

Republic of Tajikistan

FY2016 Ex-Post Evaluation of Japanese Grant Aid Project

“The Project for Improvement of Water Supply in Mir Saiid Alii Khamadoni District of Khatlon Region” / “The Project for Improvement of Water Supply in Mir Saiid Alii Khamadoni District of Khatlon Region (Phase II)”¹

External Evaluator: Keisuke Nishikawa, Japan Economic Research Institute Inc.

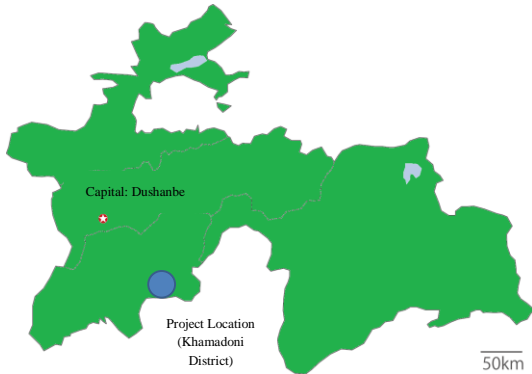
0. Summary

This project was implemented primarily to construct water supply facilities and procure the equipment necessary to drill wells in order to fulfil the objective of improving the water supply coverage rate in Moskva Town and two villages in Mekhanatabod in Khamadoni District of Khatlon Province. This project was consistent with Tajikistan’s development plans, sector plans and development needs at the time of planning and ex-post evaluation as well as with Japan’s ODA policy at the time of planning. Therefore, the relevance of this project was high. Regarding the implementation aspect of the project, while the project outputs were largely in line with the plan, the project cost exceeded the plan and project period substantially exceeded the plan due to the influences of bid tendering failures, etc., resulting in the judgment that the project’s efficiency was low. As for project effectiveness, while the operation indicators were apparently achieved, the water supply system could not be regarded as functioning sufficiently on the whole due to frequent occurrences of water leakages, releases of water taps at each house by the residents and so forth. With regard to impact, positive aspects were observed that the Executing Agency independently conducted geophysical exploration and constructed wells in accordance with the plan by using equipment procured through this project. Therefore, the effectiveness and impact of the project are fair. With regard to operation and maintenance, while no major issues were found in terms of the organizational and technical aspects, there were several issues in that (1) no training structure was established, (2) sufficient repairs and capital investment were financially difficult and (3) maintenance activities such as repairs were insufficient due to a lack of budget. Therefore, the sustainability of the project’s effectiveness was judged to be fair.

In light of the above, this project is evaluated to be unsatisfactory.

¹ In this report, ‘The Project for Improvement of Water Supply in Mir Saiid Alii Khamadoni District of Khatlon Region’ is indicated as ‘Phase I’ and the ‘The Project for Improvement of Water Supply in Mir Saiid Alii Khamadoni District of Khatlon Region (Phase II)’ as ‘Phase II’.

1. Project Description



Project Location (Khamadoni District)



Elevated Water Tank Constructed in This Project

1.1 Background

At the time of planning this project, 699 water supply facilities had been constructed in Tajikistan, of which, 113 were no longer supplying water and 358 did not meet water quality standards (Ministry of Health, 2004). Despite being considered a country rich in water resources, even when viewed globally, only 59% of Tajikistan's population had access to safe drinking water. This placed it last among former Soviet Union countries in terms of developing its water supply and also made it a high-risk country for water-borne diseases. Furthermore, most of the Tajikistan's poor population was concentrated in rural areas such as Khatlon Province, this project's target area, and taking poverty measures in rural areas had been one of the key issues for the country's government.

At the time of planning, the population of the Khamadoni District, the assumed project area, was approximately 119,000, including the population of 21,000 in Moskva Town. The water supply in Moskva Town was operated by a public waterworks company, however, only 52% of the residents were receiving water due to the dilapidated facilities including wells. Also in village areas, while 42 out of 57 total villages had water supply facilities, only 16 of 47 deep wells were operational due to lack of maintenance. Because of this, over 70% of residents relied on unsanitary water sources such as rivers and irrigation canals, which made the updating, improvement, and establishment of a maintenance system for water supply facilities a pressing matter for the country². Against this backdrop, a Grant Aid project to procure well drilling equipment was requested to the Japanese government in order to improve the water supply in Khamadoni District.

Although this project was originally planned as a single project, as described in '3.2.2.1 Project Cost', it was later divided into two projects. Due to the integrated nature of these

² According to the Basic Design Report of this project (December, 2007)

projects, the ex-post evaluation was conducted for both projects.

1.2 Project Outline

The objective of the project was to raise the water supply coverage in Khamadoni District of Khatlon Province by improving water supply facilities, thereby contributing to the improvement of people's sanitary conditions.

E/N Grant Limit or G/A Grant Amount / Actual Grant Amount	(Detailed Design) 49 million yen / 49 million yen (Construction) Phase I: 955 million yen / 375 million yen Phase II: 779 million yen / 779 million yen
Exchange of Notes Date / Grant Agreement Date	(Detailed Design) December, 2007 (E/N only) (Construction) Phase I: August, 2008 (E/N only) Phase II: June, 2011 / June, 2011
Executing Agency	Center for Management of the Project on Supply of Potable Water to Population of Mir Saiid Alii Khamadoni District (hereinafter referred to as 'The Center')
Project Completion	June, 2013
Main Contractors	(Construction) Phase I: Tone Engineering Corporation Phase II: Dai Nippon Construction (Equipment) Marubeni Corporation
Main Consultant	(Phase I and II) Kyowa Engineering Consultants Co., Ltd.
Basic Design	April – December, 2007
Related Projects	[Technical Cooperation] Dispatch of Expert for the Development of Underground Water in Hamadoni District in Khatlon Province (2012-2013) Training of Operation and Management skills on Water Supply System in Hamadoni District of Khatlon Region (2013-2015) The Project for Strengthening the Water Service Management of Pyanj and. Khamadoni Vodokanals (2017-2020 (scheduled)) [Grant Aid] The Project for Rehabilitation of Drinking Water Supply Systems in Pyanj District, Khatlon Region (2014) [Other International and Aid Organizations]

	(World Bank) Dushanbe Water Supply Project (2002-2016) (European Bank for Reconstruction and Development) Khujand Water Supply Improvement Project (Phase 1: 2004-2008, Phase 2: 2008-2011) (United Nations Children’s Fund (UNICEF)) Communities and Schools Water Supply Project (1996-2000) (United Nations Development Programme) Water Supply Facilities and Transmission Pipes Rehabilitation Project (1999-2005, targeting Hamadoni District)
--	--

2. Outline of the Evaluation Study

2.1 External Evaluator

Keisuke Nishikawa, Japan Economic Research Institute Inc.

2.2 Duration of Evaluation Study

This ex-post evaluation study was conducted with the following schedule.

Duration of the Study: November, 2016 – April, 2018

Duration of the Field Study: February 15 – 28, 2017 and May 20 – 26, 2017

2.3 Constraints during the Evaluation Study

The Khamadoni District of Khatlon Province, where this project was implemented, was in a state of unstable security even during the ex-post evaluation. Accordingly, on-site work including visits to project sites and conducting of beneficiary surveys was substituted by local consultants. In addition to providing consultation to the local consultant for the site survey in the capital city Dushanbe, the External Evaluator also invited the director of Vodokanal of Khamadoni District (hereinafter referred to as ‘Vodokanal’), the public water supply and sewerage corporation in charge of operating and maintaining the facilities constructed in this project, to the capital in order to gather information through face-to-face discussions. In Kurgantube, the capital of Khatlon Province where Khamadoni District is located, the External Evaluator also visited the Khatlon Provincial Office of the public housing services corporation that serves as the regulatory body over Vodokanal, where the evaluator held discussions with stakeholders. For the reasons described above, the External Evaluator did not carry out field inspections at the project sites, but rather obtained some information through the local consultants.

3. Results of the Evaluation (Overall Rating: D)³

3.1 Relevance (Rating: ③)⁴

3.1.1 Consistency with the Development Plan of Tajikistan

At the time of planning of this project, Tajikistan's development policy, the *National Development Strategy 2007-2015* (formulated in 2006) set a target of 83% nationwide improvement in the proportion of citizens with access to a safe water supply (urban areas: 97%; rural areas: 74%). In response to the National Development Strategy, a second *Poverty Reduction Strategy* for 2007-2009 outlined a three-pillar approach, one of which being the development of human potential (improving the quality of social services, including water supply).

The policy regarding the water sector at the time of planning was the *National Program on Potable Water Supply for 2007-2020*, announced in December 2006. It attached strong importance to water supply projects that promote poverty reduction and sustainable growth. Under this program, the Khamadoni District required an investment of 27.2 million somoni (7.88 million USD converted at June 2007 rates).

