temporary works with borrowed resources, permanent works are urgently needed to fully restore this basic service to the affected communities and safeguard against the recurrence of such a disaster in the project area. An emergency assistance to minimize the social and economic impacts of the disaster is warranted by the Government's budgetary constraints, which are expected to continue over the medium term. The Project will rehabilitate the water supply infrastructure and safeguard against recurrence of future disruptions, and thus ensure

maintenance of quality of life by sustaining critical water supply. In line with Asian Development Bank (ADB) policy on rehabilitation assistance after disasters, the Project will enable Tajikistan to continue with development expenditures that otherwise would have been foregone for disaster rehabilitation.

Objectives and Scope

The Project's immediate objective is to fully restore irrigation and household water supply in the project area. The long-term objective is to ensure access of the affected rural communities to water supplies on a sustainable basis. The Project comprises two components: (i) physical infrastructure, and (ii) project implementation support. The physical infrastructure component includes (i) temporary restoration of Loikasai siphon, (ii) construction of Loikasai bypass canal, (iii) remodeling of Ishmasai bypass canal, (iv) replacement of pipes of Shurchasai siphon, and (v) rehabilitation of Pravaya Vetka main canal and Vakhsh-Yavan tunnel. The project implementation support component will provide inputs for surveys, investigations, design, environmental monitoring, and social impact assessment.

Cost Estimates

The Project is estimated to cost $4.50 million equivalent, of which $2.76 million (61 percent) is the foreign exchange cost and $1.74 million equivalent (39 percent) the local currency cost. The cost estimates include physical and price contingencies, and $0.40 million for taxes and duties.

Financing Plan

($ million)

Source	Foreign Exchange	Local Currency	Total	Percent
Asian Development Bank	2.76	0.84	3.60	80
Government	0.00	0.90	0.90	20
Total	**2.76**	**1.74**	**4.50**	**100**

Loan Amount and Terms

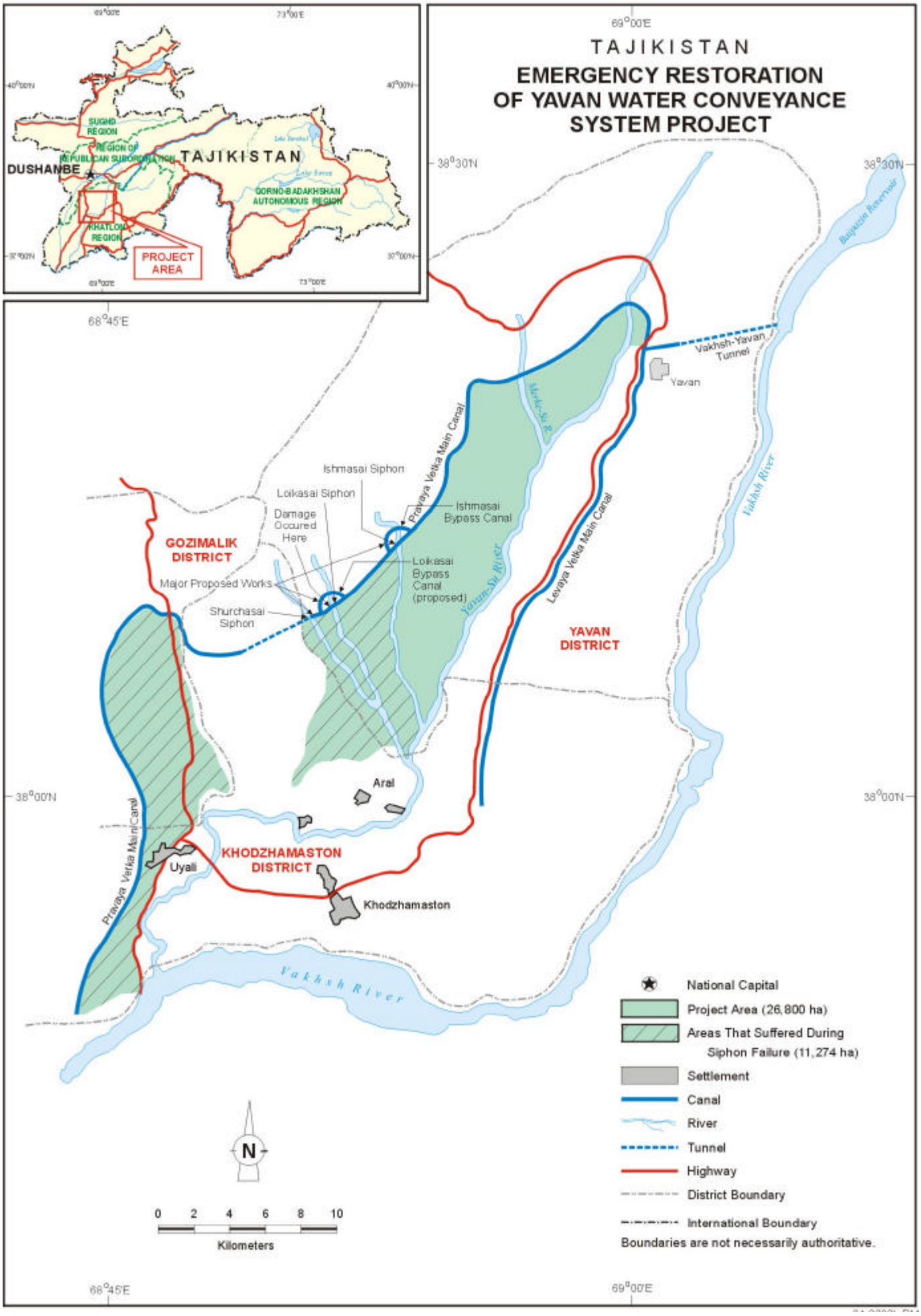
The loan of Special Drawing Rights 2,795,000 ($3.60 million equivalent) will be provided from the ADB's Special Funds resources, with a term of 32 years, including a grace period of 8 years, and an interest charge of 1 percent per year during the grace period and 1.5 percent thereafter.

Period of Utilization

Until 31 October 2003

Executing Agency	Ministry of Water Resources and Land Reclamation (MWRLR)
Implementation Arrangements	MWRLR is responsible for the operation and maintenance (O&M) of the water conveyance system and has implemented temporary rehabilitation works. A project management office (PMO) has been established for (i) overall project management, (ii) recruitment and supervision of domestic consultants, (iii) supervision of implementation and quality control of project works, (iv) liaison with beneficiary communities, (v) monitoring and evaluation of Project impacts, and (vi) preparation of reports and communications with ADB. The PMO will be staffed by local experts supported by domestic consultants. A project steering committee (PSC) will be established to facilitate interagency coordination, review implementation progress, and provide guidance. The PSC will be chaired by the deputy prime minister in charge of the ministries of transport, trade, construction, energy, industry, and emergency situations; and comprise representatives from MWRLR; the ministries of agriculture, finance, and environment protection; and the Center for Liquidation of Consequences of Natural Disasters. The PSC will meet quarterly and as often as required.
Procurement	The Project will finance civil works, materials, machinery, and equipment. All procurement will be undertaken in accordance with ADB's *Guidelines for Procurement*. Civil works contracts costing more than $800,000 equivalent will be awarded based on international shopping procedures. The temporary works were completed using force account works, while construction of Loikasai bypass canal is ongoing, also using force account works. The remaining civil works packages are small, amounting to less than $800,000 equivalent. Considering that the project site is located in a remote area with security risks, the Project is unlikely to attract international contractors. Therefore, local competitive bidding will be used for civil works packages under $800,000 equivalent.
Consulting Services	A total of 116 person-months of domestic consulting services will be required to assist with project implementation. Qualified and experienced domestic consultants are available for these engineering and construction works, and will be responsible for surveys, investigations, detailed design, preparation of tender documents, construction supervision, quality control,

	environmental monitoring and evaluation, and social impact assessment. Field engineers will be responsible for day-to-day supervision of the contractors. The consultants will be selected and engaged through a consulting firm in accordance with ADB's *Guidelines on the Use of Consultants* and other arrangements satisfactory to ADB for the selection and engagement of domestic consultants.
Estimated Project Completion Date	30 April 2003
Project Benefits and Beneficiaries	The Project will restore disrupted potable and irrigation water supply to the predominantly poor communities in the shortest possible time, based on a least-cost solution. The project measures will also safeguard the system against recurring future breakdown. Therefore, the projected benefits will include (i) improved living conditions, (ii) ready access to potable and irrigation water supplies on a sustainable basis, and (iii) avoidance of permanent losses of crop and livestock outputs of predominantly poor farmers caused by insufficient water supply.
Technical Assistance	A technical assistance (TA) grant of $135,000 equivalent from ADB-funded TA program will provide services of 4 person-months of international and 15 person-months of domestic consulting input to determine practices and help establish proper O&M procedures for the project facilities, and build MWRLR capacity for construction management and supervision. The consultants will be recruited through a consulting firm in accordance with ADB's *Guidelines on the Use of Consultants* and other arrangements satisfactory to ADB for the selection and engagement of domestic consultants.


TAJIKISTAN
EMERGENCY RESTORATION OF YAVAN WATER CONVEYANCE SYSTEM PROJECT
69°00'E
38°30'N
38°00'N
68°45'E
SUGHD REGION
REGION OF REPUBLICAN SUBORDINATION
DUSHANBE
TAJIKISTAN
KHATLON REGION
GORNO-BADAKHSHAN AUTONOMOUS REGION
PROJECT AREA
Vakhsh-Yavan Tunnel
Yavan
Ishmasai Siphon
Loikasai Siphon
Damage Occured Here
Pravaya Vetka Main Canal
Ishmasai Bypass Canal
Loikasai Bypass Canal (proposed)
Major Proposed Works
Shurchasai Siphon
GOZIMALIK DISTRICT
YAVAN DISTRICT
Levaya Vetka Main Canal
Yavan-Su River
Vakhsh River
Aral
KHODZHAMASTON DISTRICT
Uyali
Khodzhamaston
Pravaya Vetka Main Canal
Vakhsh River
N
0 2 4 6 8 10
Kilometers
National Capital
Project Area (26,800 ha)
Areas That Suffered During Siphon Failure (11,274 ha)
Settlement
Canal
River
Tunnel
Highway
District Boundary
International Boundary
Boundaries are not necessarily authoritative.

I. THE PROPOSAL

1. I submit for your approval the following Report and Recommendation on a proposed loan to the Republic of Tajikistan for the Emergency Restoration of Yavan Water Conveyance System Project. The report also describes proposed technical assistance (TA) for support for facilitating sustainable project benefits, and if the proposed loan is approved by the Board, I, acting under the authority delegated to me by the Board, shall approve the TA.

II. INTRODUCTION

2. On 7 May 2001, Tajikistan experienced an earthquake with an intensity of 4 on the Richter scale; the most immediate effect on the human population was felt in Gozimalik, Khodzhamaston, and Yavan rayons (districts) of Khatlon Region. The earthquake ruptured the water conveyance system cutting off water supplies to a population of approximately 56,000 and 65,000 livestock. About 11,724 hectares (ha) of arable land were left without irrigation water. About 90 percent of the affected people are living below the poverty line.

3. Government agencies took immediate steps to address the situation and alleviate the plight of the affected population. Household water supplies were met by water tankers. A workforce of 250 persons and a huge machinery pool undertook construction of a temporary pipeline, and thus restored water supply to affected households and livestock. Given the time and resources available to the Government, the contingency restoration of household supplies has met their immediate objective. However, the system remains precarious and permanent works are needed to restore the system to its full capacity and to address the risk of failure in other parts of the system, which are all more than 30 years old and have been destabilized or weakened by earthquake activity but which continue to be in use.

4. The President of Tajikistan in a letter dated 23 May 2001 asked the Asian Development Bank (ADB) to provide emergency assistance to restore the water conveyance system. The Appraisal Mission[1] visited Tajikistan from 15 to 30 July 2001 and visited the affected areas. The Mission held discussions with a wide range of national and local agencies, and the affected communities. This report is based on the Mission's findings and agreements reached with the Government. The project framework is in Appendix 1.

III. BACKGROUND

A. Geographic Features

5. Tajikistan is the most southerly of the former Soviet Union Central Asian republics, which became independent in 1991. It is bordered to the north by the Kyrgyz Republic, in the east by the Peoples Republic of China, Afghanistan to the south, and Uzbekistan to the west. The total area of 143,100 square kilometer (km) is divided into four regions, namely Sughd in the north, Region of Republican Subordination in the center, Khatlon in the south, and the mainly mountainous Gorno-Badakshan in the east.

6. The climate is continental although the relatively southerly latitude has an ameliorating impact and altitude is a significant local factor. The lowland agricultural areas have an average summer temperature of about 26ºC and a winter average of 6ºC, and have a long growing

[1] The Mission comprised A. Malik, Senior Project Specialist/Mission Leader; K. Motomura, Programs Officer; T. Bayarsaihan, Project Economist; A. Sweetser, Social Development Specialist; J. Wartiovaara, Environmental Specialist; R. Shaw, Economist, Staff Consultant; and M. Ali, Design Engineer, Staff Consultant.

season by central Asian standards of over 220 days. Rainfall averages 150 to 250 millimeter (mm) per year, most of which falls in the winter months. As a consequence, agriculture is highly dependent on irrigation. At higher altitudes, temperatures decline, the growing season shortens, and snow cover is common for much of the winter.