With regard to the development policies at the time of ex-post evaluation, the *National Development Policy for the period up to 2030* was formulated in 2016, and based upon which the *Medium-term Development Strategy 2016-2020* was also announced. In addition to the national development policy setting the improvement of water supply as a priority matter for regional development, it was confirmed that the medium-term development strategy also prioritized improvements in access to safe drinking water in connection with the development of people's living environment. It should be noted that, in terms of plans dedicated to the water sector, although the Tajikistan government was in talks during the time of the ex-post evaluation, the specific details were unknown as nothing had been officially announced.

In view of the above, it was confirmed that at the time of this project's planning and ex-post evaluation, the project was consistent with the government's development plan referring to water supply improvements.

3.1.2 Consistency with the Development Needs of Tajikistan

Tajikistan's stability has been regarded as indispensable in ensuring the economic stability and safety of all Central Asia including Afghanistan (according to the Japan ODA Data Book 2007 (MOFA)). Further, the "'Central Asia plus Japan' Dialogue/Foreign Ministers Meeting," held in 2006, attached importance to controlling borders and securing them reliably,

³ A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory

⁴ ③: High, ②: Fair, ①: Low

especially with regard to Tajikistan. Khatlon Province, the target area of this project, shares a border with Afghanistan, and the stability of this national border is important to all of Central Asia.

At the time of project planning, the 119,000 population of Khamadoni District of Khatlon Province consisted of 21,000 people in Moskva Town with the remainder living across various villages. In Moskva Town, only 52% of residents were being supplied with water due to dilapidated water supply facilities. Despite 42 out of 57 total villages having water supply facilities, only 16 of the 47 deep wells were operating due to lack of maintenance. Over the entire Khamadoni District including Moskva Town and other village areas, 59% of the population was not supplied from water supply facilities due to either equipment failure or service suspension.

In the district, locations of pump, transformer, and storage tank failures accounted for respectively 65%, 29%, and 69% of all failures. In particular, submersible pump and elevated water tank failures stood out as prominent factors that prevented achieving an uninterrupted water supply. 49% of the entire pipe lines were unable to distribute water due to its dilapidated state.

In terms of the water supply situation at the time of ex-post evaluation, the percentage of population supplied with safe water in 2015 was 93% in urban areas and 67% in rural areas, confining the nationwide average to just 74%.

According to 2016 data on the project area (Moskva Town and two Mekhnatabad villages) provided by the Executing Agency, the percentage of population served in Moskva Town (population 22,505) and the two Mekhnatabad villages (population 7,103) was 100% in both. Further, the percentage of population served in all villages in the Khamadoni District (population around 70,000) was 85%. However, according to Vodokanal, in most areas where distribution pipe is not been newly installed or updated by this project (i.e. areas outside the scope of this project), water leakage has become normal. For example, although repairs were made at 35 locations in 2016, no meaningful solution has been implemented. According to Vodokanal estimates, the leakage rate of Moskva Town and the two Mekhnatabad villages is 35-50%. Also, 70% of water distribution pipe not covered in this project is in need of replacement, and in addition, water meters must be installed across the region in order to correctly gauge supplied water volume.

In view of the above, among regions in Tajikistan, which neighbors Afghanistan, Khatlon Province in particular lies across the border from Afghanistan. Therefore, supporting improvements in the social living environment of the Khamadoni District, which lies closest to the border, is considered an important task in achieving stability for the entire region. Regarding the water supply situation, the percentage of population served in Tajikistan

(2015) did not reach the 74% target announced in the national development strategy, leaving one-third of the country's population without access to safe water. In Moskva Town and the two villages in Mekhnatabad Jamoat⁵, although the required volume of water is being supplied to residents according to flowmeters at water supply facilities, in reality, 30-50% of that volume is believed to be lost through leakage, resulting in a situation in which residents are still not being provided with sufficient water. The area is in need of further distribution pipe replacement and meter installation.

Therefore, due to the strong need to supply safe water to residents at the time of planning and ex-post evaluation, this project is judged to be consistent with the development needs.

3.1.3 Consistency with Japan's ODA Policy

In the Country Assistance Policy for Tajikistan, which was being formulated at the time of planning of this project in 2007, the basic policy was stated as "nation-building that makes possible sustainable development based on the market economy and poverty reduction," and a priority area (out of 4) was set as the "development and management of basic social services." As part of this, cooperation with Tajikistan government was planned in an effort to ensure a sustainable supply of drinking water to citizens.

Therefore, at the time of planning the overall project, this project was consistent with one of the priority areas in Japan's assistance to Tajikistan.

It was confirmed that this project was consistent with Tajikistan's development plans, sector plans and development needs at the time of planning and ex-post evaluation as well as with Japan's ODA policy at the time of planning.

Based on the above, the relevance of this project is judged to be high.

3.2 Efficiency (Rating: ①)

3.2.1 Project Outputs

This project was designed to construct water supply facilities in Moskva Town and Mekhanatabod Jamoat and to procure well drilling equipment. As its capacity development program (soft component), the project was also designed to provide guidance on geophysical exploration techniques for well drilling and the operation and maintenance (O&M) of water supply facilities. Table 1 shows the planned and actual outputs of this project as understood at the time of ex-post evaluation.

⁵ Jamoat is the smallest administrative division that controls several villages. There are seven jamoats in Khamadoni District.

Table 1: Planned and Actual Outputs of This Project

	Plan	Phase I: Actual	Phase II: Actual
Construction of Facilities	<ul style="list-style-type: none"> - Repair of existing water supply facilities in Moskva Town (Construction of 3 deep wells, Installation of submersible pump, New construction and repair of elevated tank, Installation of distribution pipelines, etc.) - Works for water supply facilities in 2 villages in Mekhanatabod Jamoat (Installation of submersible pump, New construction of elevated tank, Installation of distribution pipelines, etc.) 	<ul style="list-style-type: none"> - Moskva Town: Construction of 3 deep wells 	<ul style="list-style-type: none"> - Moskva Town: Installation of submersible pump, New construction and repair of elevated tank, Installation of distribution pipelines, etc. - Mekhanatabod Jamoat: Installation of submersible pump, New construction of elevated tank, Installation of distribution pipelines, etc.
Procurement of Equipment	<ul style="list-style-type: none"> - Equipment for well drilling and related equipment for the Center (Stationary well drilling machine, Compressor, Water truck, Truck, etc.) - Maintenance equipment for distribution pipelines for Vodokanal (Compactor, Mud pump, etc.) 	<ul style="list-style-type: none"> - Equipment for well drilling and supporting equipment for the Center (Stationary well drilling machine, Compressor, Water truck, Truck, etc.) - Maintenance equipment for distribution pipelines for Vodokanal (Compactor, Mud pump, etc.) 	<ul style="list-style-type: none"> - None
Soft Component	<ul style="list-style-type: none"> - learning and capacity enhancement of the Center on geophysical exploration techniques - Capacity enhancement of the Vodokanal on operation and maintenance 	<ul style="list-style-type: none"> - Learning of geophysical exploration techniques by the Center 	<ul style="list-style-type: none"> - Capacity enhancement of the Vodokanal on operation and maintenance

Source: Prepared based on the Basic Design Report and information provided by JICA



Procured crane-mounted truck



Procured drilling compressor

Major modifications from the original planning design include a 720m extension of the Moskva Town water distribution pipe network and a model change of the well pump control board. The former modification was based on a request after the initial plan from the Executing Agency to extend the distribution pipe network to rural roads where water

distribution pipe had not been installed yet. As a result, the water distribution network installed in Moskva Town was extended to 32.9 km from the initially planned 32.2 km. The latter modification for the pump control panel was due to a request from the Executing Agency to install a control panel that permits understanding of electrical voltage and current data. There were no other major modifications, and these modifications did not have any negative effects on the overall project.

In addition to the cooperation items from the Japanese side, this project also included plans intended for the Tajikistan side to carry out. Besides acquiring the necessary approvals and authorization to implement project work, the Tajikistan side was also expected to handle the following items:

- Install fences
- Draw in 10 kV transmission line (750 m length)
- Establish a drilling equipment yard in Khamadoni District
- Install water supply connection lines and valves in residences
- Repair leakages in existing distribution pipe
- Pay fees related to the Banking Arrangement

According to the Executing Agency and Project Consultant, all responsibilities on the Tajikistan side were carried out by the time Japanese side construction was completed.

3.2.2 Project Inputs

3.2.2.1 Project Cost

This project was planned to cost 1,028 million yen⁶, consisting of the project cost of 1,005 million yen (detailed design: 49 million yen; construction works: 955 million yen⁷) from the Japanese side and the costs of roughly 23 million yen from the Tajikistan side.

As detailed below, actual project costs for Japan were 375 million yen for the Phase I and 779 million yen for the Phase II (detailed design cost was 49 million yen as planned). The breakdown of each is shown below in Table 2.

⁶ The project cost estimated at the time of initial planning of this project, based on the Basic Design Survey Report

⁷ The sum of individual values and the total value may not match due to rounding.

Table 2 Actual Breakdown of the Project Cost (Japan side only)

(Unit: million yen)

Item		Phase I	Phase II
Equipment procurement	Equipment cost	280.0	-
	Design and supervision costs	12.0	-
Facility construction	Construction cost	49.7	690.0
	Design and supervision costs	33.8	89.0
Total		375.5	779.0

Source: Materials provided by JICA

The circumstances which led to the initially planned single project being split into two phases are described as follows.

- 1) Well drilling in Mekhanatabod Jamoat was planned at a location composed of an alluvial fan of cobbles that required advanced technology to drill, which resulted in a failed bidding as no bidders competed in the first bidding round in December 2008 (in contrast, equipment procurement bidding was approved and the equipment was delivered in September 2009).
- 2) In the second bid held in July 2009, despite the bids being tendered by drilling operators without any experience in laying water distribution pipes, all bids were rejected due to exceeding the ceiling price.
- 3) A subsequent third bid was planned, however, in light of (a) the unlikelihood of securing a successful bidder and (b) even if a successful bidder could be secured, it would be unlikely for construction to be completed within the period specified in the Exchange of Notes (E/N). Thus it was decided to first drill three wells in Moskva Town using the well drilling equipment already procured. Ultimately, a bid for the reduced-scope was approved in May 2010.

Due to the above flow of events, project costs were divided into a Phase I project cost, in which equipment was procured and three wells were drilled, and a Phase II project cost, in which the remaining work was carried out. In the Phase II project, the project cost was revised as a result of the Implementing Review Study and a Grant Agreement (G/A) limited to 779 million yen was separately signed.

According to the Executing Agency, the actual cost by the Tajikistan side was 911,000 somoni. The cost exceeded the planned amount (664,000 somoni⁸) due to

⁸ Based on the Basic Design Survey Report (December, 2007)

higher-than-planned expenses to install fencing as well as residential water supply connection lines and valves. Nevertheless, the yen-denominated amount calculated based on the average exchange rate⁹ during the project period totaled 19 million yen.

Based on the above, the project cost—including detailed design and combining Phases I and II—was 1,203 million yen on the Japanese side and 19 million yen on the Tajikistan side for a total cost of 1,222 million yen. As total project cost was estimated at 1,028 million yen in the initial plan, the actual cost exceeded the plan (119% of the plan).

3.2.2.2 Project Period

The project period was planned as follows: 8.5 months for detailed design and bidding; 9.5 months for procurement of equipment and materials; 14.5 months for facility construction; and 5.5 months for implementing soft components. However, because some processes overlap, the entire project was scheduled to last 31 months from the conclusion of the Detailed Design E/N¹⁰.

As described in "3.2.2.1 Project Cost," events such as reimplementation of the Implementation Review Study and the re-signing of the E/N due to the occurrences of the bid rejection and the bid failures required 67 months. The breakdown of the project period is described below.

Table 3: Actual Project Period

	Period*	Number of Months Required
Detailed Design	December, 2007 – December, 2008	13 months
Phase I	August, 2008 – March, 2011	32 months
Phase II	June, 2011 – June, 2013	25 months
Total	December, 2007 – June, 2013	67 months

* Starting with the month when the Exchange of Notes or Grant Agreement was signed

Source: Information provided by JICA

According to the Executing Agency and the Project Consultant, given the fact that no delays occurred during the construction stage, the primary factors delaying the project were bidding rejection/failure and the implementation of the feasibility study.

Accordingly, the project period significantly exceeded the planned 31 months, finally completing after 67 months (216% of the plan).

⁹ The International Financial Statistics (IFS), International Monetary Fund, was used as reference for the exchange rate data.

¹⁰ Similarly to the project cost, this was based on the project period described in the Basic Design Survey Report.

With the exception of some changes, outputs were generally achieved as planned. As for project cost, however, there was a disparity between the cost estimate calculated by the Project Consultant and the bid price from contractors, leading to the need for a feasibility study to reassess the project costs. As a result, the actual cost was 119% compared to the plan. The project period also significantly exceeded the plan by 216% due to the impact of the bid rejection, bid failure, and the subsequent feasibility study.

Based on the above, the efficiency of the project is judged to be low.

3.3 Effectiveness¹¹ (Rating: ②)

3.3.1 Quantitative Effects (Operational Effects)

At the time of planning of this project, the operation and effect indicators of this project were expected to be the increase in population with water supply; improvement in the percentage of population served; and the increase in the amount of water supply. The actual values for these indicators after project completion are shown in Table 4.

Table 4: Operation and Effect Indicators of This Project

		Baseline	Target	Actual			
		2007	2013	2013	2014	2015	2016
		Planned Year	Completion Year	Completion Year	1 Year after Completion	2 Years after Completion	3 Years after Completion
Population with Water Supply	Moskva Town (person)	10,700	22,230	22,230	22,320	22,380	22,505
	Two villages in Mekhanatabod Jamoat (person)	0	6,640	6,640	6,870	6,900	7,103
Percentage of Population Served	Moskva Town	52%	100%	100%	100%	100%	100%
	Two villages in Mekhanatabod Jamoat	0%	100%	100%	100%	100%	100%
Amount of Water Supply per Day*		3,030m ³	6,615m ³	6,615m ³	7,480m ³	7,515m ³	7,580m ³

Source: Basic Design Survey Report for the Baseline and Target figures of the Population with Water Supply and the Percentage of Population Served, Ex-Ante Evaluation Summary (Phase II) for the Baseline and Target figures of the Amount of Water Supply per Day. Information provided by Vodokanal for all Actual figures

* While the target value indicates the maximum water supply volume per day, the actual values show the average volume of water per day, including the amount taken from existing wells, supplied to the target area of this project.

By implementing this project, it is indicated that the 'population with water supply', 'percentage of population served', and 'amount of water supply' indicators all reached their

¹¹ Sub-rating for Effectiveness is to be put with consideration of Impact.

target values immediately after project completion. The actual value for population with water supply was estimated by the Statistical Agency. The target and actual values in 2013 indicate the same value. According to Vodokanal, the percentage of population served is assumed to be 100% because the supply is connected to the entire population in the project area. The amount of water supply per day was as recorded by the flowmeters at each pump station.

Water is supplied via individual residential water connections in Moskva Town and via a common faucet used by multiple families in the two villages in Mekhanatabod Jamoat. However, since water meters are not installed, it is impossible to ascertain how much water is delivered to each household. Water supply facilities were designed to permit water to be supplied 24 hours a day in Moskva Town and 8 hours a day in Mekhanatabod Jamoat. As water volume was supplied accordingly, the figures in the table were obtained from the Executing Agency.

It was expected at the time of planning that the distribution areas in entire Moskva Town would be divided into four blocks to enable efficient water supply management. However, water was actually supplied to entire Moskva Town from the pumping station (the point where a magnified drawing is shown) all together instead of distributing to each zone. (After that, in the Technical Cooperation Project being implemented at the time of ex-post evaluation, Moskva Town has been divided into multiple zones: a zone where water is supplied using existing water distribution pipes (Zone 6 on the Figure 1) and zones where water is supplied using the water distribution pipes installed through this project (Zones 1 - 5)). In other words, in order to also distribute water from the pumping station upgraded by this project to the existing water supply zone, which had poor water supply, water had to be distributed to all zones at the same time without dividing into separate water supply zones. According to Vodokanal, this resulted in exacerbating water leaks¹² in Zone 6, which contained existing dilapidated distribution pipes. There were also many residents leaving their faucets always open for the purpose of irrigation especially during the summer. As a result, these factors caused a situation that prevented sufficient water volume from reaching the end-point areas of distribution pipes and elevated areas developed in this project.. Further, since water meters were not installed in residences, many residents left faucets open continuously for the purpose of irrigation especially during the summer, contributing to the chronic shortage of water supply throughout the distribution network. In terms of the capacities of water supply facilities, although it was technically possible to continue supplying water 24 hours a day, water leakages and faucets being left open not only made it

¹² Although leakage and non-revenue water rates are unknown, the leakage rate estimated by Vodokanal is 35 to 50%, as shown earlier.

difficult to maintain water pressure, but also wasted a massive volume of water. Because of this, it was decided to suspend pumping at night and early afternoon when actual demand was low.¹³