7. The population is about 6.1 million, two thirds of whom are ethnic Tajiks. Other significant ethnic groups include Kyrgyz, Russians, and Uzbeks. Population distribution is uneven; about 0.5 million people live in the capital Dushanbe and the total urban population is 1.8 million. The rural population is concentrated in the Sughd and Khatlon regions, which account for about 4 million people, most of whom are dispersed in over 3,000 communities of less than 1,000 persons each.

8. Tajikistan is a mountainous country; only 960,000 ha are designated as cultivable land. A further 3.6 million ha or 7 percent of the total area is classified as permanent pasture. Thus the amount of arable land per rural household is very modest at about 0.9 ha, plus about 3.5 ha of pasture. These include significant areas of often steeply sloping land, which is at risk and often results in evident soil erosion. A more sustainable pattern of land use would be consistent with a lower cultivated area.

9. The country has over 600 water supply systems, which originally provided 60 percent of the population with piped water mainly from groundwater sources. As a result of damage caused and lack of maintenance during the civil conflict, this figure has fallen substantially. Most rural potable water systems have deteriorated, thus depriving many rural communities of access to safe drinking water. Many households now depend on surface water, usually rivers or canals, where water quality is low. Outside district centers, the proportion of households with access to piped water is less than 20 percent. Even where a pipe network exists, the source of water is usually surface water, such as a river, with no guarantee that the water has been treated. Many systems are in a state of disrepair, forcing households to collect water from as far away as 5 km. The increased dependence on surface water sources has resulted in a much higher incidence of waterborne diseases in rural areas.

B. Recent Economic Developments

10. Tajikistan had an estimated per capita gross national product of $290 in 2000.[2] At independence, Tajikistan was the poorest republic of the former Soviet Union. The transition process proved to be difficult as the country faced many challenges. First, Tajikistan lost the most from the termination of transfers from Moscow, estimated at 40 percent of gross domestic product (GDP). Second, independence was accompanied by the outbreak of civil conflict in 1992, which continued at varying degrees of intensity until 1997. The conflict made reforms extremely difficult and effectively delayed implementation of any significant economic restructuring before 1997. Third, Tajikistan has suffered a number of natural disasters, including earthquakes, floods, and avalanches, that have disrupted economic activities and destroyed infrastructure. As a consequence, GDP fell by an estimated 60 percent between 1991 and 1997. The signing of a peace agreement in June 1997 ended the civil conflict and allowed the reform program to be pursued more vigorously. As a result, GDP began to grow. Between 1997 and 2000, GDP grew by about a cumulative 20 percent. Nevertheless, the country still faces a huge task of reconstruction, requiring large investments, which the Government has found difficult to mobilize. Tajikistan's external position is also weak as a result of its dependence on cotton and aluminum, whose prices are prone to considerable variation.

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[2] World Bank 2001. *Country Economic Memorandum*. Tajikistan. Dushanbe.

11. The contraction of the economy has severely constrained the Government's ability to provide (i) basic social services and (ii) operation and maintenance (O&M) of physical and social infrastructure. The Government is devoting 42 percent of its budget to the provision of social services, but with a national poverty level of 83 percent the impact is modest. The proposed Project will enable the Government to finance much needed social services as well as O&M of critical infrastructure.

C. Description of the Yavan Water Conveyance System

12. The Yavan water conveyance system was completed in 1968. The system originates from Baipazin Reservoir on Vakhsh River, about 65 km southeast of Dushanbe and serves Gozimalik, Khodzhamaston, and Yavan districts. About 90 percent of the people served by the system live below the poverty line. The water supply is taken from the river through a 7.3 km tunnel whose outlet is in the neighboring valley adjacent to the town of Yavan. The water passes from the tunnel via an open canal to a headworks with three outlets .The right side outlet feeds the Pravaya Vetka main canal, which has a design capacity of 50 cubic meters per second (m^3/sec) and irrigates about 26,800 ha. After the initial reach of 27.6 km where the system serves 15,526 ha, the canal capacity is reduced to 20 m^3/sec, and inverted siphons are used to traverse three valleys followed by a tunnel before entering Gozimalik district. Because of deterioration of various parts of the system over time, the flow in the siphon is generally limited to 17 m^3/sec against a design capacity of 20 m^3/sec.

13. The first siphon, Ishmasai, is 950 meters (m) long, consists of two parallel pipelines each 1.8 m diameter (dia), and has a total design capacity of 17 m^3/sec. To augment the capacity of the siphon and to match it with that of the main canal, a bypass canal of 4 m^3/sec was constructed in 1985. Ishmasai siphon discharges into a 4 km long open canal, which drains into the second, 1.1 km long Loikasai siphon. Loikasai siphon consists of three parallel pipelines, two of 1.8 m dia each and the one of 1.02 m dia, and it discharges into a 3 km long open canal. The third, Shurchasai siphon is 850 m long and consists of two pipelines of 1.8 m dia each. All pipes are made of steel and originally had a thickness of 10 mm. During more than 30 years of use, the pipes have been severely corroded by the sediment load in the water; in some stretches, the thickness has been reduced to an alarming limit. At the bottom, the pipe thickness has been reduced to about 3 mm posing threat of failure of the siphons, which seem to be in good condition.

14. Like other water-related facilities in the country, the maintenance of physical facilities has been inadequate because of poor cost recovery from the project beneficiaries and minimum Government support. Also, Soviet-era construction management and supervision practices are still being followed. Thus, the scope for introducing modern efficient and cost-effective practices in these fields is considerable.

D. The Disaster

15. The earthquake of 7 May 2001 caused cracks in both the pipelines and the open canal parts of the system. The most severe cracks occurred at the intake structure of the Loikasai siphon. Water poured from these cracks, soaking the soil under the structure. Maintenance staff began preparations to plug the cracks and close the gates, which regulate the flow of water into the system. During the night of the 7/8 of May, most of the soil under the intake structure, which consisted of alluvial deposits, was washed away and at 1100 hours on 8 May, the structure collapsed. Water gushing from the collapsed structure began to wash away the soil supporting the siphon pipes. Although the gates regulating the flow of water were closed, water continued

to flow for another 12 hours until the upstream siphon and open canals were completely empty. About 600 m of the initial reach of the Loikasai siphon and 100 m of open canal above the intake were washed away.

16. The immediate impact was the disruption of (i) potable water supplies to the community, and (ii) irrigation supplies to more than 11,700 ha of cultivated land. For almost four weeks about 56,000 people were dependent on water tankers for their supplies, while cropped areas suffered moisture stress. Water gushing from the collapsed structure destroyed 48 houses in the valley but luckily, caused no casualties. The disruptions to irrigation supplies immediately after the disaster, and supply of about 9 m^3/sec against 14 m^3/sec at Loikasai siphon after completion of the temporary works is expected to reduce crop yields by about 40 percent for the 11,724 ha irrigated area. Higher levels of febrile disease (said to be malaria) than usual have occurred during the months following the catastrophe, but no significant loss of time in school or other health consequences have been identified.

E. Government Response

17. The Government immediately established an emergency center charged with the task of reconstruction to restore potable water supplies. By 2 June 2001, the workforce succeeded in laying a temporary pipeline of 1.4 m dia, carrying about 3.0 m^3/sec or some 21 percent of the original supply of 14 m^3/sec. The second pipeline of 2.02 m dia and about 6.0 m^3/sec capacity was completed on 18 June 2001. Another pipeline of 1.0 m dia with capacity of 0.5 m^3/sec, also completed in June 2001, supplies water to local areas of Khodzhamaston district. This restored water supplies to households. These temporary works with available materials were aimed at restoring the water supply with minimum disruption and will need to be replaced as soon as possible. Unless a permanent solution is implemented, the project area will remain under the threat of another system collapse leading to a disaster.

18. The cost of the temporary works is estimated at $478,300. The Government has diverted some funds from other activities while the Design Institute of the Ministry of Water Resources and Land Reclamation (MWRLR), and some contractors and suppliers are still to be paid.

19. The Design Institute of MWRLR prepared a design plan to rehabilitate the system including parts that pose a continued threat to local communities. The plan is to construct bypass canals for the first two inverted siphons and replace pipes of the third. The existing bypass canal of Ishmasai (first) siphon, which carries 4.0 m^3/sec will need to be remodeled to carry 20 m^3/sec. A detailed survey and design has already been carried out for the second bypass canal and preparatory works for its construction are in progress.

F. Aid Coordination and External Assistance

20. Tajikistan has received several emergency loans from various development agencies. The World Bank alone provided three emergency loans. The first, postconflict emergency reconstruction for $10.0 million, approved in February 1998[3] has been fully disbursed and was closed in September 2000. Emergency flood assistance for $5.0 million was approved in August 1998[4] and supplemented by $2.0 million in December 1999.[5] ADB approved the Emergency

[3] World Bank Loan 30370-TAJ: *Postconflict Emergency Reconstruction Project*, for $10.0 million, approved on 17 February 1998.

[4] World Bank Loan 31230-TAJ: *Emergency Flood Assistance Project*, for $5.0 million, approved on 31 August 1998.

[5] World Bank Loan 31231-TAJ: *Supplementary Flood Assistance Project*, for $3.0 million, approved on 20 December 1999.

Flood Rehabilitation Project (EFRP) in December 1999 for $5.0 million.[6] Bilateral assistance has been provided by United States Agency for International Development and Germany through German Agro Action. The United Nations office for the Coordination of Humanitarian Affairs played a particularly useful role following the July 1999 floods. Good coordination among these agencies has been maintained and was followed up during the preparation of the proposed Project. Consultation with the World Bank was undertaken to ensure that the activities under this Project do not overlap with the recently approved Rural Infrastructure Rehabilitation Project (RIRP) of the World Bank.[7]

G. Lessons Learned

21. The following lessons learned from a number of emergency projects financed by ADB have been incorporated in the project design: (i) project components should be defined clearly; (ii) adequate consulting services should be provided to assist with surveys, investigations, design, and construction supervision; (iii) advance action and retroactive financing are essential to facilitate speedy restoration; (iv) training is critical for executing agencies not familiar with ADB procedures; and (v) appropriate O&M arrangements should be facilitated for the rehabilitated infrastructure. TA (para. 59) will be provided to facilitate proper O&M of the project facilities.

22. The EFRP, the only ADB-financed emergency assistance project in Tajikistan, is being implemented by the Center for Liquidation of Consequences of Natural Disasters (CLCND), which has performed creditably. CLCND has agreed to provide guidance and support to MWRLR, the proposed EA, particularly in areas such as disbursement and procurement procedures. The experience gained by MWRLR during project implementation will strengthen its capacity to implement forthcoming ADB agriculture and water sector projects for which it will act as the EA.

H. ADB's Country Strategy

23. The current country assistance program for Tajikistan is prepared based on the Interim Operational Strategy (IOS), which was endorsed by the Board in 1998. The objectives of the IOS are to (i) facilitate the country's transition to a market economy, (ii) assist in the postconflict rehabilitation and reconstruction, and (iii) support natural disaster rehabilitation. To maximize the development impact of ADB's assistance, the IOS focuses on three priority areas: (i) agriculture; (ii) infrastructure rehabilitation, especially roads and power; and (iii) the social sector. While the current IOS remains broadly appropriate, a full country operational strategy is scheduled to be prepared in 2002 based on a poverty partnership agreement, which will be concluded with the Government in 2001.

IV. THE PROPOSED PROJECT

A. Rationale

24. The earthquake and consequent flooding of May 2001 caused significant damage to public and private infrastructure and disrupted potable and irrigation water supply to 26,800 ha. The incidence attracted immediate Government attention as about 90 percent of the affected people live below the poverty line. Although water supplies have been partly restored through

[6] Loan 1714(SF)-TAJ: *Emergency Flood Rehabilitation Project*, for $5.0 million approved on 2 December 1999.
[7] World Bank Loan 33870-TAJ: *Rural Infrastructure Rehabilitation Project*, for $20.0 million, approved on 6 July 2000.

temporary works with borrowed resources, permanent remedial actions are urgently required to fully restore this basic service to affected communities and safeguard against the recurrence of such disaster in the project area. Unless a permanent solution is implemented urgently, the restored system remains vulnerable and the local communities' welfare is at risk of possible loss of life, damage to property, lost agricultural production, and reduced family incomes. A permanent solution will also safeguard against environmental damage. An emergency assistance to minimize the social and economic impacts of the disaster is warranted by the Government's budgetary constraints, which are expected to continue over the medium term. In line with ADB's policy of assistance after disasters, the proposed emergency loan will enable Tajikistan to continue with development financing that otherwise would have been diverted for disaster rehabilitation.

25. The Project was formulated in close consultation with central and local government officials, the affected communities, nongovernment organizations, and local groups. The project design ensures a significant role for the concerned regional and district authorities, including their participation in project implementation.

B. Objectives and Scope

26. The immediate objective of the Project is to fully rehabilitate the household and irrigation water supply system damaged by the earthquake. The long-term objective is to ensure access of the affected rural communities to water supplies on a sustainable basis and thereby raise their living standards. The Project will assist the Government to (i) rehabilitate the water supply infrastructure and safeguard against recurrent damage in the affected areas; and (ii) reduce the possibility that emergency expenditures will disrupt the implementation of approved development programs.

27. The Project comprises two components: (i) physical infrastructure, and (ii) project implementation support. The physical infrastructure works to be implemented under the Project include (i) temporary restoration of Loikasai siphon, (ii) construction of Loikasai bypass canal, (iii) remodeling of Ishmasai bypass canal, (iv) replacement of pipes of Shurchasai siphon, and (v) rehabilitation of Pravaya Vetka main canal and Vakhsh-Yavan tunnel. Details of the project components are as follows.

1. Physical Infrastructure

28. The use of an open channel was found to be the least-cost solution in the cases of Loikasai and Ishmasai siphons. However, in the case of Shurchasai siphon, ground conditions do not allow a feasible open channel and, therefore, replacement of pipelines was adopted. Details of the works follow.

a. Temporary Restoration of Loikasai Siphon

29. Temporary works were completed under the supervision of MWRLR before end-June 2001 using force account works (para. 17 and 18). The works will continue to be used until Loikasai bypass canal (para. 30) is complete. Later, these works will remain as a standby facility.

b. Construction of Loikasai Bypass Canal

30. The cost-effective, long-term solution for the damaged Loikasai siphon is a 4.1 km long open bypass canal running along the contour. MWRLR has already completed surveys and design. With a capacity of 20 m^3/sec, the canal will be 8 m wide at the bottom and 3 m deep. The associated structures include intake and outfall structures, two bridges, and five cross-drainage works. The Project will provide for procurement of earth-moving equipment, which will be used for O&M after project completion. Six families living along the alignment are being resettled. The Government plans to complete its construction and test running by April 2002, before the start of the next cropping season. As the temporary pipelines are already operational, the works on the bypass canal could be conducted during both growing and nongrowing seasons without interrupting the current level of water supply.

c. Remodeling of Ishmasai Bypass Canal

31. A 4.0 m^3/sec 5.1 km long bypass canal for Ishmasai siphon was constructed in 1985 to augment the capacity of the siphon and match it with that of the main canal. The bypass canal is to be remodeled and its capacity increased to 20 m^3/sec so that it can replace Ishmasai siphon. The Project provides for procurement of earth-moving equipment which will be used for O&M after project completion. As the Ishmasai siphon is operational, remodeling of the bypass canal could be undertaken any time of the year without interrupting water supply in the main conveyance system.

d. Replacement of Pipes of Shurchasai Siphon

32. Surveys and investigations revealed that the topography of Shurchasai valley does not allow a feasible bypass canal. Rehabilitation of Shurchasai siphon involves replacement of pipes. To not disrupt irrigation water supply, these works will be conducted during the nongrowing season. To ensure continuous potable water supply, one pipeline will be replaced at a time.

e. Rehabilitation of Pravaya Vetka Main Canal and Vakhsh-Yavan Tunnel

33. To sustain the benefits of the project investments, some original design flaws of the system need to be readdressed, and minor rehabilitation of Pravaya Vetka main canal and Vakhsh-Yavan tunnel undertaken. Of particular importance are the works associated with handling the emergency situations through efficient communication, timely closing of the system intakes, and emptying the canal through spill channels. Being associated with the main supply line and considering that the works involved will need canal closure, these works will be scheduled during the nongrowing season.

2. Project Implementation Support

34. The project implementation support component will provide inputs for surveys, investigations, design, construction supervision, environmental monitoring and evaluation, and social impact assessment. The Project will be implemented by a project management office (PMO) in Dushanbe and a project site office in Yavan (para. 38). For monitoring and evaluation, the PMO will (i) prepare and analyze baseline economic, social, and environmental data in the project area; and (ii) monitor and evaluate the Project's economic, social, and environmental impacts including the extent to which the negative economic, social, and environmental impacts

of the earthquake of 7 May 2001 have been alleviated under the Project, as well as the Borrower's utilization of the O&M practices and procedures developed under the associated TA.

35. The PMO will be supported by 116 person-months of domestic consulting input (para. 40). The consultants will assist in carrying out surveys, investigations, design, construction supervision, environmental monitoring and evaluation, and social impact assessment.

C. Cost Estimates

36. The Project is estimated to cost $4.50 million equivalent, of which $2.76 million (61 percent) is the foreign exchange cost and $1.74 million equivalent (39 percent) the local currency cost. The cost estimates include physical and price contingencies, and $0.40 million equivalent for taxes and duties. The foreign exchange cost is relatively higher because machinery, equipment, and most of the construction materials will be imported. A summary of the cost estimates is in Table 1 and detailed cost estimates are in Appendix 2.

Table 1: Cost Estimates
($ million)

Component			Foreign Exchange	Local Currency	Total Cost
A.	**Base Costs**				
	1.	**Physical Infrastructure**	**2.33**	**1.31**	**3.64**
		a. Temporary Restoration of Loikasai Siphon	0.24	0.24	0.48
		b. Construction of Loikasai Bypass Canal	0.85	0.49	1.34
		c. Remodeling of Ishmasai Bypass Canal	0.35	0.12	0.47
		d. Replacement of Pipes of Shurchasai Siphon	0.55	0.28	0.83
		e. Rehabilitation of Pravaya Vetka Main Canal and Vakhsh-Yavan Tunnel	0.34	0.18	0.52
	2.	**Project Implementation Support**	**0.06**	**0.19**	**0.25**
		Subtotal (A)	**2.39**	**1.50**	**3.89**
B.	**Contingencies**				
	1.	Physical[a]	0.25	0.14	0.39
	2.	Price[b]	0.08	0.10	0.18
		Subtotal (B)	**0.33**	**0.24**	**0.57**
C.	**Service Charges[c]**		**0.04**	**0.00**	**0.04**
		Total	**2.76**	**1.74**	**4.50**
	Percent		61%	39%	100%

[a] At 10 to 12 percent for civil works, except for item 1(a) for which no provision was made as it is already complete.
[b] At 2.4 percent for foreign exchange costs, based on the projections of the manufacturing unit value indices for inflation in dollar terms, and at 4 percent for first year and 7 percent for the following years for local currency costs. No provision was made for item 1(a), which is already complete.
[c] At 1 percent per year during the grace period and 1.5 percent thereafter.
Source: Staff estimates.

D. Financing Plan

37. The proposed ADB loan of Special Drawing Rights 2,795,000 ($3.60 million equivalent) will finance the entire foreign exchange cost of $2.76 million and $0.84 million equivalent of the local currency cost, or 80 percent of the total project cost. The provision of local cost financing is justified by budgetary constraints of the Government, and the project focus on enhancing the welfare and living standards of very low income communities in a transition economy (para. 24).

The Government will meet the remaining local currency cost of $0.90 million equivalent, or 20 percent of the total project cost. The Borrower will be the Republic of Tajikistan. The Government will make the loan proceeds available to MWRLR through budgetary appropriations. The loan will be provided from ADB's Special Funds resources and with a term of 32 years, including a grace period of 8 years, and an interest charge of 1 percent per year during the grace period and 1.5 percent thereafter. The financing plan is summarized in Table 2.

Table 2: Financing Plan
($ million)

Source	Foreign Exchange	Local Currency	Total Cost	Percent
Asian Development Bank	2.76	0.84	3.60	80
Government	0.00	0.90	0.90	20
Total	**2.76**	**1.74**	**4.50**	**100**

Source: Staff estimates.

E. Implementation Arrangements

1. Execution and Coordination

38. MWRLR, the EA, is currently responsible for O&M of water conveyance systems. MWRLR has established a PMO in Dushanbe, and will establish a project site office in Yavan within one month of loan effectiveness. The PMO will be responsible for (i) overall project management, including approval of designs, preparation and evaluation of tenders, award of contracts, and procurement of materials and equipment; (ii) recruitment and supervision of domestic consultants; (iii) supervision of implementation and quality control of project works; (iv) liaison with beneficiary communities; (v) monitoring and evaluation of Project impacts; and (vi) preparation of reports and communications with ADB. The PMO will be staffed by local experts supported by domestic consultants. The organization chart for project implementation is in Appendix 3.

39. A project steering committee will be established to ensure overall coordination, review implementation progress, identify issues, determine measures to address the issues, and provide guidance. The steering committee will be chaired by the deputy prime minister in charge of the ministries of transport, trade, construction, energy, industry, and emergency situations; and comprise representatives from MWRLR; the ministries of agriculture, finance, environment protection; and CLCND. The committee will meet quarterly or more frequently if required.

2. Consulting Services

40. A total of 116 person-months of domestic consulting services financed from loan will be required to assist project implementation. The project works are simple engineering and construction works, and adequately qualified and experienced domestic consultants are available. Therefore, the services of international consultants are not considered necessary. The consultants will be responsible for surveys, investigations, detailed design, preparation of tender documents, construction supervision, quality control, environmental monitoring, and social assessment. Field engineers will be responsible for day-to-day supervision of the contractors.

41. The Government will select and engage consultants through a consulting firm in accordance with ADB's *Guidelines on the Use of Consultants* and other arrangements

satisfactory to ADB for the selection and engagement of domestic consultants. The terms of reference for the consulting services are in Appendix 4.

3. Procurement

42. Procurement of goods and services to be financed by ADB will be carried out in accordance with ADB's *Guidelines for Procurement*. Tentative packaging of major contracts is given in Appendix 5. The package of temporary works was completed using force account procedures; the ongoing construction of Loikasai bypass canal is also using force account procedures. The remaining civil works packages are small. Considering that the project site is located in a remote area with security risks, the Project is unlikely to attract international contractors. International shopping procedures will be used for contracts amounting to $800,000 equivalent or more, and local competitive bidding will be used for civil works packages amounting to less than $800,000 equivalent. Certain civil works for temporary restoration of Loikasai siphon and construction of Loikasai bypass canal, each estimated to cost the equivalent of $700,000 or less, may be carried out by MWRLR on a force account basis. The Government has been advised of ADB's anticorruption policy and corresponding provisions under ADB's *Guidelines for Procurement* (para. 54)

4. Advance Procurement Action and Retroactive Financing

43. At the Government's request, ADB has approved (i) advance action for recruitment of consultants, and procurement of equipment and civil works; and (ii) retroactive financing of the project works from 8 May 2001. Advance action is necessary to expedite project implementation considering that the proposed works are critical for restoring normalcy in the social and economic life of the affected communities. Retroactive financing will ease the Government's budgetary constraints and minimize the impact of the disaster on its development plan. Retroactive financing will be limited to loan-related expenditures since 8 May 2001 until loan effectiveness, and is subject to a ceiling of $1.0 million equivalent.

5. Disbursement Procedures

44. To expedite project implementation through timely release of the loan proceeds, the Government will establish an imprest account promptly after loan effectiveness with an initial deposit of $0.5 million equivalent. The imprest account will be established at a commercial bank acceptable to ADB, and will be managed and liquidated in accordance with detailed arrangements agreed upon by the Government and ADB, consistent with ADB's *Loan Disbursement Handbook*. ADB's statement of expenditures procedure will be used to reimburse expenditures and liquidate the imprest account for payments not exceeding $100,000 equivalent each. The experience of the EFPR and a recent World Bank review of the CLCND accounting system suggest that the Government has the capacity to maintain an imprest account and expenditure record in accordance with generally accepted accounting standards.

6. Implementation Schedule

45. The Project will be implemented over one-and-a-half years with physical completion by 30 April 2003. Appendix 6 illustrates the proposed scheduling of the rehabilitation works. The most urgent task is to construct Loikasai bypass canal before the end of April 2002 to restore irrigation supplies by the beginning of the cropping season. During the winter months of 2001/2003, Pravaya Vetka main canal and Vakhsh-Yavan tunnel will be rehabilitated. Other

major reconstruction will be undertaken between October 2002 and April 2003 so as not to disrupt farming activities.

7. Reports, Accounts, and Audit

46. MWRLR will submit brief quarterly and annual reports to ADB indicating the progress made and problems encountered during the review period, the steps taken or proposed to remedy the problems, the proposed program of activities, and the expected progress during the following period. Within three months of physical completion of the Project, the Government will submit to ADB a completion report providing details about implementation, costs, benefits, and other information requested by ADB.

47. MWRLR will maintain separate accounts and financial statements for the Project, which will be audited annually by independent auditors acceptable to ADB. A separate audit opinion on the use of the imprest account and statement of expenditure procedures will be included in the annual audit report. The Government will provide ADB with an audited report together with audited accounts and financial statements nine months after the end of each fiscal year.

48. The Government was informed of ADB's policy on submission of audited accounts, which covers failure to submitt audited accounts and financial statements by the due date. If the delay in submitting financial statements is more than six months (i) no commitment letter will be issued, and (ii) new contract awards may not be approved by ADB. If the delay is more than 12 months, loan disbursements may be suspended or the loan may be canceled.

8. Midterm Review

49. The Government and ADB will jointly carry out a midterm review of the Project, after the end of the first year of its implementation. The midterm review will assess (i) implementation status; (ii) design and construction standards; (iii) physical progress made and disbursements in relation to the implementation schedule; (iv) Government utilization of the O&M practices and procedures, monitoring mechanisms, and data developed under the associated TA (para. 59); (v) performance of the consultants and contractors; and (vi) status of compliance with the covenants stipulated in the Loan Agreement. The midterm review will also assess the need for any additional works or changes in the project scope to take account of any delayed consequences of earthquake activity.

9. Community Participation

50. The proposed activities were discussed in detail with local government officials and representatives of the affected communities. All concerned placed high priority on the restoration of the water conveyance system at the earliest opportunity. The communities were informed of the proposed solution and time frame, and are well aware of the implications for their welfare. The proposed solution is not expected to have any negative impact on the communities. The land required for the bypass canals is not cultivated and is not privately owned.

51. The Government agreed to ensure that the Project is designed and implemented, to the extent possible, with active participation of the project beneficiaries, using participatory practices, as described in ADB's handbook, *Mainstreaming Participatory Development Processes*. The Government also agreed to take necessary actions to ensure that the information campaign under the associated TA (para. 59) for men, women, and school children

on the structures and functioning of the Yavan water conveyance system, annual maintenance requirements for the system, and the reconstruction works is carried out in a timely manner.