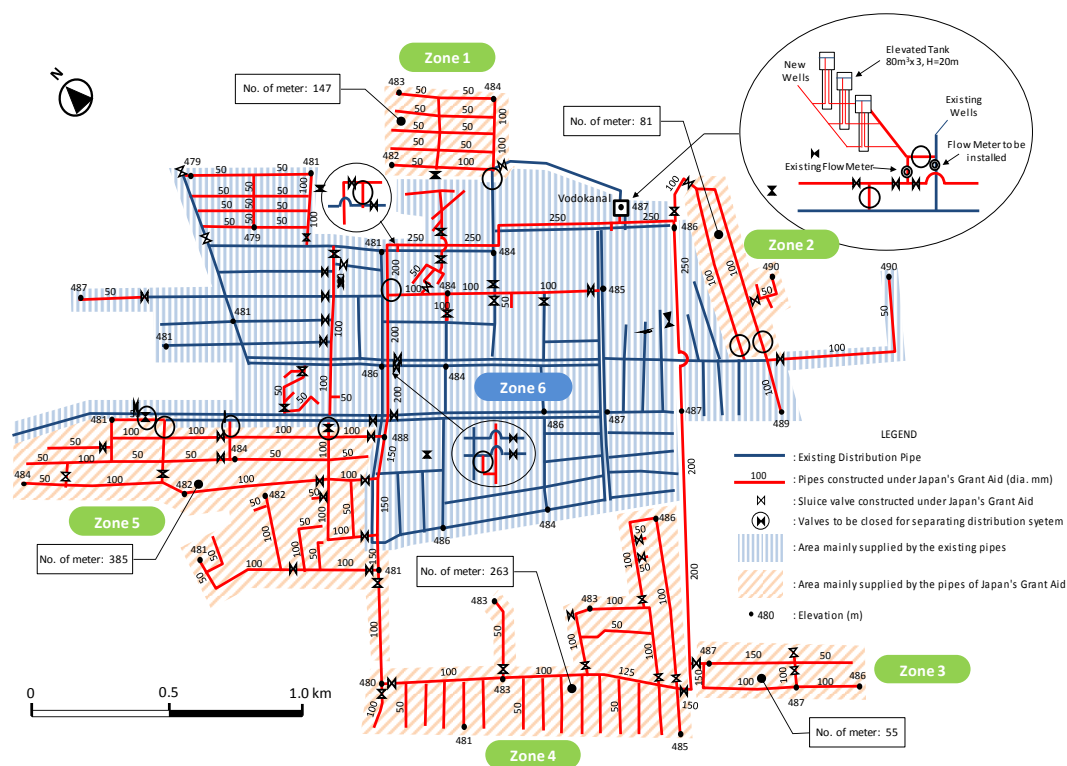


Figure 1 Schematic Diagram of Moskva Town's Water Distribution System

Source: Provided by the experts of 'The Project for Strengthening the Water Service Management of Pyanj and Khamadoni Vodokanals'

The beneficiary survey¹⁴ targeting the residents in the project area was conducted during

¹³ Water supply times during the ex-post evaluation were for 13 hours from 5:00 am–1:00 pm and 4:00 pm–9:00 pm.

¹⁴ In the evaluation of this project, the beneficiary survey was conducted twice as described below with the aim of collecting additional quantitative analysis material from directly benefiting water users. The first survey was conducted by the beneficiary survey assistant during the Phase I field survey. However, during the Phase II field survey, local reports indicating that improvements were made to the water supply by modifying the water supply method in Moskva Town.

The first beneficiary survey was conducted as described below.

[Survey Target Group] A total of 100 residents in the project area (75 water users from Moskva Town water users and 25 water users from two other rural villages (15 from Gulobod village; 10 from Navobod village)). The male to female ratio was 66% males to 34% females.

* Since the beneficiary ratio was roughly 3:1, surveyed participants of 'Moskva Town: Other Two Villages' was set to the same ratio (75:25 people).

[Survey Method] Interview format using a questionnaire. The survey team visited several families along pipe laying sections in the project area and interviewed those living there.

[Questions] Questions cover the following topics: Water supply improvement (stability of water supply, supply times, water quality, water pressure); frequency of drawing water after the project; satisfaction with the water supply project; changes in sanitary conditions; occurrence of waterborne illnesses; changes in the living environment; presence/absence of economic or social impacts; impact on the environment during and after the project; presence/absence and contents of social impacts (resettlement, land acquisition), maintenance conditions.

the ex-post evaluation to assess changes in the water supply situation. In the survey, before the project was implemented, water supply was unstable in Moskva Town and there was no water supply at all in Mekhanatabod Jamoat. According to the survey, almost all respondents indicated that water supply remained unstable even after the project was implemented. However, when asked to compare the stability of water supply before and after project implementation, 99% of the respondents replied that conditions had "slightly improved." Thus it appears that water supply conditions improved slightly, despite remaining unstable.

With respect to water supply hours, Moskva Town respondents reported an average of 10.9 hours per day, while the two Mekhanatabod Jamoat villages reported an average of 7.9 hours per day. Since the Mekhanatabod Jamoat facility was designed to supply water for 8 hours per day, this shows that it has, for the most part, achieved its goal. As for Moskva Town, the responses show that residents feel they are supplied water 84% of the time based on a 13-hour water supply system, which was in place at the time of the ex-post evaluation.

After receiving advice from a JICA Technical Cooperation Project Expert Team, from May 2017 Vodokanal changed the water supply system by separating Zones 1-5 and Zone 6 (Figure 1) in Moskva Town. Accordingly, in July 2017, another beneficiary survey was conducted on residents of Moskva Town in the ex-post valuation in order to assess improvements. As shown in Table 5 below, although there was no change in supply stability, number of changes were seen in water quality, pressure, and supply hours.

Table 5 Comparison of Changes Before-and-After the Project / Before-and-After Changes in the Water Supply Method (May 2017)

		Before the Project			After the Project – May, 2017			After May, 2017		
		Zone 1-5	Zone 6	Total	Zone 1-5	Zone 6	Total	Zone 1-5	Zone 6	Total
Water Quality	Good	74%	71%	72%	85%	85%	85%	89%	83%	85%
	Acceptable	26%	27%	27%	15%	15%	15%	11%	17%	15%
	Bad	0%	2%	1%	0%	0%	0%	0%	0%	0%
Water Pressure	Good	15%	29%	24%	48%	56%	53%	56%	56%	56%
	Acceptable	59%	56%	57%	41%	35%	37%	30%	38%	35%
	Bad	26%	15%	19%	11%	8%	9%	15%	6%	9%
Average hours of supply (hour/day)		6.7	9.2	8.3	10.2	11.2	10.8	10.0	11.4	10.9

Source: Results of the second beneficiary survey

Note: In May 2017, the method to supply water to supply zones expanded by this project was changed to supply water only via the distribution network constructed in this project without going through the existing distribution pipes. A second beneficiary survey was conducted for all of Moskva Town including families supplied by the existing water supply network.

The second survey focused on Moskva Town. A total of 75 people (53% male, 47% female) were surveyed in the same manner as the first survey. Questions were limited to: Water supply stability; supply times; water quality; water pressure; satisfaction with the water supply project; and changes in amounts of water supplied after May 2017.

Results demonstrated that water quality and pressure in Moskva Town greatly improved over conditions prior to the project. It was reported that after the water supply method was changed in May 2017, a slight improvement in water pressure was obvious as water flowed from faucets that had no running water before. The project area was extremely hot in July, and despite being the month of highest water demand, water pressure was actually slightly better than in May. We can assume that this means a certain degree of improvement in water conditions was achieved beyond what is shown from just the numbers.

Water supply improvement levels in Zones 1-5 and Zone 6 indicate the same pattern with better water quality, water pressure, and water supply times than before the project in all zones. It was observed that the percentage of residents feeling ‘Good’ water quality and pressure rose further in Zones 1-5 after May 2017.

With regard to satisfaction with water supply services, 64% of respondents answered "Satisfied," 32% answered "Not really satisfied," and 4% answered "Dissatisfied," meaning just under two-thirds of users were satisfied.

As demonstrated by the above results, the indicators for population with water supply, percentage of population served, and amount of water supply have all achieved their targets based on the data provided. Nevertheless, frequent water leakage from existing distribution pipes not covered in this project coupled with the influences of leaving faucets open shows that the water supply from water pipe newly installed and upgraded in this project were insufficient, resulting in a situation where water did not reach the entire district. In fact, since water supply time has been confined to half the 24-hours or less it is capable of by design, and since there are opinions that water pressure has not been good while it has improved, it cannot be said as a whole that the project has achieved the high level of achievement shown by the data in Table 4. However, changes to the water supply method after May 2017 have shown gradual improvements in water supply conditions across Moskva Town and there is a possibility that further improvements will be made in the future.



Water Leakage onto Roadways

3.3.2 Qualitative Effects (Other Effects)

As a qualitative effect of implementing the project at the time of planning, it was expected that it would be possible to repair existing water distribution pipes and also connect the water supply to all residences by utilizing the procured equipment, and by improving geophysical exploration and O&M skills through the project's soft component.