10. Operation and Maintenance

52. The rehabilitated facilities will continue to be the responsibility of MWRLR and its respective local branches. Currently, households and farmers pay for their water, and the collected fees are utilized by the delivery agencies to help maintain the systems. However, the sums collected are insufficient to maintain these systems over the longer term. The issue of inadequate O&M is a complex one, linked to ability to pay and requires a phased approach that is applicable across the irrigation and water supply network. The Government recognizes the importance of ensuring adequate funding and has agreed to a phased program to gradually increase cost recovery levels as a condition of the World Bank's RIRP,[8] which is commencing in 2001. The proposed Project will supplement the RIRP through the associated TA (para. 59) by reviewing practices and helping establish procedures for proper O&M of the project facilities. The TA will also run an information campaign to inform the communities of the structures and functions of the entire system, the necessary annual maintenance, and construction works being undertaken.

11. Resettlement

53. The Project does not involve any land acquisition but involves resettlement of six families living along the alignment of Loikasai bypass canal. These families are being resettled in the same *jamoat*[9] about 1.3 km from the original place. The Government prepared the compensation packages in consultation with the affected families, and the construction of the houses at the new location has commenced. The Appraisal Mission visited the families, inquired about their resettlement, and witnessed construction of the houses. The families have better access to potable water, markets, and education and health facilities. The Government assured ADB that the families will be resettled in accordance with the applicable Tajik laws and regulations, and ADB's *Policy on Involuntary Resettlement*. The short resettlement plan prepared by the Government is in Appendix 7.

12. Governance and Anticorruption

54. During project processing, ADB's anticorruption policy was explained to the central and local governments. Attention was drawn to the section on fraud and corruption in ADB's *Guidelines for Procurement*, particularly the need for bidders, suppliers, and contractors to observe the highest standards of ethics in procurement and execution of ADB-financed contracts, and the sanctions if fraud and corruption are discovered. Similarly, the anticorruption provisions in ADB's *Guidelines on the Use of Consultants* were discussed.

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[8] The Yavan irrigation system area is included in the ongoing RIRP (footnote 7). The RIRP covers 130,000 ha; its scope includes (i) formulation and adoption of a water code that will provide the legal base for establishment and functioning of water users' associations (WUAs), (ii) establishment of WUAs responsible for O&M of irrigation and drainage system, collecting water charges from the beneficiaries, and paying for services of the distribution system; and (iii) establishment of a transparent system of irrigation service fee with progressive increases in level and improvement of collection rates. Full cost recovery, particularly for O&M, will be achieved over 10 years for delivery of water from source to the farmer's field. The Government will provide funds to meet the shortfalls during the transition period.

[9] A *jamoat* is the smallest administrative unit

F. The Executing Agency

55. MWRLR is the primary agency responsible for water resource management and is under the authority of the deputy prime minister in charge of the ministries of agriculture, water resources and land reclamation, and environment protection. It has a network of region and district offices, which are responsible for O&M of the systems within their jurisdiction. Most MWRLR professional staff are engineers with a range of skills; the remainder are economists, accountants, and lawyers. The staff are rapidly becoming familiar with the procedures followed by multilateral agencies having experience working with ADB, World Bank, and Islamic Development Bank. MWRLR staff made a creditable job of preparing material for the Appraisal Mission and in designing the Project. Given their detailed knowledge of the water supply system involved, its relatively small size, and the essentially engineering nature of the activities, MWRLR is considered to be capable of managing the Project with the TA support (para. 59). To the extent that additional resources are needed, MWRLR can call upon the experience of CLCND, which has performed well in implementing the ADB-financed EFRP.

G. Environmental and Social Measures

1. Environment

56. Tajikistan has an environment that is prone to natural disasters related to its mountainous terrain, steep and narrow river valleys, sparse mountain vegetation, and annual snowmelt. These natural characteristics have been exacerbated by poor management of natural resources. During construction, care will be taken to avoid dust creation and the contamination of water supplies that may adversely affect local communities and livestock. Construction stockpiles and site facilities will use existing buildings as much as possible. If not, they will be located on wasteland to avoid the destruction of trees and vegetation and to minimize hazards to the local population who should be consulted on their location. The main environmental problem associated with operation of the rehabilitated infrastructure will be the need for proper O&M and preventing the risk of similar damage. The mitigation strategy will concentrate on improving O&M through training and awareness of engineering staff, improved management of O&M activities, and a medium-term program to increase the level of funding from a combination of budgetary support and beneficiary contributions. The associated TA (para. 59) will address these institutional and financing issues. The Government agreed to put in place during project implementation the environmental mitigative measures proposed in the summary initial environmental examination given in Appendix 8.

2. Social Analysis

57. According to the local administration, the incidence of poverty in the project area is about 90 percent, higher than the 83 percent at the national level. The social structure of the project area is one of relatively small jamoats with a majority Tajik population, but commonly some other ethnic groups are represented. Virtually all households have a 0.15 ha household plot on which they grow food crops intensively. These plots are dependent on the same source of water supply as the household. Additional income may come from *dehkan* (privatized farm) land shares usually used to grow cotton and from remittances sent by male members of families who seek seasonal work in the Russian Federation. The most vulnerable groups in these villages are households with more than five children, single households headed by women, families without dehkan land, and the elderly/infirm. The Project will benefit all households but will inevitably benefit those families with irrigated land the most. However, considering the preponderance of

the poor in the project area, the project beneficiaries will be predominantly households living below the poverty line. An initial social assessment of the project area is in Appendix 9.

58. The Project involves resettlement of six families (para. 53). The Government has given assurance that the families are being resettled in accordance with ADB's *Handbook on Resettlement*.

H. The Technical Assistance

59. The TA will review practices and help establish procedures for proper O&M of the Yavan conveyance system facilities, and build MWRLR capacity for construction management and supervision. By establishing procedures, determining inputs, and instituting a monitoring mechanism with strong beneficiary participation for proper O&M, the TA will ensure sustainability of project benefits. Also, through hands-on training, the TA will introduce MWRLR staff to efficient practices for construction management and supervision that will considerably improve the capacity of the staff for cost-effectiveness and quality construction. About 4 person-months of international and 15 person-months of domestic consulting input will be required at a cost of $170,000 equivalent. This comprises foreign exchange costs of $116,000 and local currency costs of $54,000 equivalent. ADB will finance the TA by providing $135,000 equivalent from ADB-funded TA program on a grant basis. The Government will finance $35,000 equivalent of the local currency costs. The consultants will be selected and engaged through a consulting firm in accordance with ADB's *Guidelines on the Use of Consultants* and other arrangements for the selection and engagement of domestic consultants. The details on specialists, terms of reference, and cost estimates of the TA are in Appendix 10.

V. PROJECT JUSTIFICATION

A. Impact on Poverty and Other Benefits

60. The project benefits will result from full restoration of the water supply disrupted by the damaged water conveyance system. About 56,000 people in the project area will be assured of reliable potable water supply. In addition, about 11,724 ha of cropped areas will receive irrigation water on a sustainable basis. This is a critical element of combined efforts to improve living standards in rural areas. The project works will also provide a temporary source of employment for local labor and a small but attractive market for provisioning the construction workforce. The restoration of facilities will enable local communities to concentrate their time and efforts on economically rewarding tasks, mostly agricultural, such as crop and livestock production, instead of concerning themselves with the logistics of a temporary water supply. As a consequence, health concerns will recede and family cash flows will return to normal. An experienced domestic consultant will be recruited under the associated TA (para. 59) to undertake a social impact analysis of the restored system.

B. Risks

61. The major risk to the Project will be the possibility of further disruption to the system before all remedial works are completed. This risk will be mitigated by frequent inspection of the system during implementation and by completing the rehabilitation of the weakest part of the system first. The risk of failure of other siphons, which are currently intact but are as old as the damaged siphon and pose a threat, will be mitigated by replacing Ishmasai siphon by a bypass canal and replacing pipes of Shurchasai siphon. Rehabilitation of the Pravaya Vetka main canal and Vakhsh-Yavan tunnel will minimize the risk of future disruption of flows in the project area.

Last, the associated TA will help the Government determine practices and establish procedures for proper O&M and generate adequate funds for this purpose (para. 59), which will safeguard against recurrence of such disaster.

VI. ASSURANCES

62. The Government has given the following assurances, in addition to the standard assurances, which have been incorporated in the legal documents:

(i) The Project will be designed and implemented with the active participation of Project beneficiaries, including application of the participatory practices suggested in ADB's handbook *Mainstreaming Participatory Development Processes*.

(ii) In consultation with ADB, the Government will utilize the O&M practices and procedures, monitoring mechanisms and data developed under the TA in its phased program to increase cost recovery. This utilization will be monitored and evaluated by PMO and included in the scope of the Project's mid-term review.

(iii) All necessary environmental approvals and clearances will be obtained in a timely manner in accordance with applicable Tajik environmental laws and regulations, and the Project will be implemented in accordance with such laws and regulations and ADB's environmental guidelines, including carrying out of the environmental mitigative measures set forth in the summary initial environmental examination.

(iv) Adequate counterpart funds will be made available in a timely manner.

(v) Resettlement of the six families affected by construction of the Loikasai bypass canal will be carried out in accordance with the resettlement plan agreed between the Government and ADB, applicable Tajik laws and regulations, and ADB's *Policy on Involuntary Resettlement*.

VII. RECOMMENDATION

63. I am satisfied that the proposed loan would comply with the Articles of Agreement of ADB and recommend that the Board approve the loan in various currencies equivalent to Special Drawing Rights 2,795,000 to the Republic of Tajikistan for the Emergency Restoration of Yavan Water Conveyance System Project, with a term of 32 years, including a grace period of 8 years, and with an interest charge at the rate of 1 percent per annum during the grace period and 1.5 percent per annum thereafter, and such other terms and conditions as are substantially in accordance with those set forth in the draft Loan Agreement presented to the Board.

TADAO CHINO
President

(Date)

APPENDIXES

PROJECT FRAMEWORK

Design Summary	Performance Targets	Monitoring Mechanisms	Assumptions and Risks
1. Sector Goals Enhance and protect living standards and welfare conditions for rural populations	• Agriculture sector and social performance parameters for selected population	National statistics and sample surveys	• Damage by a natural disaster during project implementation stage. • Risk of the recurrence of civil strife
2. Project Objective Fully restore household and irrigation water supply to 56,000 people and 11,724 hectares of land	• Farm incomes sustained on the irrigated area • Access to potable drinking water improved for 56,000 people • Incidence of waterborne disease reduced in the project areas to below national averages	• Baseline and impact monitoring surveys • Poverty monitoring surveys	• Failure to establish an economic environment conducive to irrigated agriculture production and marketing of commodities • Services of irrigation and water supply will not be sustained
3. Project Components/ Outputs 3.1 Physical Infrastructure rehabilitation	• Completion of physical construction and full restoration of water supply	• Project monitoring reports	• Government remains committed to the restoration program and continues to provide local resources
3.2 Project management support	• Construction and other project activities to be managed by the project management office (PMO).	• Project monitoring reports	• Government remains committed to the restoration program and continues to provide local resources

Design Summary	Performance Targets	Monitoring Mechanisms	Assumptions and Risks
4 Activities			
4.1 Rehabilitation of water supply infrastructure	• Design, procurement, and construction • Implementation of monitoring activities	Reports by project consultants and the PMO	Conditions remain favorable for implementation of the Project
4.2 Project management	• Establishment of the PMO and recruitment of technical staff		

5 Inputs

Civil works	$3.30 million	Physical contingencies	$0.40 million
Equipment	$0.35 million	Price contingencies	$0.17 million
Consultants	$0.11 million	Interest charges	$0.04 million
Recurrent costs	$0.10 million	Total project costs	$4.50 million

PROJECT COSTS AND FINANCING PLAN

Table A2.1: Components Project Cost Summary by Financier

($)

Item	Asian Development Bank			Government of Tajikistan			Total		
	Foreign	Local	Total	Foreign	Local	Total	Foreign	Local	Total
A. System Rehabilitation									
1. Temporary Restoration of Loikasai Siphon	239,150	191,320	430,470	0	47,830	47,830	239,150	239,150	478,300
2. Construction of Loikasai Bypass Canal	947,910	272,020	1,219,930	0	284,695	284,695	947,910	556,715	1,504,625
3. Remodeling of Ishmasai Bypass Canal	418,125	64,671	482,797	0	78,793	78,793	418,125	143,465	561,590
4. Replacement of Pipes of Shurchasai Siphon	644,454	107,353	751,806	0	237,832	237,832	644,454	345,185	989,638
5. Rehabilitation of Pravaya Vetka Main Canal and Vakhsh-Yavan Tunnel	404,345	79,982	484,327	0	152,886	152,886	404,345	232,868	637,214
Subtotal (A)	**2,653,984**	**715,346**	**3,369,330**	**0**	**802,037**	**802,037**	**2,653,984**	**1,517,382**	**4,171,367**
B. Project Implementation Support	73,193	120,095	193,288	0	97,963	97,963	73,193	218,059	291,251
Disbursement, Subtotal (A+B)	**2,727,177**	**835,441**	**3,562,618**	**0**	**900,000**	**900,000**	**2,727,177**	**1,735,441**	**4,462,618**
Service charge	37,382	0	37,382		0	0	37,382	0	37,382
Total	**2,764,559**	**835,441**	**3,600,000**	**0**	**900,000**	**900,000**	**2,764,559**	**1,735,441**	**4,500,000**

Note: Component costs include contingencies.
Source = Staff estimates.

Table A2.2: Components Project Cost Summary

Item	(TJS)			($)			% Foreign Exchange	% Total Base Costs
	Local	Foreign	Total	Local	Foreign	Total		
A. System Rehabilitation								
1. Temporary Restoration of Loikasai Siphon	562,003	562,003	1,124,005	239,150	239,150	478,300	50	12
2. Construction of Loikasai Bypass Canal	1,146,874	1,984,557	3,131,431	488,032	844,492	1,332,524	63	34
3. Remodeling of Ishmasai Bypass Canal	274,713	835,526	1,110,239	116,899	355,543	472,442	75	12
4. Replacement of Pipes of Shurchasai Siphon	660,952	1,310,654	1,971,605	281,256	557,725	838,981	66	22
5. Rehabilitation of Pravaya Vetka Main Canal and Vakhsh-Yavan Tunnel	435,371	787,373	1,222,744	185,264	335,052	520,317	64	13
Subtotal (A)	**3,079,912**	**5,480,112**	**8,560,025**	**1,310,601**	**2,331,963**	**3,642,564**	**64**	**94**
B. Project Implementation Support	429,627	153,878	583,505	182,820	65,480	248,300	26	6
Baseline Costs (A+B)	3,509,539	5,633,990	9,143,530	1,493,421	2,397,443	3,890,864	62	100
Physical Contingencies	334,612	596,217	930,829	142,388	253,709	396,097	64	10
Price Contingencies	234,135	178,659	412,794	99,632	76,025	175,657	43	5
Project Costs	4,078,286	6,408,866	10,487,153	1,735,441	2,727,177	4,462,618	61	115
Service charge	0	87,848	87,848	0	37,382	37,382	100	1
Total	**4,078,286**	**6,496,714**	**10,575,000**	**1,735,441**	**2,764,559**	**4,500,000**	**61**	**116**

Note: Component costs are net of contingencies.
Source = Staff estimates.

Table A2.3: Expenditure Accounts Project Cost Summary

Item	(TJS)			($)			% Foreign Exchang	% Total Base Costs
	Local	Foreign	Total	Local	Foreign	Total		
A. Investment Costs								
1. Civil works	3,030,562	4,745,502	7,776,065	1,289,601	2,019,363	3,308,964	61	85
2. Resettlement costs	49,350	0	49,350	21,000	0	21,000	0	1
3. Equipment, Machinery and Vehicle								
Equipment and machinery	0	734,610	734,610	0	312,600	312,600	100	8
Vehicle	0	94,000	94,000	0	40,000	40,000	100	1
Subtotal (1-3)	**0**	**828,610**	**828,610**	**0**	**352,600**	**352,600**	**100**	**9**
4.Specialist Services								
Domestic Consultants	210,560		210,560	89,600	0	89,600	0	2
Office and Technical Services	10,575	37,600	48,175	4,500	16,000	20,500	78	1
Subtotal (4)	**221,135**	**37,600**	**258,735**	**94,100**	**16,000**	**110,100**	**15**	**3**
Subtotal (A)	**3,301,047**	**5,611,712**	**8,912,760**	**1,404,701**	**2,387,963**	**3,792,664**	**63**	**97**
B. Recurrent Costs								
1. Project Staff	158,625	0	158,625	67,500	0	67,500	0	2
2. Office Operational Expenditures	49,867	22,278	72,145	21,220	9,480	30,700	31	1
Subtotal (B)	**208,492**	**22,278**	**230,770**	**88,720**	**9,480**	**98,200**	**10**	**3**
Subtotal (A+B)	**3,509,539**	**5,633,990**	**9,143,530**	**1,493,421**	**2,397,443**	**3,890,864**	**62**	**100**
Physical Contingencies	334,612	596,217	930,829	142,388	253,709	396,097	64	10
Price Contingencies	234,135	178,659	412,794	99,632	76,025	175,657	43	5
Project Costs	**4,078,286**	**6,408,866**	**10,487,153**	**1,735,441**	**2,727,177**	**4,462,618**	**61**	**115**
Service charge		87,847	87,847		37,382	37,382	100	1
Total Costs	**4,078,286**	**6,496,713**	**10,575,000**	**1,735,441**	**2,764,559**	**4,500,000**	**61**	**116**

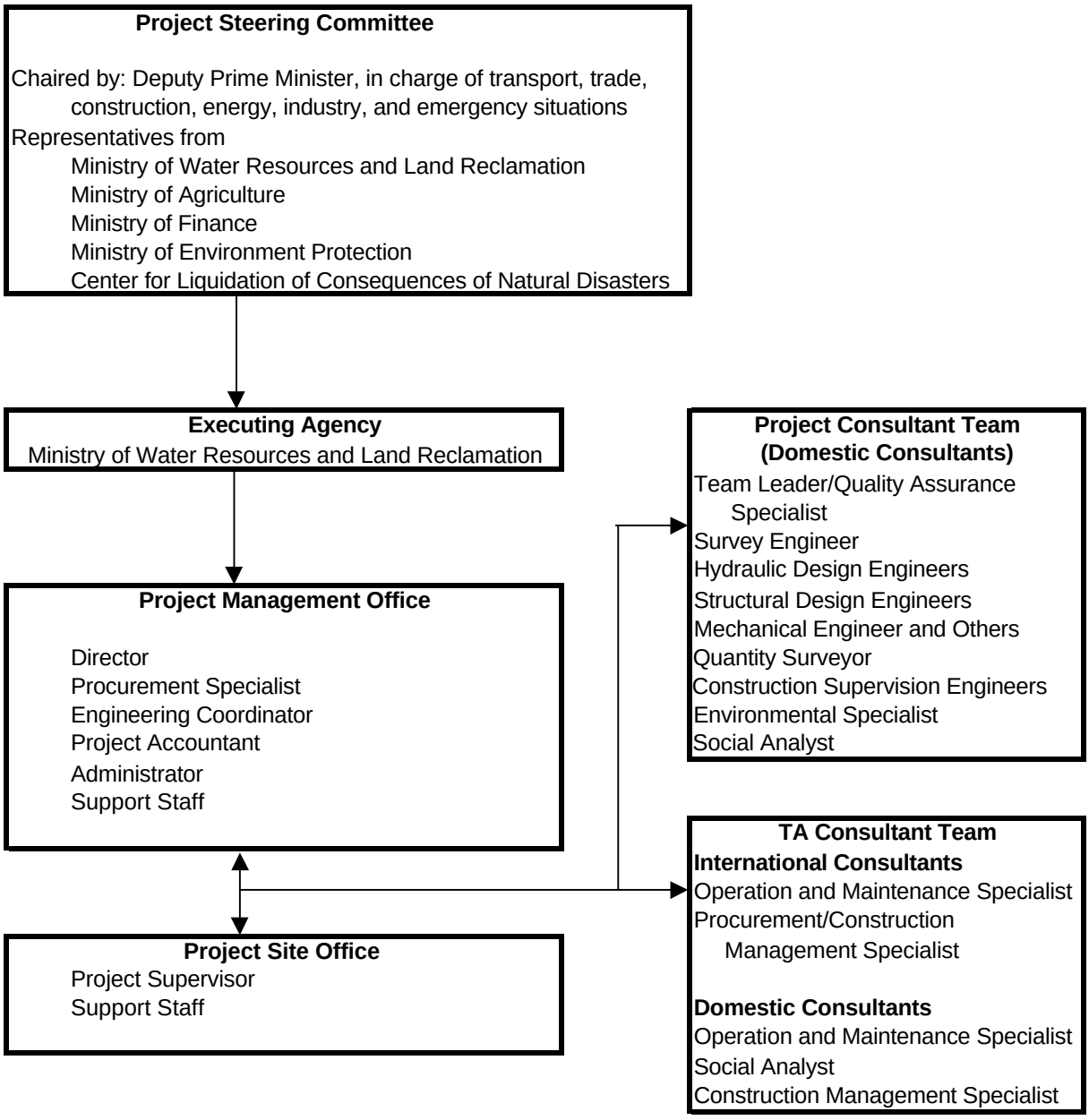
Source = Staff estimates.

Table A2.4: Expenditure Accounts by Components - Base Costs
($)

Item	System Rehabilitation: Temporary Restoration of Loikasai Siphon	Construct-ion of of Loikasai Bypass Canal	Remodel ing of Ishmasai Bypass Canal	Replace-ment of Pipes of Shurca-sai Siphon	Rehabilitation of Pravaya Vetka Main Canal and Vakhsh-Yavan Tunnel	Project Implement-ation Support	Total	Physical Contingencies %	Physical Contingencies Amount
A . Investment Costs									
1. Civil works	478,300	1,198,924	272,442	838,981	520,317	0	3,308,964	9.9	327,907
2. Resettlement costs	0	21,000	0	0	0	0	21,000	10.0	2,100
3. Equipment, Machinery and Vehicle									
Equipment and machinery	0	112,600	200,000	0	0	0	312,600	13.2	41,260
Vehicle	0	0	0	0	0	40,000	40,000	10.0	4,000
Subtotal (1-C403)	**0**	**112,600**	**200,000**	**0**	**0**	**40,000**	**352,600**	**12.8**	**45,260**
4. Specialist Services									
Domestic Consultants	0	0	0	0	0	89,600	89,600	10.0	8,960
Office and Technical Services	0	0	0	0	0	20,500	20,500	10.0	2,050
Subtotal (4)	**0**	**0**	**0**	**0**	**0**	**110,100**	**110,100**	**10.0**	**11,010**
Subtotal (A)	**478,300**	**1,332,524**	**472,442**	**838,981**	**520,317**	**150,100**	**3,792,664**	**10.2**	**386,277**
B. Recurrent Costs									
1. Project Staff	0	0	0	0	0	67,500	67,500	10.0	6,750
2. Office Operational Expenditures	0	0	0	0	0	30,700	30,700	10.0	3,070
Subtotal (B)	0	**0**	**0**	**0**	**0**	98,200	98,200	10.0	9,820
Baseline Costs (A+B)	**478,300**	**1,332,524**	**472,442**	**838,981**	**520,317**	**248,300**	**3,890,864**	**10.2**	**396,097**
Physical Contingencies	0	133,252	70,866	83,898	83,251	24,830	396,097	0	0
Price Contingencies	0	38,849	18,282	66,759	33,646	18,121	175,657	10.4	18,274
Project Costs	**478,300**	**1,504,625**	**561,590**	**989,638**	**637,214**	**291,251**	**4,462,618**	**9.3**	**414,371**
Service charge							37,382		
Total	**478,300**	**1,504,625**	**561,590**	**989,638**	**637,214**	**291,251**	**4,500,000**		
Taxes	47,830	203,580	48,423	28,735	55,367	16,614	400,549		
Foreign Exchange	239,150	947,910	418,125	644,454	404,345	73,193	2,764,559		

Source = Staff estimates.

ORGANIZATION CHART FOR PROJECT IMPLEMENTATION



TERMS OF REFERENCE FOR CONSULTANTS

A. Introduction

1. The Project will require 116 person-months of domestic consulting services. The consultant will be responsible for surveys, investigations, detailed design, preparation of tender documents, construction supervision, quality control, environmental monitoring, and social impact assessment. The field engineers will be responsible for day-to-day supervision of the various contractors.

2. The consultants will be recruited by the Government through a consulting firm in accordance with ADB's *Guidelines on the Use of Consultants* and other arrangements satisfactory to ADB on the engagement of domestic consultants. The list of consultants to be engaged is in Table 1.

Table 1: Consulting Services Required

	Expertise	Person-months
1.	Team Leader/ Quality Assurance Specialist	18
2.	Survey Engineer	6
2.	Hydraulic Design Engineers (2)	12
3.	Structural Design Engineers (2)	15
4.	Mechanical Engineer and others	12
5.	Quantity Surveyor	18
6.	Construction Supervision Engineers (2)	30
7.	Environmental Specialist	2
8	Social Analyst (Impact Assessment)	3
	Total	**116**

3. The consultants will work very closely with the Ministry of Water Resources and Land Reclamation (MWRLR), the Executing Agency (EA) of the Project. Specific terms of reference for various fields of specialization are given below.

B. Surveys and Investigations

4. The survey and investigation tasks are listed below:

(i) Carry out the required topographic surveys;

(ii) Carry out strip surveys along the alignment of bypass canals;

(iii) Prepare investigation plan for intake and outfall structures, bridges, crossdrainage works, and borrow areas; and laboratory testing program;

(iv) Prepare technical specifications and tender documents for investigation works; and

(v) Supervise execution of investigations.

C. Project Detailed Design and Tender Documents

5. The consultant will be required to undertake the following tasks:

(i) Select the most feasible alignment of the canal;

(ii) Using survey and investigation results, carry out analysis and prepare detailed designs of the project works;

(iii) Prepare detailed construction drawings, specifications, and bill of quantities suitable for inclusion in the bidding documents;

(iv) Prepare bidding documents for civil works and supply of material in accordance with the relevant ADB guidelines;

(v) Prepare prequalification documents following relevant ADB guidelines; and

(vi) Prepare draft advertisements and letters of invitation, and assist the Project Management Office in bids evaluation and award of contracts.