With regard to training geophysical exploration skills (described in more detail later) a total of nine types of deliverables were prepared in the soft component of this project, including textbooks on geophysical exploration/hydrogeology, manuals on project planning, manuals on water distribution pipe O&M, etc., which were used to provide training to staff at Vodokanal overseeing these respective fields. According to the soft component report, although a certain degree of improvement in knowledge and technical skills at Vodokanal was achieved, it was not necessarily enough. In response, further initiatives to enhance operation and management skills were planned. Specifically, two Short-Term Experts on the O&M of water supply facilities and the business improvement of waterworks utility were dispatched from 2013 to 2015. Also, a JICA Technical Corporation Project, "The Project for Strengthening the Water Service Management of Pyanj and Khamadoni Vodokanals" has been implemented from 2017 with an approximate 3-year project timeline.

In other words, the soft component of this project did not solely account for greatly improving the skills to realize the higher percentage of population served with water. It can be said that further improvements of technical skills have been endeavored through follow-up expert dispatches and the technical cooperation project.

3.4 Impacts

3.4.1 Intended Impacts

The following impacts were assumed as result of implementing this project.

- 1) A well drilling team is set up at The Center and 23 wells are independently drilled over the five years using procured equipment.
- 2) Better sanitary conditions are realized for residents in the project area (fewer residents will have water-borne diseases in the target town and villages).

At the time of ex-post evaluation, the following situation was confirmed through interviews with the Executing Agency and relevant government agencies.

At the time of the feasibility study in 2010, it was decided to begin drilling new wells in 2012 with 2016 as a target completion year. The Executing Agency planned the drilling of 20 wells based on a planned water supply that made allowances for population increases and

used procured equipment to perform work, and by 2016, the 20 wells were in fact all drilled according to plan.

Table 6 Construction of New Wells in Khamadoni District

Completion year	Number of wells	Construction cost (Units: 1000 somoni)
2012	4	826.1
2013	4	793.4
2014	4	1,220.0
2015	4	1,224.4
2016	4	1,432.9
Total	20	5,496.8

Source: Prepared based on materials from the Executing Agency

Upon questioning Vodokanal and the Project Consultant on whether sanitary conditions had improved for residents, opinions were heard that the water quality had largely improved. Checking the inspection results of water quality of water sources and water in each area by Vodokanal and the Committee on Environment have found no health concerns with the water itself other than high salinity in some samples (but not high enough to cause adverse health effects).

When asked whether sanitary conditions had improved as a result of implementing the project in the beneficiary survey, 2% of respondents answered "Greatly improved," 75% answered "Somewhat improved," 9% answered "No change," and 14% answered "Don't know." Regarding the data on the occurrences of waterborne diseases in the project area, no organized data were available at hospitals, etc., and they could not be obtained. According to the beneficiary survey, 98% of the respondents indicated that water-borne diseases were occurring before the project and 96% said that they occurred even after the project was implemented. However, it is unknown whether illnesses like diarrhea are caused by tap water in light of the fact that no abnormalities were discovered by water quality testing, and water quality assessments were generally quite high. Therefore, it is conceivable that some other factors were affecting the quality. It is considered necessary to collect samples not only at pump stations, but also of water as received at residences in order to accurately assess the situation.

3.4.2 Other Positive and Negative Impacts

3.4.2.1 Impacts on the Natural Environment

It was confirmed at the time of planning of this project that conducting the Environmental Impact Assessment (hereinafter referred to as 'EIA') was exempted based

on the notice from the Environment Management Bureau of the Ministry of Agriculture and Environmental Protection (No.1/307 issued on 7 November, 2007), and it was concluded that performing the EIA was not necessary.

In implementing the project, mainly the following measures were to be taken to avoid adversely impacting the natural environment.

- To measure wells' groundwater levels and test water quality at least once per year and monitor changes in groundwater level and quality in future years.
- To properly manage slurry and surplus soil from drilling, and avoid overnight construction in residential areas.

According to the Executing Agency, Vodokanal, and Committee on Environment, no particular negative impact to the natural environment occurred as a result of implementing this project either during construction or after its completion. In addition, the Khamadoni Department of Sanitation and Infectious Disease monitors water quality twice a month; the Department of Geological Research quarterly monitors water levels; and Vodokanal checks chlorine levels daily and bacterial levels weekly. As described above, it can be judged that there are no serious concerns with regard to water quality when it is sent from pumping stations.

With regard to managing slurry and surplus soil from drilling, the Executing Agency has reported that disposal was carried out with the permission of the Khamadoni District Department of Environment. Also, no overnight work was performed in residential areas.

Therefore, it is believed that, on the whole, there were no problems in terms of negative impact on the natural environment from this project because there were no negative impacts occurring either during the project or after its completion, and because it was verified that control measures have been established and carried out.

3.4.2.2 Resettlement and Land Acquisition

No resident resettlement or land acquisition was expected in this project as the project site was either at pump stations or on roads. It was confirmed through information obtained from relevant organizations and by results of the beneficiary survey in the ex-post evaluation that there were actually no resettlement or land acquisition cases.

Regarding the quantitative effects of this project, all the operational indicators assumed at the time of planning have been achieved. Also, Tajikistan independently conducts geophysical exploration and constructs wells using the procured equipment as planned. Thus, the positive effectiveness and impact of this project were confirmed. However, the water supply system as a whole including the areas targeted in this project is not functioning sufficiently in terms of a

stable water supply due to frequent water leaks, especially from the water distribution network not covered in this project, and also due to faucets being left open especially during the summer season at many houses. Therefore, it is judged that, in practical terms, the project is only partially satisfactory in achieving the project's aim of increasing the percentage of population served.

It is deemed that there was no negative impact on the natural environment as well as no resident relocation or land acquisition as a result of implementing this project. With regard to water quality, testing results indicated no problems, and water quality was largely highly rated by residents in the beneficiary survey. However, in light of residents' harsh view of waterborne diseases, checking the quality of water coming into households is necessary.

Based on the above, while a certain degree of effectiveness has been achieved by implementing this project, there are problems in terms of providing a stable water supply for the water supply hours targeted in towns and villages covered. Therefore, the effectiveness and impact of the project are judged to be fair.

3.5 Sustainability (Rating: ②)

3.5.1 Institutional Aspects of Operation and Maintenance

The competent authority on this project was an emergency committee and the Executing Agency was the "Center for Management of the Project on Supply of Potable Water to Population of Mir Saiid Alii Khamadoni District" ('The Center'). The Center continued drilling another 20 wells until the end of 2016 even after the completion of this project. The Center (Executing Agency), which fulfilled its role, was in the midst of being dissolved at the time of ex-post evaluation. Well drilling equipment owned by The Center was physically stored in a Vodokanal warehouse in Moskva Town, but it was not decided who would take ownership after The Center is dissolved.

After the completion of this project, Vodokanal will become responsible for the operation and maintenance of facilities, as planned. Khojagii Manziliyu-Kommunali (KMK, meaning housing service corporation) serves as the supervising body of Vodokanal nationwide.

Under the organizational structure shown in Figure 2, as of May 2017 Vodokanal is composed of 28 staff members, 23 of whom are technical experts. According to Vodokanal, it is mostly composed of staff with degrees or qualifications in related fields such as civil or electrical engineering, and it was not feeling insufficiency in terms of the number of staff.

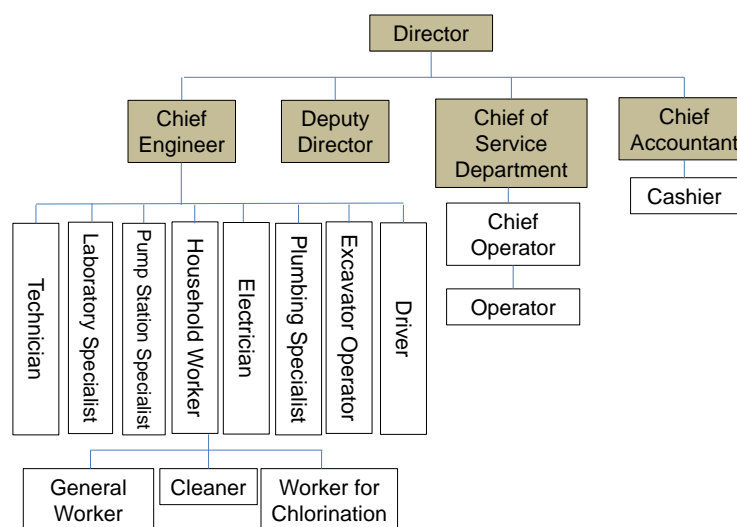


Figure 2 Organization Chart of Vodokanal in the Khamadoni District

Source: Information provided by Vodokanal

The organizational structure of Vodokanal has not changed much since the time of project planning. However, Vodokanal is aware of the urgency to secure the technicians required to operate and maintain facilities in the future since the average age of technicians is 51. Nevertheless, they are also aware that securing highly capable technicians in rural areas far from major cities is a formidable challenge.

In light of this situation, while there are no current issues in the O&M organizational structure or number of personnel, including technicians, some concern is felt over securing enough technicians in the future.

3.5.2 Technical Aspects of Operation and Maintenance

According to Vodokanal, although the technical knowledge and skill of staff has reached a certain level, there is no budget to install meters or upgrade dilapidated distribution pipes, nor do they have the equipment to do so. Because of this, they have been able to do little more than repair leaks. The pumping facilities in Moskva Town and Mekhanatabod Jamoat are equipped with technology designed to operate problem-free and in fact have not encountered any technical problems. However, given that no water meters are installed and residents leave faucets open, and that there are frequent water leakages, it cannot be said that water supply management is being carried out according to the O&M plan.

In addition to the soft component implemented in this project, technical cooperation was also provided through dispatch of two Short-Term Experts. In the experts' opinion, this has succeeded in improving the skills of Vodokanal technicians in areas such as data recording and management, welding equipment operation and maintenance, water quality testing, and

repair of leaking sections. There are also additional efforts being taken to further improve O&M capabilities, including the installation of water meters in some areas through a technical cooperation project underway since 2017. On the other hand, Vodokanal has no systematic training program in place, and besides training provided through JICA technical cooperation, the only training efforts are OJT (On-the-Job Training). It is essential to establish a structure of passing down technical expertise to future technicians amid the aging staff.

Based on the above, it is considered important to improve O&M skills through the technical cooperation project underway at the time of ex-post evaluation, and to put a system in place that improves capabilities toward future.

3.5.3 Financial Aspects of Operation and Maintenance

Vodokanal operates the water supply business under an independent financial system. Its income and expenditures of the past few years are shown in Table 7. Water charges account for the majority of revenue – for example, they were 97% of revenue in 2016 – but as shown, there are many years in which revenues have not been sufficient to cover expenditures, resulting in a loss for the financial year.

Table 7 Vodokanal Income and Expenditures

(Units: somoni)

	2013	2014	2015	2016
Income	385,889	526,788	588,317	658,593
Expenditures	489,889	540,843	561,629	708,443
(Of which, salaries comprise)	211,464	253,548	290,867	256,594
(Of which, O&M comprises)	25,800	14,635	0	72,398
Income	- 104,000	- 14,055	26,688	- 49,850

Source: 2013 and 2014 data obtained by Experts from "Training of Operation and Management skills on Water Supply System in Khamadoni District of Khatlon Region" (2013–2015). 2015 and 2016 data obtained from Vodokanal.

Vodokanal's income has increased greatly in recent years as the range of water supply has expanded from this project, but cost to provide water service has increased. While O&M expenditures are viewed as insufficient, due to the financially independent nature of the business, a situation has continued where Vodokanal cannot repair water pipes or make capital investments that would further extend losses.

Water rates per 1m³ have been set as follows: 0.83 somoni for regular households; 1.40 somoni for public organizations; and 2.40 somoni for private organizations. Nevertheless,

since no water meters have been installed, water customers are permitted to use unlimited water by paying 13.4 somoni per month (168 yen at the end of August 2017), which prevents Vodokanal from growing revenue through water charges. According to Vodokanal and experts, the bill collection rate of the company is almost 100%.

Therefore, the O&M financial situation is viewed as being structurally flawed in that water charges are set excessively low and there are no water meters installed, essentially meaning that the cost to provide water supply services per user gets increasingly more expensive relative to the fixed rate revenue from each user.

3.5.4 Current Status of Operation and Maintenance

In the site survey conducted by the local consultant, facilities and equipment put in place by this project were being used and generally found to be in good condition. However, repairing leaks in Moskva Town's existing water distribution pipes, which was outside the scope of this project, was not sufficiently done, which hindered the overall water supply to Moskva Town. Although an annual O&M plan was prepared and approved by KMK, much of the time is spent on repair, the budget is insufficient, and regular maintenance work is not being regularly performed. According to Vodokanal, spare parts were also not sufficiently purchased due to the lack of budget.

As for Mekhanatabod Jamoat, it was decided to use the existing well in this project as they were no water quality problems detected¹⁵ at the time of planning the project; however, upon drawing water from the well after the work was completed, the water drawn often came to have a strong saline taste—although not at levels considered a health risk. The Tajikistan government drilled another well to address this, however, the water quality was unsatisfactory and ultimately water ended up being supplied in this project using a pump-installed well. Nevertheless, water quality complaints from residents are frequently received (note that inspections have found that water quality is not at levels harmful to health).

No major issues were apparent in the O&M system. On the technical side, however, the issue was found that the training system was not established sufficiently. On the financial side, there were difficulties in making adequate repairs and capital investment mainly due to the inability to collect water charges based on amount of water used. As far as O&M, the facilities built through this project were for the most part in operation; however, maintenance activities as a whole

¹⁵ The Kenja Abdul well used in this project was built in 1985 but had not been used for many years. The two villages of Mekhanatabod Jamoat were receiving water supply services from a different well. Since the water distribution network was badly damaged, it was decided to test the water quality of the nearby Kenja Abdul well, and as no problems were found, the decision was made to utilize this well by installing a pump.

could not be considered satisfactory.

Based on the above, there are some problems in the technical, financial, and O&M aspects of the project. Therefore, the sustainability of the project effect generated is judged to be fair.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

This project was implemented primarily to construct water supply facilities and procure the equipment necessary to drill wells in order to fulfil the objective of improving the water supply coverage rate in Moskva Town and two villages in Mekhanatabod in Khamadoni District of Khatlon Province. This project was consistent with Tajikistan's development plans, sector plans and development needs at the time of planning and ex-post evaluation as well as with Japan's ODA policy at the time of planning. Therefore, the relevance of this project was high. Regarding the implementation aspect of the project, while the project outputs were largely in line with the plan, the project cost exceeded the plan and project period substantially exceeded the plan due to the influences of bid tendering failures, etc., resulting in the judgment that the project's efficiency was low. As for project effectiveness, while the operation indicators were apparently achieved, the water supply system could not be regarded as functioning sufficiently on the whole due to frequent occurrences of water leakages, releases of water taps at each house by the residents and so forth. With regard to impact, positive aspects were observed that the Executing Agency independently conducted geophysical exploration and constructed wells in accordance with the plan by using equipment procured through this project. Therefore, the effectiveness and impact of the project are fair. With regard to operation and maintenance, while no major issues were found in terms of the organizational and technical aspects, there were several issues in that (1) no training structure was established, (2) sufficient repairs and capital investment were financially difficult and (3) maintenance activities such as repairs were insufficient due to a lack of budget. Therefore, the sustainability of the project's effectiveness was judged to be fair.

In light of the above, this project is evaluated to be unsatisfactory.

4.2 Recommendations

4.2.1 Recommendations to the Executing Agency

Even after the project was implemented, water leakages frequently occurred in areas that were not covered by the project, placing a significant burden on Vodokanal's operation of the water supply system. It is therefore necessary to supply water to respective zones depending on the leakage conditions of each individual zone, and to take steps to improve the leakage situation by repairing leaks across the water distribution network on an ongoing basis. It is

also important to install water meters at each residence through the technical cooperation project currently underway, to establish a billing system based on amount of water use, and to improve the financial situation of Vodokanal. Furthermore, it is desirable to establish its own training system so that the improvement effects will be sustained.

4.2.2 Recommendations to JICA

The Executing Agency, Vodokanal, Project Consultant, and experts have unanimously stated that the major problem in operating the water supply system overall is the leakages in water distribution pipes in areas not covered by the project. In the water supply system, the water intake, water transmission, and water distribution all work together to supply water properly to users. This is why it is important to improve the distribution network of sections not covered by this project; install water meters at each residence as part of the improvement; and provide guidance through the technical cooperation project currently in progress in order to ensure smooth operation of the water supply operations achieved by implementing these actions. By doing this, we can expect to see improvements in the financial status and operational capabilities of Vodokanal.

4.3 Lessons Learned

A project plan with a big-picture view of the entire water supply system

In Moskva Town, covered by the scope of this project, leakages frequently occurred from several sections of dilapidated water distribution pipe that was not replaced (areas not covered in the project), resulting in a situation whereby water could not be adequately supplied with the water pipes newly constructed or upgraded in this project. This is considered a major factor behind the project not achieving its intended effect. Furthermore, as a result of not installing water meters, there is no way to assess the percentage of leaked water or non-revenue water. This seems to be a factor in both residents' continuous opening of faucets and the difficulty in effectively formulating and carrying out a business plan. In order to improve the management of the water supply business, it is desirable to plan an integrated project or program that encompasses not only the construction work that allows the water supply system to function as a whole—including repairs and updates of existing water distribution pipe and installation of water meters at residences—as these are essential elements in improving the prerequisite hard component, but also the implementation of soft components such as spreading awareness among residents on how to properly use the water.