D. Construction Supervision and Quality Controls

6. The consultant will be responsible for the following:

(i) Develop and implement a program of effective construction supervision including inspection of materials, equipment, and other goods; and accurate measurement of the completed works and facilities;

(ii) Maintain a permanent presence at site during the contractors' working hours for construction supervision and contract administration, including contractors' claims and variation orders;

(iii) On behalf of client, make arrangements for inspection and testing of materials, plants, and equipment during production/manufacture off site;

(iv) Inspect natural materials such as sand and gravel, precast pipes etc. at their place of quarrying/manufacture;

(v) Provide additional construction plans and drawings as requested by the contractors;

(vi) Verify and certify as-built drawings and manuals prepared by the contractors;

(vii) Arrange for and supervise, acceptance tests and surveys including arrangements for joint inspection with the client and or agency which will accept and/or operate the works and facilities on completion. Issue certificates of acceptance and completion as required under the construction contract;

(viii) On completion of the works and facilities deliver to the client design criteria and calculations, records and manufacturer's manual as are reasonably necessary to enable the works and facilities to be operated and maintained;

(ix) Assist in settling of disputes or differences that may arise between the client and contractors, excepting litigation and arbitration; and

(x) During the construction and maintenance period, monitor physical and financial progress and prepare monthly and annual reports.

E. Environmental Monitoring and Social Impact Assessment

7. The consultant will closely monitor the environmental impact of the project to ensure that the preventive and mitigative measures are being observed by the contractors and other staff involved in project implementation.

8. Through information collection and personal interviews, the consultant will assess the social and economic impact of the disaster and determine to what extent the negative impact has been alleviated under the Project.

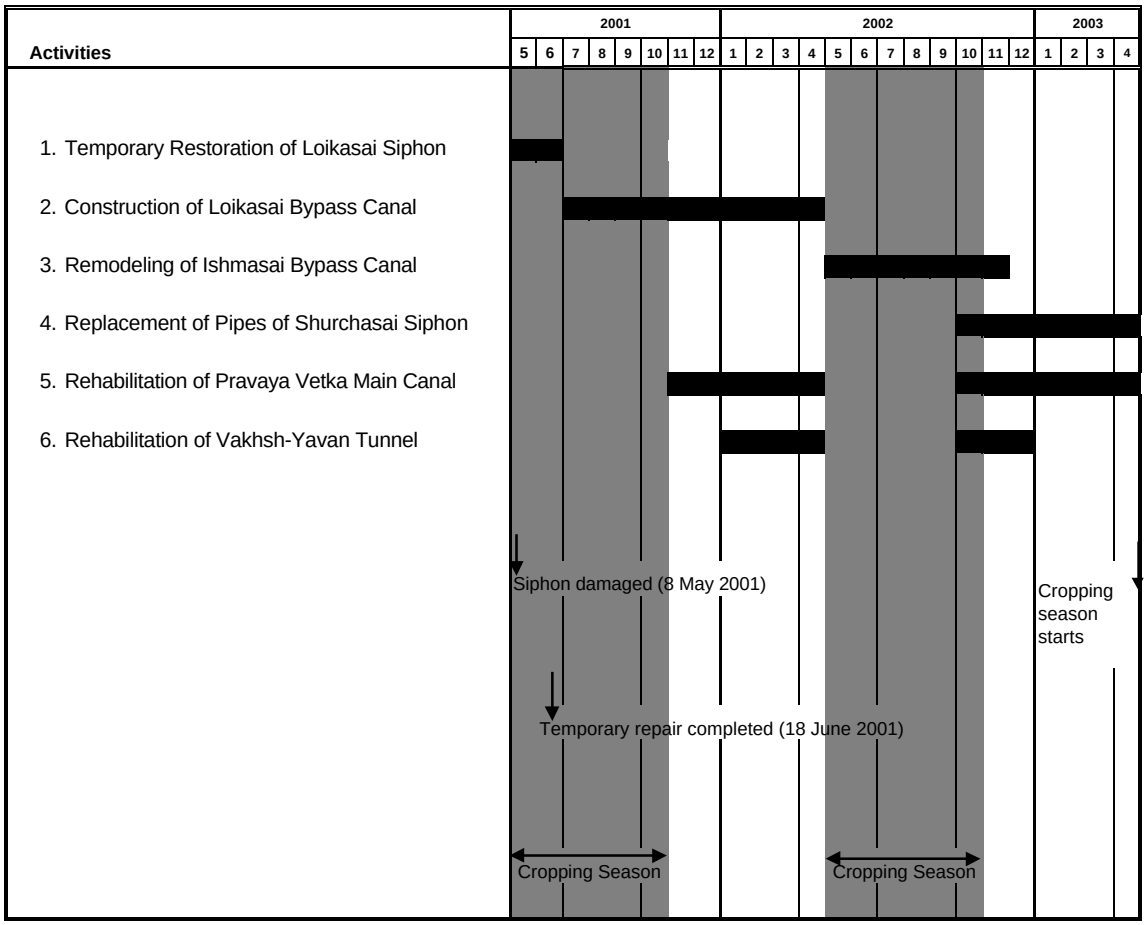
TENTATIVE PACKAGING OF MAJOR PROCUREMENT

Component/Package	Tentative Value ($)	Mode of Procurement
Physical Infrastructure		
1. Temporary Restoration of Loikasai Siphon (completed)[a]	478,000	FAW
2. Construction of Loikasai Bypass Canal (ongoing)[a]	1,333,000	FAW/IS
3. Remodeling of Ishmasai Bypass Canal	472,000	LCB/IS
4. Replacement of Pipes of Shurchasai Siphon	839,000	IS/LCB
5. Rehabilitation of Pravaya Vetka Main Canal and Vakhsh-Yavan Tunnel	520,000	LCB

FAW = force account works, IS = international shopping, LCB = local competitive bidding.

[a] To be financed retroactively. Actual amount will be determined by the approved ceiling and date of retroactive financing.

IMPLEMENTATION SCHEDULE



SHORT RESETTLEMENT PLAN

No.	Topic	Contents
1	Scope of land acquisition and resettlement	Six houses located along the alignment of the Loikasai bypass canal need to be relocated. The option of the bypass canal against rehabilitation of the existing siphon was found to be the most cost-effective solution. The affected families have been given 0.15 plots each for house building in an area which is about 1.3 km away and has better access to potable water supply, education, and health facilities; and is better connected through access roads. Compensation amounts have been determined at the current market rates (see attached Deed, and Amendment to Deed).
2	Objectives, policy framework, and entitlements	The objective of the resettlement plan is to facilitate resettlement of the affected families in accordance with the Government of Tajikistan laws and relevant ADB guidelines. The entitlements have been determined in line with the existing laws, current market prices, and assets and needs of the affected beneficiaries.
3	Consultation, and grievance redress participation	The resettlement plan has been prepared in due consultation with the beneficiaries and they are being consulted during the implementation stage. They can approach the Commission for Resettlement for any grievances.
4	Compensation, relocation, and income restoration	The compensation has been based on the Government of Tajikistan's laws and ADB's guidelines. Accordingly, the Government has provided 0.15 ha lot to each family and has determined the compensation amounts using current market rates. The Government has also provided free transport of their property and construction materials. The livelihood of the families has not been affected mainly because the new location is only 1.3 km away.
5	Institutional framework	The Commission for Resettlement, which has as its members the key specialists involved in resettlement (see Deed, Attachment 1), has determined compensation amounts and has prepared the plan. The Commission is also monitoring its implementation. The Commission will evaluate the activity after it is complete.
6	Resettlement budget and financing	An amount of 67,211 somoni has been allocated for resettlement (see Deed, Attachment 1). In addition, the Government has provided (i) 0.15 ha lot to each family, (ii) vehicles for transportation of property, (iii) assistance

		to dismantle their former houses, and (iv) transportation of the construction materials to the new location (see amendment to Deed, Attachment 2). Of the compensation amount, an amount of 100 somoni was paid at the time of relocation. The remaining amount is being/will be paid during house construction
7	Implementation Schedule	Resettlement started on 14 July 2006, the transfer of the families together with their assets to the resettlement site was completed on 25 July 2001. Currently, the families are living in tents provided by the Government while construction of houses is ongoing. Construction of house is scheduled to be completed in October 2001, well before the next winter season.
8	Monitoring and evaluation	The Commission for Resettlement established for the families affected by the Project is, in close consultation with the affected families, monitoring the progress of resettlement and will continue to monitor it. The Commission will evaluate the resettlement activity after it is completed.

Attachment:

- Deed (14 July 2001)
- Amendment to the Deed of 14 July 2001

DEED

Dated: 14.07.2001

Plot “Furkat”, Municipal Economy “Bakhor”

We, undersigned below: Mr. Rajabov M., Deputy Chairman of Khukumat of Khojimaston region; Ms. Vakhidova N., Chairman of Jamoat “October”; Mr. Abdurakhmanov N., Sr. Architect of the region; Ms. Vakhidova E., Chief of the municipal economy of the region; and; Mr. Khamroev Kh., Accountant constitute the Commission for Resettlement for TAJ: Emergency Restoration of Yavan Water Conveyance System Project. The present deed dated 14.07.2001 was prepared after undertaking the survey of the Loikasai Bypass Canal which concluded that six individual dehkan houses need to be relocated and hence the following amounts need to be allocated to the household head given below:

1.	Mr. Elmurodov Bobojon	8,710	somoni
2.	Mr. Khuseinov Abdukosim	10,272	somoni
3.	Mr. Khuseinov Abdukahor	9,621	somoni
4.	Mr. Yormatov Kodir	8,450	somoni
5.	Mr. Khuseinov Juma	8,240	somoni
6.	Mr. Khuseinov Karimjon	7,630	somoni
	Total:	52,923	somoni

Additionally, an amount of 14,288 somoni needs to be allocated for relocation of the silage storehouse.

Thus, the total amount of the expenditures is estimated at 67,211 somoni. These estimates were based on current market prices.

Deed was prepared to facilitate resettlement of individual dehkan houses in the municipal economy “Bakhor” of Khojimaston region. The allocations are included in the cost estimates of Loikasai Bypass Canal.

Signatures

Rajabov M. Vokhidova N.

Abdurakhmonov N. Vokhidova E.

Khamroev Kh.

Certified true copy

Kolesnikov A.I.

AMENDMENTS TO THE DEED OF 14.07.2001

This is amendment to the deed of 14.07.2001 regarding resettlement of six families and compensation for the cost of silage storehouse.

Land plots have been provided to the affected six families at a distance of 1.3 km from the former location, as per details given below:

1.	Mr. Elmurodov Bobojon	4 family members	0.15 ha
2.	Mr. Khuseinov Abdukosim	5 family members	0.15 ha
3.	Mr. Khuseinov Abdukahor	4 family members	0.15 ha
4.	Mr. Yormatov Kodir	5 family members	0.15 ha
5.	Mr. Khuseinov Juma	5 family members	0.15 ha
6.	Mr. Khuseinov Karimjon	5 family members	0.15 ha

Each family got 100 somoni in cash. In addition, vehicle was provided for transportation of the property. Assistance was also provided to dismantle the former houses and for transportation of the construction materials to the new location.

At the new location, the families have better access to drinking water. Also, the secondary school and outpatient departments are more closely located compared to the old place.

The authorities of the Khukumat, Jamoats, and the responsible specialists prepared the resettlement plan in close consultation with the affected families. Also, their transfer to new location was scheduled and undertaken with their consultation.

The cost of resettlement of the families and the cost of silage storehouse are included in the cost estimates for Loikasai Bypass Canal.

Director of the design Institute
“Tajikgiprovodkhoz”
Kolesnikov A.I

Director of the PIU
Khasanov Kh.

SUMMARY INITIAL ENVIRONMENTAL EXAMINATION

A. Introduction

1. On 7 May 2001, Tajikistan experienced an earthquake whose most immediate effect on the human population was felt in Gozimalik, Khodzamaston, and Yavan rayons (districts) of Khatlon Region. The earthquake led to disruption of water supplies to approximately 56,000 people, 65,000 livestock, and 11,724 hectares (ha) of arable land. The Government agencies took immediate steps to alleviate the plight of the affected population and asked the Asian Development Bank (ADB) to provide emergency assistance to restore the water conveyance system.

2. This report is summary initial environmental examination of the proposed loan to the Tajikistan for the Emergency Restoration of Yavan Water Conveyance System Project. For the emergency project, the initial environmental examination was carried out urgently, recommending some environmental issues to be addressed in more detail during project implementation. The findings contribute to the ongoing technical assistance (TA) No. 3614,[1] which aims to strengthen the national environmental assessment capacity. In addition, findings of the Reconnaissance and Appraisal missions in May and June 2001 were used in preparing this report. Materials have also been drawn from TA 3514,[2] which has two of the three subproject areas in the same oblast. The location of the area in the southwestern part of the country is presented in the map.

B. Description of the Project

3. The Yavan water conveyance system was completed in 1968. It originates from Baipazin Reservoir on Vakhsh River and serves Gozimalik, Khodzamaston, and Yavan districts, about 65 kilometers (km) southeast of the capital city Dushanbe. The system takes water from the river through a 7.3 km tunnel whose outlet is in the neighboring valley adjacent to the town of Yavan. The water passes from the tunnel to the canal, which has a design capacity of 50 cubic meters per second (m^3/sec) and irrigates an area of about 26,800 ha. After the initial reach of 27.6 km, where the system serves an area of 15,526 ha, the canal capacity is reduced to 20 m^3/sec. It traverses three valleys using inverted siphons, before entering Gozimalik district. Because of deterioration of various parts of the system over time, the flow in the siphons is generally limited to 17 m^3/sec. During more than 30 years of use, the pipes have become severely corroded. The thickness has been reduced to an alarming level. Maintenance of the facilities has been inadequate because of poor cost recovery from the beneficiaries.