(End)

Supplementary Explanation for Opinions from JICA Operational Departments

In the process of JICA Ex-Post Evaluation, evaluators conduct evaluation with their value judgement based on the confirmation of the facts through studies including interview with stakeholders. However, disagreement on the evaluation results can happen among stakeholders including evaluators, JICA's departments/offices in charge or executing agencies.

In such a case, JICA Evaluation Department publicizes both parties's opinion in the report not only to deal with the stakeholders faithfully but to keep independency of evaluators.

In light of the above, the opinion of operational departments/office in charge of the titled project is attached herewith.

JICA Ex-Post Evaluation is conducted in line with *JICA Guidelines for Operations Evaluation (Second Edition)* and *JICA Handbook for Operations Evaluation (Ver1.1)* and *References for External Ex-post Evaluation*. Ex-post evaluation is conducted based on the comparison of the plan and the results, with focuses on the confirmation of 1) whether measures were taken appropriately to realize the development effects and 2) to what extent the development effects were realized as a result of such measures

END

Opinion from JICA's Department in Charge

1. General Statement

The evaluated Grant Aid Project was implemented to construct two water supply facilities as described below in order to increase the percentage of the population with access to a safe and stable water supply in the target area. Thereby the project was completed and the facilities started operation in 2013, contributing to the improvement of the Khamadoni District residents' living conditions.

- ① Improvement of Water Supply Facilities in Moskva Town (Population: 22,505 as of 2016)
 - Construction of water intake facilities (3 Deep wells)
 - Construction of new high-elevated water tanks (2 lots) and rehabilitation of the existing high- elevated water tank (1 lot)
 - Replacement and installation of water distribution pipes (32.9km)
 - Construction of public faucets (57 points) and procurement of house-connection material (1335 sets)

- ② Construction of Water Supply Facilities in two villages in Mekhanatabod Jamoat (Population: 7,103 as of 2016)
 - Construction of water intake facilities (using existing deep wells) and high- elevated water tanks
 - Installation of water distribution pipes (approx. 15km)
 - Construction of public faucets (65 points)

In this project, a Japanese firm was contracted to rehabilitate and construct facilities of the deep wells including everything up until the water distribution pipes. Vodokanal, the public water supply and sewerage corporation in charge of operating and maintaining the facilities directly carried out the works connecting distribution pipes to house-connections, using the materials procured through the project.

The consultants, who undertook the design and supervision of the construction work of the project, visited project sites to conduct a defect inspection in 2014: one year after the start of the service. They confirmed that the constructed facilities were working steadily, contributing to the substantial expansion of both the water supply area and served population. On the other hand, the consultants and Vodokanal also observed several operational and management issues such as water leakages caused by poor connections made by Vodokanal and old distribution pipes, the habit residents have of leaving their faucets open for the purpose of irrigation during the summer, and so on.

As Vodokanal was obliged to provide an unstable water supply service due to aged water facilities constructed in the 1960s, JICA assessed, through a basic design study of the project, that it was necessary to strengthen the operational and institutional capacity of Vodokanal (improvement of water supply and distribution pipe, improvement of the water charge collection system, human resources development, etc.) in order to respond to the expansion of service areas and its operations after the completion of the project. Due to this, JICA decided to implement a technical cooperation project, including efforts to introduce a metered charge system, from 2017 to 2020.

Through the field survey of the ex-post evaluation in 2017, it was confirmed that the facilities were being continuously operated, and the actual water supply volume was reaching 7,580m³ per day. It means about 1.5 times as much water is being supplied than the planned average daily water supply of 5,292m³¹. Moreover, it has been reported in the evaluation survey report that the target area has achieved a water supply rate of 100%.

Before the implementation of the project, JICA's study team confirmed the following situations; in Moskva Town, about 9,900 people (about half of the population) received no water supply; in the 2 villages of Mehanatabad Jamoat, the water supply volume and water pressure were insufficient due to the transmission from distant wells and residents were forced to fetch water from irrigation canals, located 2 to 3 km away, once or twice a day. It seems that the project contributed to improving the above situation, but it appeared difficult for the evaluator to collect sufficient information because he didn't carry out field visits at the project sites. In addition, the evaluator did not mention basic information such as the utilization status of the entire facility and the number as to which water supply connections increased after the project (actual water supply population) in the ex-post evaluation report.

Based on the water supply population in the evaluation report², the water supply amount per person (average of 2 villages in total) reaches 256 ℓ/person/day, although the water supply amount according to the unit of design is 150 ℓ/person/day for Moskva Town and 55 ℓ/person/day for the villages. In other words, there is significantly more amount of water being supplied. On the other hand, there is room for improvement in terms of how the water service is operated and ensuring residents are aware about cutting down their water usage. The supplied water is used not only for domestic purposes but also for agricultural ones, and the residents often seem to leave a faucet running for irrigation purposes.

Some distribution pipes still remain very old although the project renewed most of the aged pipes and expanded the new water pipes networks. It is inevitable that existing aging pipes will increase the amount of leakage to happen as water flow and pressure increases. As a medium to long-term effort, Vodokanal needs to secure a budget for O&M from the revenue produced through the management of their improved billing system etc., and to enhance routine maintenance such as water leakage control (renewal of aging pipes, adequate water supply connection, etc.). The capacity development of Vodokanal, not covered by the project, is being complementarily implemented by JICA's technical cooperation project.

It is aware that Vodokanal's capacity needs to be increased in order to continuously make efforts in water leakage control and raise awareness on saving water among users. However, in saying this, the evaluation report shows that the expected outcome of the project has already been generated. Therefore, we deem that the results of the overall evaluation, a "D: unsatisfactory" rating, does not properly reflect the outcome of this Grant Aid Project.

¹ Though the evaluator used a daily water supply of 6,615m³ in 2013 as the target of the project, this figure is the design maximum daily water supply (maximum daily supply over a period of one year). It is more appropriate to use the design average daily supply instead, in order to grasp the operational situation throughout the year. It is apparent that more water is being supplied than in the original project plan.

² In the evaluation survey, only the population data of the target water supply area is available, hence it is not possible to compare the current number of water supply connections with the number that was used at the planning stage of this project. It means that objective basic information necessary to confirm the expansion of the water supply service is not included in the ex-post evaluation.

2. Specifics

1) Evaluation of Efficiency (Related Section: 3.2.2. Project Inputs)

In the ex-post evaluation, efficiency is rated “①: low” because of the bidding failure at the implementation stage; increase in project costs due to the additional survey needed to review the project components and cost for re-bidding; and extension of the project period.

Although the above rating is scored following the evaluation guidelines, these events were caused by external factors, not attributable to the original project plan itself as mentioned below. Also, the revision of the implementation schedule of the project was agreed upon between the governments, and the revised project was implemented as planned under the new plan.

The completion of the project was three years later than the initial plan including the time taken to review the project plan. However, it cannot be said that there was a significant adverse effect to the significance and effectiveness of the overall water supply construction project which has a service period of several decades.

① Delay in the project period due to external factors

- Procurement of Japanese contractors who undertake grant aid projects is made by price bidding, but this can be greatly affected by the economic situation, market changes, security situations etc. The project site was located in a rural area close to the Afghanistan border and Japanese bidders were not familiar with on-site conditions and local subcontractors. The bidding failure occurred due to such conditions, and it is not attributed to the detailed design or plan prepared by the consultants.
- In the evaluation report, it is assumed that a factor of the failure of the first bidding is the topography of the well-drilling sites, which require a high level of skill. However, no supporting evidence for the reason of the withdrawal is shown in the report. In fact, the contractor was procured by re-bidding without any changes in design and technical specifications.

② Relevance of modifications to the plan

- The splitting up of the project (Phase 1 and 2) and a supplemental feasible study were carried out in order to avoid repetitive bidding failures: necessary and appropriate for the smooth implementation of this project.
- When implementing “Phase 2”, additional on-site surveys were conducted to review the cost estimation based on price escalations and the project period, and the reviewed plan was agreed upon between both governments. Therefore, it is not appropriate to compare the results of this plan with the original plan. It should be compared with the revised budget and schedule which were reviewed by the supplemental feasible study. “Phase 2” was implemented within the project period and budget as planned.

2) Evaluation of Effectiveness / Impacts (Related Section: 3.3 Effectiveness, 3.4 Impacts)

While effectiveness is rated “②: moderate” in the ex-post evaluation report, we score it as “③: high” based on the following facts obtained in the ex-post evaluation.