4. The earthquake caused cracks in both the pipelines and the open canal parts of the system. The most severe cracks occurred at the intake structure of Loikasai siphon. Water poured from the cracks soaking the soil under the structure. The soil, consisting mainly of alluvial deposits, was washed away, and the structure collapsed. Although the regulating gates were closed, water continued to flow until the upstream siphon and open canals were empty. About 600 meter (m) of Loikasai siphon, and 100 m of the open canal above the intake were washed away.

5. The immediate objective of the Project is to fully restore the irrigation and household water supply damaged by the earthquake and consequent flooding of the valley. The

[1] TA 3614-TAJ: *Capacity Building for Environmental Assessment and Monitoring,* for $600,000, approved on 21 December 2000.

[2] TA 3514-TAJ: *Agriculture Rehabilitation Project*, for $750,000, approved on 10 October 2000.

components of the Project are (i) physical infrastructure, and (ii) project implementation support. The restoration of the water conveyance system in the project area and safeguarding it against failure risk involves the following works, under the supervision of the Ministry of Water Resources and Land Reclamation (MWRLR):

(i) Loikasai siphon has been temporarily restored. The works included two parallel pipelines (9.0 m^3/sec) to restore water supply in the main system, and a pipeline (0.5 m^3/sec) to supply the local areas. They are needed until Loikasai bypass canal is complete. Later, they will remain as a standby system.

(ii) Construction of Loikasai bypass canal, 4.1 km long running along the contour, is a cost-effective, long-term solution to replace the damaged siphon. The canal will be 8 m wide at the bottom and 3 m deep, with a capacity of 20 m^3/sec. The associated structures include the intake and outfall structures, two bridges, and 5 cross-drainage works. Six families living along the alignment need to be resettled.

(iii) Remodeling of Ishmasai bypass canal for a capacity of 20 m^3/sec, originally constructed in 1985 for a capacity of 4.0 m^3/sec, is a cost-effective way to replace the aging siphon.

(iv) Rehabilitation of Shurchasai siphon by replacing its pipes with new ones is necessary, as the topography of the valley does not allow a feasible bypass canal.

(v) Rehabilitation of Pravaya Vetka main canal and Vakhsh–Yavan tunnel are needed to sustain the benefits of the project investments. Some original design flaws of the system need to be readdressed.

C. Description of the Environment

6. Tajikistan is the most southerly of the former Soviet Union Central Asian republics, which became independent in 1991. It is bordered to the north by the Kyrgyz Republic, in the east by the Peoples Republic of China, Afghanistan to the south, and Uzbekistan in the west. The area is 143,000 square kilometers, divided into four regions, namely Sughd in the north, Region of Republican Subordination in the center, Khatlon in the south, and the mainly mountainous Gorno-Badakshan in the east.

7. The climate is continental, with cold winters and hot, dry summers, although the relatively southerly latitude has an ameliorating impact, and altitude is a significant local factor. The lowland agricultural areas have an average summer temperature of about 26ºC and the winter average of 6ºC. The growing season of over 220 days is long by Central Asian standards. The rainfall is low, averaging 150 to 250 millimeters (mm) per year, falling mainly in winter and spring, and evaporation is high. As a consequence, agriculture is highly dependent on irrigation. At higher altitudes, temperature declines, the growing season shortens, and snow cover is common for much of the winter. Soils are typically silty gray-brown desert soils of alluvial origin and relatively low inherent fertility. Concentration of organic matter is low, erodibility high. Groundwater levels are high. Water logging and secondary salinization are significant environmental problems, caused by failing drainage infrastructure and poor water management. Floods may occur at any time due to adverse weather. Tajikistan is a mountainous country, only 960,000 ha are designated as cultivable land. The amount of arable

land per rural household is only 0.9 ha plus about 3.5 ha pasture. Significant areas of often steeply sloping land have been utilized, resulting in increased risk of erosion.

8. Poverty, an overriding environmental issue in Tajikistan, is endemic in the rural areas: 83 percent of rural households are unable to reach the Government's minimal consumption basket equivalent to approximately TJS20 per person per month. The rural poor eat an inadequate diet, have insufficient income or production to provide food for all seasons, and have low stocks of food. Single women, households headed by women, children, and orphans are thought to be particularly vulnerable, as well as large families and those living in remote areas. Poverty tends to increase as availability of land per household member decreases.

9. Livelihoods are based on irrigated cotton cultivation. About 40 percent of all irrigated land is planted to cotton, which is heavily taxed. Food crops may be grown on the remaining irrigated land and on household plots. Food insecurity has resulted in extensive hand-cultivation of grazing lands on the surrounding hills for winter wheat. Livestock are important for subsistence. About 20 percent of rural communities had piped water supplies during the Soviet era, but few of those schemes have survived the past decade. Many rural households now depend on surface water, usually rivers or canals. Low hygienic and chemical quality of water is a major factor contributing to the high level of malnutrition among children. Morbidity of the population with malaria in 1999 was 222 per 100,000 population.

10. Administration is controlled by the central Government. Its agencies are represented at both the *oblast* (region) and *rayon* (district) levels, with suboffices at *jamoat* (village) level where needed.

11. As a summary, Tajikistan has an environment that is prone to natural disasters related to its dynamic mountainous terrain, steep and narrow river valleys, sparse mountain vegetation, and annual snowmelt. Those natural characteristics have been exacerbated by deforestation and overgrazing, which were features of the former regime. In addition, salinization of agricultural soils resulting from poorly managed irrigation systems is a growing problem. Selective reforestation, improved pasture management, and more effective irrigation and water supply systems would have a positive impact on environmental conditions.

D. Screening of Potential Environmental Impacts and Mitigative Measures

1. Environmental Issues Arising from the Project Location

12. Environmental impact related to the location can be considered small considering the need to relocate only six households and compensate the permanent and temporary losses of land areas. The principles of compensation are presented in the assurances of the Government. The issues include (i) lost income during the processing and replacement of the housing and properties for relocation of the household; (ii) loss of productive land due to excavation works and dumping of the materials; (iii) loss of connection to the market and other community, or to pastures and remote parts of the farm; and (iv) loss of land at the borrowing sites, construction areas, and areas needed for facilities. Timely liquidation and implementation is important. Most sensitive areas are located in the immediate vicinity of the new canals, and those to be expanded. Temporary losses should be addressed correspondingly.

13. Possible changes in groundwater levels and salinity risks are considered small, but they should be monitored during project implementation. Lost access to groundwater, as well as weakened drainage of farmland should be compensated.

14. Negative effects on biodiversity seem insignificant based on the brief survey. However, the possible sensitive areas, which will be destroyed or harmed by the Project, should be checked during the design and implementation, as well as the possible cultural heritages.

2. Environmental Issues Arising from Project Design

15. The hydrogeological and geological properties of the soils to be excavated should be monitored to keep the risks minimal. A particular concern is the somewhat unforeseeable stability, as well as chemical composition, of the alluvial sediments. Appropriate representative profiles should be surveyed prior to digging. Although salinity is the main chemical concern, some representative groundwater samples should be analyzed to eliminate the risk of heavy metals or other elements that could harm the water quality for irrigation and potable purposes.

16. Dumping sites for the excavated materials, as well as the borrowing sites, should be defined in the context of other engineering design. Landscaping after the works should be addressed, with particular attention to erosion control. A rough estimate of the amount of landmasses to be removed is 1-2 million m^3, which requires careful planning. The masses may be used to fill waterlogged claypots or other areas suitable for mosquito breeding. Particularly, the design should not allow creation of new waterlogged wetlands by cutting the drainage of floods.

17. The working camps and engine stations should be designed with appropriate sanitation facilities and maintenance areas to prevent spills of the oil or other chemicals to the ground or groundwater. Inspectors should be trained and appointed to supervise those practices. A useful tool is a monthly environmental report, to be required from each of the contractors. The contracts should state the environmental responsibilities in detail.

18. With these mitigative measures implemented, the adverse environmental impact resulting from the construction stage is considered minor, except the increased suspended solids in the water, as well as siltation and corrosion of the structures. The high concentration of suspended solids may apparently last several years after the construction works have been completed, depending on the efficiency of erosion control measures that have been taken.

3. Environmental Issues Associated with Construction Stage

19. During the construction, negative environmental impacts can be reduced to an acceptable level by applying appropriate mitigative measures and monitoring as designed. The main concern is erosion control. Monitoring of the possible cavitation in canals, erosion and replantation of slopes, and control of hydrological changes in the vicinity of the working sites should be continuous. Financing for those activities should be allocated in the project budget.

20. Facilities and discipline in the maintenance of engines also require monitoring and financing during the construction stage. Temporary arrangements such as engine stations, material stores, transportation routes, dumping sites, supply of water to users whose connection has been temporarily cut, and the farmers' traffic, will be addressed in the contracts, and monitored by monthly reports.

4. Environmental Issues Arising from Project Operation

21. The main environmental problem associated with operation of the rehabilitated infrastructure will be the need for proper maintenance and generally minimizing the risk of

similar damage. The mitigating strategy will concentrate on improving maintenance through training and awareness of engineering staff, improved management of operation and maintenance (O&M) activities and a medium-term program to increase the level of funding to O&M from a combination of budgetary support and beneficiary contributions. The associated advisory TA is designed to address these institutional and financing issues.

22. The negative environmental impacts arising from operation of the Project could result from further erosion, which may continue for several months after the works have been completed. The water will contain considerable amounts of eroded materials, which may cause siltation of the structures, corrosion, and limitations to the potable usability of water. The occurrence of harmful chemical or biological constituents is addressed in the Institutional Requirement and Environmental Monitoring Program (para. 24).

23. During operation, the significant benefits will cover environmental issues. The living conditions of the beneficiaries will be improved, health conditions will be enhanced, and poverty will be reduced indirectly. In this context, comparison of the environmental costs and benefits has not been possible, but negative impacts during operation appear insignificant.

E. Institutional Requirement and Environmental Monitoring Program

24. MWRLR, the Executing Agency of the Project, has limited environmental expertise among its own staff. The practice is that the Ministry of Environment Protection (MEP) assigns an environment specialist to assist the executing agency during the design and implementation of relevant projects. The project may, in addition to the services of a full-time domestic environment specialist during the design and implementation, need the assistance of an international expert for two weeks as a component of a supporting TA.

25. An important requirement is use of a participatory approach, including consultation with the beneficiaries and affected people, and free access to environmental information. A practical way is to organize seminars in the villages to discuss the environmental and social issues relevant to the project. Interested nongovernment organizations and other organizations may be associated in this regard. The participatory approach has been incorporated into the Government's assurances.

26. The environmental monitoring program will include (i) weekly monitoring of the groundwater level and salinity at 10-20 representative monitoring stations; (ii) analyses for metals such as arsene, iron, manganese, cadmium, copper, zinc, chromium, and mercury from groundwater samples taken from different depths; (iii) monthly analyses of stream flow, temperature, acidity/alkalinity, pH, chemical oxygen demand, salinity, and suspended solids from two stations in the new canal after the construction; (iv) microbiological quality twice a year of canal water in the 3-5 places where the water is used for drinking purposes; and (v) monitoring of the construction works with monthly reports and occasional inspections.

F. Findings and Recommendations

27. Considering the urgency of processing the emergency loan project, it is recommended that this report would suffice as both the initial environmental examination and summary report. The findings indicate that the negative environmental impacts of the Project can be mitigated to an acceptable level. Hence, it is recommended that the Project would be classified as environmental category B, which does not necessarily require a full-scale environmental impact assessment.

28. An associated TA is recommended to assist the Government in addressing the environmental mitigation and monitoring recommendations as above, and supervise the institutional capacity building.

29. It is recommended that the designs (i) make maximum use of contouring; (ii) minimize the creation of steep slopes; (iii) provide adequate slope protection using bioengineering solutions; and (iv) select disposal areas for borrowed spoils that will preserve valuable land, wetlands, and biodiversity.

30. During construction, care will be taken to avoid dust creation, and the contamination of water supplies, which may adversely affect local communities and livestock.

31. Construction stockpiles and site facilities are recommended to use existing buildings as far as possible. If not, they should be located on wasteland to avoid the destruction of trees and vegetation, and to minimize hazards to the local population who should be consulted on their location.

32. The possible occurrence of significant biodiversity sanctuaries or cultural heritage sites should be monitored during design and implementation of the Project.

G. Conclusions

33. As the adverse environmental consequences resulting from the Project can be mitigated to an acceptable level, and the other technical alternatives to address the objectives are apparently not feasible, this report is recommended to be sufficient. Further environmental impact assessment is not required.

34. A program should be established under the Project to address environmental awareness, mitigation, monitoring, and financing issues in a manner suitable for an emergency project.

SUMMARY INITIAL SOCIAL ASSESSMENT

1. Tajikistan's economy recovered significantly during 1997-2000 with a cumulative gross domestic product increase of more than 20 percent. Notwithstanding this, Tajikistan remains a poor country, with 1999 per capita gross national income of $280.[1] The civil war and economic contraction have caused a drastic deterioration in living conditions. The Tajikistan living standards survey undertaken in 1999 shows that 83 percent of the population lives below the poverty line.[2] The isolated Gorno-Badakhshan Autonomous Region is the poorest in the country, with 94.7 percent of its population living below the poverty line, followed by Khatlon Region (93.3 percent), Leninabad Region (88.1 percent), the Region of Republican Subordination (81.5 percent), and Dushanbe (67.7 percent). With the high human cost of economic transition, which was exacerbated by the civil war[3] and natural disasters, Tajikistan's human development index,[4] declined from 0.620 in 1992 to 0.528 in 1997. Despite continuous difficulties, the country's human development index increased to 0.601 in 1999.[5] Unemployment is believed to have increased to approximately 30 percent in 1999.[6] Jobs are increasing in the emerging private sector but labor markets remain weak due to the narrow base of economic growth.