In the ex-post evaluation report, the following points have not been studied nor analyzed. Hence, we deem that the effectiveness and impact of the overall project have not been properly evaluated.

① Effects of improvement of water supply facilities

- In Moskva Town, there were many areas without water supply services due to the aging of the overall facility before the project. Through the project, water intake facilities (wells) were constructed in order to cover the unserved population of 10,000 and brought about a stable water supply with an adequate water pressure reaching the ends of the service area through the construction and rehabilitation of other facilities such as high-elevated water tanks. The evaluation report has no mention of the operational status of these facilities or their effects. Also, we would like to emphasize that proper chlorine injection, brought about as a result of this project, ensures that safe water is supplied to residents for domestic use.
- In Moskva Town, there were concerns about water leakage from the deteriorated distribution pipes increasing as distribution pressure increased, thus aged pipes were identified and renewed. As a result of renewing water distribution pipes and expanding the pipe network with 32 km of piping, the number of deteriorated pipes decreased to less than half of the town. According to Vodokanal, it is reported that most of the leakage occurred in the areas containing aged piping; therefore, the water distribution pipe initiatives implemented under the project greatly contributes to the improvement of the water supply situation.

② Improvement of water supply services

In Khamadoni District, the annual rainfall is only 100mm. It is hot and dry from June to September and the lowest temperatures are below zero from December to February. It is understood that residents had trouble securing water for daily use under these harsh conditions.

A) Moskva Town

- There were about 9,900 people, equal to about half of the town's population, who did not receive a water supply at all; therefore, water distribution pipe works, and the procurement of house-connection materials were implemented under the project. We believe that the project is contributing to the improvement of water supply services and the quality of life of the newly-served population, but there is no analysis in the ex-post evaluation.

B) Two villages in Mehanatabad Jamoat

- It is reported that residents fetched water from the irrigation canal several kilometers away from their residence due to the water supply from the wells in neighboring villages being insufficient before the implementation of the project. 65 joint faucets were newly constructed for 7,000 residents belonging to the target village of the project.
- In the ex-post evaluation, Vodokanal reported that water was being supplied as planned in these villages; however, the evaluator didn't assess whether there were living improvements among the residents and any changes were not reflected in the evaluation result.

C) Others

- It is reported that 20 wells were constructed using the drilling equipment procured through the project. Vodokanal reported that these wells contributed to the supply of water to more than 10,000 residents of the villages, but this was not evaluated properly as an effect of the project in the ex-post evaluation.

③ Issues such as leakage and unintended usage of drinking water

- It is necessary to distribute water with adequate water pressure in order to reach the ends of the service area, and it is inevitable that the leakage from aged pipes will increase. It seems that Vodokanal has considerable concerns about any leakages because this will mean having to deal with additional workloads with limited personnel. It is seen as a negative effect of the project in the evaluation report, but there is no assessment as to the degree of impact on the volume of the water supply planned in the project.
- Unintended usage of drinking water such as opening faucets and using tap water in agricultural areas are reported on the ex-post evaluation. Since it is about 3 years since the facilities commenced operation, it seems that a lack of a water saving mindset or the installation of water meters has caused such unintended usage. Those issues should be solved by Vodokanal by making steady efforts to strengthen operations and the public awareness after the project. (As mentioned above, the on-going technical cooperation project covers some issues.)

3. Recommendations/Lessons Learned (Related Section:4.2 Recommendations, 4.3 Lessons Learned)

The ex-post evaluation pointed out that leakage from the water distribution pipes and lack of water meters which were not in the scope of this Grant Aid Project were major issues which hindered the project's effectiveness and the operation of the water supply construction.

Although there is no objection to the fact that we can produce more effects by updating all the water distribution pipes in the target area and installing meters in each household, it should be examined from a cost-effectiveness viewpoint as well.

While some issues such as the installation of water meters remain to be addressed by the Tajikistan side through the technical cooperation project being implemented by JICA, in terms of the intended project objective, which is to increase the population with access to a water supply and improve living conditions by improving the water supply facilities in Moskva Town and Mehanatabad Jamoatt, we deem it to have been fully achieved as described above.

(END)

Opinions from JICA's departments/offices in charge

1. The Criterion of Effectiveness (Pertinent Portion: Page 10-14)

In the Project for Improvement of Water Supply in Mir Saiid Alii Khamadoni District of Khatlon Region and the Project for Improvement of Water Supply in Mir Saiid Alii Khamadoni District of Khatlon Region (Phase II), hereinafter referred to as “the Projects”, population with water supply, percentage of population served, and amount of water supply per day are set as “Operation and Effect Indicators”, and all of these indicators exceeded the quantitative targets as described in Table 4 of the evaluation report.

However, the independent evaluator had pointed out the following issues:

- Frequent water leakage from the existing distribution pipes which were not replaced in the Projects and the influences of leaving faucets open have made water supply from the newly installed and replaced water pipes insufficient. Consequently, not enough water is supplied to the entire service area.
- In addition, water supply hours are confined to about half of the planned 24-hour capacity of the water supply facilities.
- There are opinions that water pressure is not good although it has been improved.

In short, the independent evaluator concluded that the Projects have not reached the high level of achievement shown by the data in Table 4 of the evaluation report. In fact, some of the customers living in the higher altitude areas or in areas near the end of the water distribution pipe networks could not receive enough water supply only in summer even after the Projects were completed.

However, these issues occurred only seasonally in certain areas and the water distribution system, water pressure and water leakage have significantly improved with the technical support provided by follow-up experts and the experts of the Technical Cooperation Project (hereinafter referred to as TCP) since April 2017. In fact, more than 200 water leakages on the existing distribution pipes have been repaired with the assistance of the Japanese experts, and leakages are being continuously repaired by Khamadoni Vodokanal (hereinafter referred to as “VK”) with its own budget. According to the experts of TCP, few water leakages are recognized on the ground at present.

Additionally, as described in page 17, VK and the experts of TCP have divided the water distribution network in Moskva Town into small water supply zones and have adjusted the

opening and closing of valves. As the result, very little area is left without sufficient water supply and few complaints from the residents are received at present. This situation shows that the water service level in Moskva Town has improved.

Although the independent evaluator mentioned that the water supply hours are confined to only about half of the planned 24 supply hours, we would like to insist that 24-hour water supply was not originally designated as the operation and effect indicator of the Projects and that 24 hours was used only as an assumption of the operation hours to estimate the necessary diameter of pipes which could flow the maximum distribution amount per hour.

Experts in the TCP had suggested that VK should introduce the 24-hour water supply and require the residents to use water for daily use only during the daytime and for irrigation during night-time, especially, in summer when many residents use water for irrigation, explaining that introducing this new water supply scheme could ease the concentration of water use during daytime and at the same time improve the water pressure.

In this connection, VK and the experts had a meeting with the residents to obtain their opinion regarding the introduction of the above water supply scheme, but the residents preferred to use water during the daytime without any restriction. Therefore, VK continued to operate the facilities only during the daytime, which means that the present 13-hour operation was not caused by any failure of facilities, but by the choice of the residents as water users and hence the limited operation hours should not be taken as a factor that brings the effectiveness of the Projects lower.

As described above, the operation and effect indicators have been achieved and the issues related to water distribution, water pressure, and almost all of the water leakage found after the completion of the Projects have been solved. It is, therefore, concluded that the facilities are being utilized effectively and the Projects have enough impact to improve the water supply condition in the target areas.

2. The Criterion of Sustainability (Pertinent Portion: Page 17-20)

In connection with sustainability, the independent evaluator had pointed out the following issues:

- No major issue was apparent in the O&M system; however, on the technical aspect, the training system was not established sufficiently.
- On the financial aspect, there were difficulties in sufficient repairs and capital investment mainly due to the inability to collect water tariffs based on the amount of water use.
- As far as O&M is concerned, the facilities built through the Projects were for the most part in operation; however, maintenance activities as a whole could not be considered as satisfactory.

The number of personnel in VK have increased from 21 to 26 since the Projects started. TCP trains VK personnel including the newly employed ones, and it seems distant for a small-sized water utility like VK to build up a full-fledged training system. Even small to medium-sized water utilities in Japan work on capacity development and technical improvement by On-the-Job Training (OJT). VK also prepares manuals with the assistance of JICA experts and conducts OJT using them. It is, therefore, considered that VK, as a small-sized water utility, is taking sufficient measures to train its personnel.

On the financial aspect, VK is planning to start collecting water tariff based on the actual volume customers use (volumetric tariff system) with the installation of customer meters, and promote public awareness on water saving through the TCP. Through these efforts, the O&M activities are expected to be strengthened by the support of the TCP.

As explained above, the activities to enhance the sustainability of the Projects are proceeding, and further strengthening on O&M and financial aspects is expected.

(End of Document)