2. Public expenditure on social sectors (health, education, and social protection) as a percentage of gross domestic product fell from 19.8 percent in 1992 to 4.2 percent in 1998 under severe budget constraints after independence. In 2000, the Government placed poverty reduction at the center of its growth strategy, and committed to increasing and maintaining a budget allocation of 42 percent for overall social sector expenditures starting from 2001, up from 19.5 percent in 1999, and 39 percent in 2000. With this increase, public expenditure on social sectors as a percentage of gross domestic product will be over 5.9 percent. Social sector management and the social services delivery system must be improved to ensure that the gains from economic growth address social needs.

3. Major education indicators show that people's access to basic education has declined since independence. Many poor families are unable to purchase textbooks, adequate clothes, and other belongings, and to cover transport expenditures. In contrast, enrollment in higher education has remained remarkably constant. However, due to the lack of job opportunities, young people often have to engage in activities other than those for which they were trained, and some of them leave the country. In the face of deteriorating education services and to address the issues in the new economic environment, the Government allowed the private sector to get involved in education in 1994. Also, steps were taken to reform the curricula and

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[1] Data based on the World Bank's atlas method. By comparison, 1999 per capita gross national income in neighboring countries were the following: Azerbaijan, $460; Kazakhstan, $1,250; Kyrgyz Republic, $300; Turkmenistan, $670; and Uzbekistan, $720.

[2] The World Bank. 2000. *Republic of Tajikistan, Poverty Assessment.* Dushanbe.

[3] The civil war of 1992–1997 claimed 60,000 lives and created 700,000 refugees and 55,000 orphans.

[4] The UNDP's human development index summarizes the socioeconomic status of a country on the basis of per capita income and major education and health indicators.

[5] United Nations Development Programme. 2000. *Tajikistan Human Development Report 2000.* Dushanbe. Tajikistan's ranking in the human development index fell from 97 in 1992 to 115 in 1997 and improved to 110 in 1999 among 174 countries.

[6] The official unemployment rate (3.1 percent in 1999) grossly underestimates actual unemployment for several reasons. The official figure does not include substantial unemployment and underemployment in inactive state-owned enterprises, and many of the unemployed do not register because of the low unemployment benefits. Actual unemployment in Tajikistan was estimated to be much higher at about 30 percent according to the World Bank's poverty assessment of April 2000. The International Labour Organization estimated unemployment at 16 percent (1999).

textbooks, and new education standards were introduced in 1996. In addition, fees and user charges were introduced in schools and universities. Textbooks are no longer provided free, although the current charge is only a fraction of the actual cost.

4. The health care system also experienced a crisis after 1991. The network of basic health care provision broke down, people's access to basic health care became limited, and the quality of health services deteriorated. The war and natural disasters destroyed a large number of health facilities. The Government made an initial response to the difficult situation in health. The Health Law passed in 1997 allows private medical centers to be established and permits doctors working in public hospitals to engage in private practice located on private property. The Government also took measures to reduce operational costs by cutting the number of hospital beds from 55,000 in 1992 to 44,000 in 1997, and by introducing charges for certain health services. To further improve health care, the Government adopted the national strategy Health For All Up To 2005, and implementation of the strategy The National Program of Health Care Reform in Tajikistan was adopted in 1998.

5. Like other Central Asian republics, Tajikistan's legal and administrative systems protect women from discrimination. However, the drastically changed social situation in transition has made it more difficult for women to balance their public and private roles. The transition has severely affected industries that employed a high proportion of women (e.g., textiles, manufacturing, and agriculture), causing them to disproportionately lose their jobs. Other sectors, in which women predominate, such as education and health care, have experienced high wage arrears. Also, women have suffered most from the decline of social service delivery, including the discontinuation of many of the state benefits that supported women, such as child allowances and child care. In addition, the civil war created 26,000 widows, resulting in a significant increase in households headed by women, while men made up the vast majority of deaths resulting from the war.

6. Improving governance is key to keeping the postconflict society on the road to recovery and development by addressing poverty reduction and structural reform to promote transition to a market economy. The fight against economic crime, including corruption and drug smuggling through the Afghan border, has become a major challenge for the Government since the internal conflict ended. Presidential decrees to tackle corruption and drug trafficking were issued in May 2000. Promotion and dissemination of laws and regulations are necessary.

7. Agriculture remains a key sector of Tajikistan's economy, contributing 20-27 percent of gross domestic product, one third of export earnings, and accounting for 60 percent of employment. Tajikistan's transition has been accompanied by a significant shift in labor from industry to agriculture. More than half of Tajikistan's industrial workers have become redundant since 1990, and the agricultural workforce has simultaneously increased by 30 percent. Accordingly, agriculture and agroprocessing are now expected to play a major role in economic recovery and poverty reduction in Tajikistan given the evident comparative advantages and scope for productivity improvements. Exploitation of these opportunities requires elimination of widespread distortions and disincentives that prevailed under central planning.

8. Land reform is essential to develop the agriculture sector as arable land is scarce, only 0.14 hectares per capita. The civil war delayed Tajikistan's economic reforms. However, structural reforms have progressed substantially since 1997, and the Government has boosted land reform since mid-1998. Structural reforms were accelerated in 2000, with progress made in small-scale enterprise privatization, tax administration reform, development of the treasury system, and strengthening of the auditing system. In the agriculture sector, half of the arable

land is now privatized. More state-owned farms should be privatized and newly privatized farmers supported. As a part of financial sector reforms, nonbank financial institutions must be developed to expand the outreach of financial intermediation, including to rural areas, where about 73 percent of the population lives.

9. Khatlon oblast (region), where the damaged water conveyance system is located, was seriously affected by the civil war, and is the second poorest region of the country. In the project area, the incidence of poverty is estimated at 90 percent.

10. The water conveyance system to be restored runs through three *rayons* (districts): Gozimalik, Khodzhamaston, and Yavan. The majority of the population below the broken siphon reside in Gozimalik.[7] In 2000, about 70,700 people lived in this rural district. About 35,000 completely lost their source of water after the catastrophe at the siphon. Women outnumber men slightly, constituting 51 percent of the population. The population is young, with 52.9 percent under 20 years of age, and 29.8 percent between 20 and 40. The crude rate of natural increase is 12.6 per 1,000 due to a crude birth rate of 16.4 per 1,000 and crude mortality rate of 3.8 per 1,000. About 1,531 calories per day were available to people in this area in 1991 compared with the required 2,400 calories per day. Observers have remarked that stunting, reflecting chronic childhood malnutrition, is most pronounced in such cotton-growing regions of the country.

11. Landholding in Gozimalik is dominated by five *kolkhoz* or collective statefarms; there are only 200 *dekhan* or private farms in the district. According to one informant, farmers may apply for a private farm after paying off their debts to the kolkhoz. This strongly favors large families with many young male laborers and disadvantages smaller families and the 200 or so households headed by women, including those widowed in the civil war. In 1999, about 10,900 hectares of crops were planted; half, or about 5,400 hectares, was in cotton, and 2,900 hectares in grain. In 1999, about 4,343 tons of cotton and 2,175 tons of grain were produced and 2,622 head of cattle and 4,953 head of sheep (and goats) produced 349 tons of milk and 173 tons of meat.

12. Gozimalik has 56 schools with 1,100 teachers and 16,800 pupils, including 7,200 girls. There are 59 doctors and 325 nurses.

13. Reform of landholding and local governance of irrigation and domestic water systems is crucial for the agriculture sector and socioeconomic development in general. Creation of water users associations through bottom-up, participatory processes would bring farmers and domestic water users together to plan, manage, and monitor local water supplies and the financing required to maintain these. Federations of water users associations at the secondary channel level would contribute to empowering citizens and communities in which they reside. Linkages with other programs, such as school committees and credit for microenterprises, would reinforce local capacities and enhance social capital. The organization and training of water users associations is included in an ongoing World Bank-financed project.[8]

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[7] Data were provided for Gozimalik by officials "based on Government statistics and the World Bank Poverty Assessment." The source of the data is not specified. The statistics pertain only to Gozimalik. A small number of conversations were held in the district with assistance from a translator, and with nongovernment organization staff members and citizens from rural areas who now live in Dushanbe. Further research would be required to obtain higher quality data.

[8] World Bank Loan 33870-TAJ: *Rural Infrastructure Rehabilitation Project*, for $20.0 million, approved on 6 July 2000.

14. For the restoration of the Yavan water conveyance system to lead to sustainable results, institutional and technical issues must be addressed simultaneously. At a minimum, an extensive and comprehensive information campaign is essential to inform men, women, and school children, of the structure and function of the entire system, the necessary annual maintenance, the reconstruction works being undertaken now, and the real costs of these. Such a campaign is included in the scope of the associated TA.

TECHNICAL ASSISTANCE FOR SUPPORT FOR FACILITATING SUSTAINABLE PROJECT BENEFITS

A. Objectives

1. The objectives of the technical assistance (TA) are to (i) review practices and help establish procedures for proper operation and maintenance (O&M) of the project facilities, and (ii) build capacity of the Ministry of Water Resources and Land Reclamation (MWRLR) in construction management and supervision. By establishing procedures, determining inputs, and instituting monitoring mechanisms with strong beneficiary participation for proper O&M, the TA will ensure sustainability of project benefits. Also, through hands-on training, the TA will introduce to MWRLR staff efficient practices in construction management and supervision that will considerably improve the capacity of the staff for cost-effectiveness and quality construction.

B. Consultants

2. The TA will require the services of 4 person-months of international consulting services: an O&M specialist-environmental specialist (2), and construction management specialist (2); and 15 person-months of domestic consulting services: O&M specialist (5), social analyst (5), and construction management specialist (5).

C. Terms of Reference

3. Working closely with the staff of MWRLR, local administration, and the project communities, the consultants will carry out the following tasks:

1. Establish O&M Procedures and Estimate Associated Costs

4. The consultants will:

(i) study the Pravaya Vetka main canal system and establish procedures for proper O&M;

(ii) run an information campaign to inform men, women, and school children of the structure and function of the entire system, the necessary annual maintenance, and the reconstruction works being undertaken;

(iii) determine the organizational setup and equipment required, and estimate the associated investment and recurring costs; and

(iv) prepare guidelines for the system operators including the procedures to be followed in case of emergencies.

2. Propose Mechanism for Recovering O&M Costs

5. Activities include:

(i) prepare a profile of the project water uses and the users;

(ii) recommend ways and means to minimize water wastage and use the water in the most efficient and cost-effective manner; and

(iii) recommend how the O&M costs could be best recovered from the beneficiaries giving due consideration to the use of water and the payment capacity of the users.

3. Recommend Implementation and Monitoring Mechanisms for O&M

6. Activities include:

(i) identify performance indicators for O&M activities; and

(ii) recommend mechanisms to monitor O&M activities with particular emphasis on involvement of the project communities;

4. Capacity Building in Construction Management and Supervision

7. The consultants will:

(i) prepare in Russian, for the project management office staff and the local consultants, guidelines including related forms on construction management and supervision;

(ii) using the ongoing construction activities as an example, provide hands-on training to the project staff on efficient construction management and supervision;

(iii) explain the common difficulties and problems encountered and how to address them; and

(iv) demonstrate how to take samples, get them tested at the laboratory, and interpret the results.

D. Implementation Arrangements

8. The TA will be implemented by the project management office under MWRLR. The consultants will be recruited by the Government through a consulting firm in accordance with Asian Development Bank (ADB) *Guidelines on the Use of Consultants* and other arrangements satisfactory to ADB for the selection and engagement of domestic consultants.

E. Implementation Schedule, Reports, and Documents

9. The TA will be implemented over six months. The schedule for TA implementation will be matched with the period of peak project construction activities, particularly when a variety of construction activities are scheduled. The input of the international consultants will be limited to one month at a time with domestic consultants undertaking the same activities during the gap. As stated in the terms of reference, the consultants will prepare instructions and guidelines for the project staff. In addition, the consultants will be required to prepare a brief report on their input making recommendations for any follow-up activities.

F. Estimated Costs

10. The total cost of the TA is estimated at $170,000 equivalent, comprising foreign exchange costs of $116,000 and local currency costs of $54,000 equivalent. ADB will finance $135,000 equivalent, to cover all the foreign exchange costs and $19,000 equivalent of the local

currency costs. The funding will be on a grant basis from ADB-funded TA program. The Government will finance $35,000 equivalent of the local currency costs. The breakdown of the costs is given in Table A10.

Table A10: Cost Estimates and Financing Plan
($'000)

Item	Foreign Exchange	Local Currency	Total Cost
A. Asian Development Bank Financing[a]			
1. Consultants			
a. Remuneration			
i. International	80	0	80
ii Domestic	0	9	9
b. International and Local Travel	16	2	18
c. Reports and Communications	5	0	5
2. Equipment and Supplies	5	0	5
3. Office Assistance and Interpretation	0	5	5
4. Contingencies	10	3	13
Subtotal (A)	**116**	**19**	**135**
B. Government Financing			
1. Office Accommodation and Local Communication	0	8	8
2. Counterpart Staff and Support Services	0	10	10
3. Travel and Per Diem Costs of Counterparts	0	4	4
4. Workshops	0	2	2
5. Information Campaign Programs	0	4	4
6. Logistic Support in Districts	0	7	7
Subtotal (B)	**0**	**35**	**35**
Total	**116**	**54**	**170**

[a] Funded from the Technical Assistance Special Fund.
Source: Staff estimates.