Republic of Tajikistan

FY2015 Ex-Post Evaluation of Japanese Grant Aid Project

"The Project for Rehabilitation of Kurgan Tyube-Dusti Road (Phases I & II)"

External Evaluators: Yuko Kishino and Makiko Oleynikov, IC Net Limited

0. Summary

This project was implemented in order to secure stable transportation of people and goods and contribute to local development, correction of regional disparities, and market zone expansion by rehabilitating the road between Kurgan Tyube and Dusti in the Khatlon Region in south Tajikistan.

Both at the time of planning and at the time of the ex-post evaluation, this project is evaluated as having high relevance because it meets development policy and development needs of Tajikistan, as well as being in accordance with Japan's ODA policy at the time of planning. The targeted road of the project has been fully used with a large increase in the freight volume. After the completion of the project in 2014, the economic growth rate of the Khatlon Region is higher than that of the whole country. The project may have partially contributed to vitalizing social and economic activities. For example, in a beneficiary survey, many road users replied that access to public facilities has been improved. Thus, the project has achieved high effectiveness and impact. However, influenced by price escalation, the project cost was found to exceed the limit of a grant aid project at the time of the detailed design. Therefore, the original plan was modified and the project was divided into two phases for implementation. Consequently, although the project outputs were accomplished mostly as planned, both the project cost and the project period exceeded the plan by large margins. Therefore, the efficiency of this project is low. The State Enterprises on Highway Maintenance (SEHM) of three Districts are in charge of operation and maintenance of this project, and conduct regular inspection under the jurisdiction of Kurgan Tyube State Enterprise for Transport Management (SETM). Holding necessary personnel, the SEHMs have no problem with the operation and maintenance system. They secure the cost for operation and maintenance, and the budget is expected to increase in the future as well. No major problems have been observed in the institutional, technical, and financial aspects of the operation and maintenance system. Consequently, the sustainability of the project effects is high.

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

1. Project Description

Project Location

The Road Improved by This Project
(At the 52 km point)

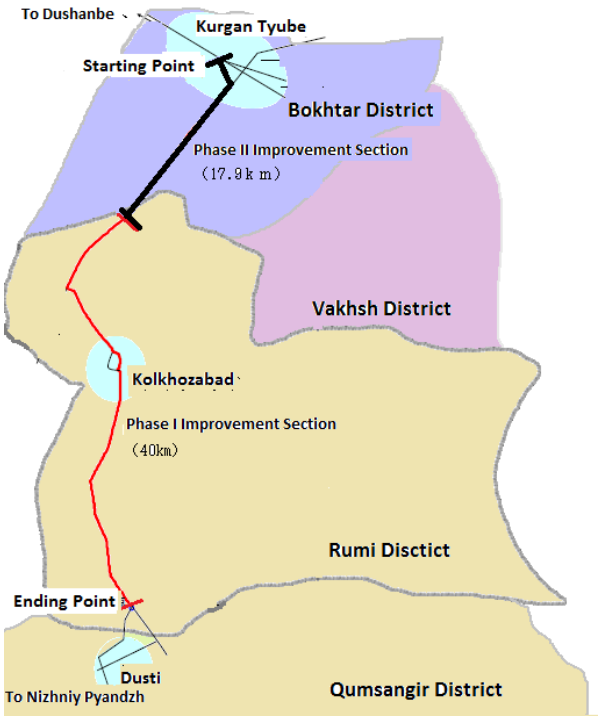
1.1 Background

Tajikistan is a country in Central Asia, located roughly in the heart of the Eurasian Continent. With a road network of approximately 26,507 km, the national roads including arterial roads comprise about 5,423 km (2016)[1]. The Khatlon Region in the south is the only large fertile plain in the country, where 2.97 million people[2] (2014) live. A motorway passing from Kurgan Tyube, the capital city of the region, to Nizhniy Pyandzh near the border, includes the targeted road of this project. The motorway, constructed in 1940, was deteriorating; meanwhile, the volume of freight transportation was growing. Therefore, it had been considered that rehabilitation of the roads was necessary for securing a safe transportation route. Some parts of the road between Dushanbe (the capital city of Tajikistan) and Kurgan Tyube was rehabilitated with financing from the Asian Development Bank (hereafter referred to as the "ADB") from 2001-2007, while the US constructed a bridge over the Panj River that crosses the Afghan border from southern Nizhniy Pyandzh from 2004-2007. The "Project for the Improvement of Dusti-Nizhniy Pyandzh Road: Phase I (2006–2007), Phase II (2009–2011)," a grant aid project of Japan, has improved the road between Dusti and Nizhniy Pyandzh. With the completion of the road rehabilitation between Kurgan Tyube and Dusti, the road rehabilitation from Dushanbe to the Afghan border was supposed to be completed. Under these circumstances, the Government of Tajikistan requested the Government of Japan to rehabilitate the said section.

1.2 Project Outline

The objective of this project is to secure stable transportation of people and goods by rehabilitating the road between Kurgan Tyube and Dusti (59.9 km) in the Khatlon Region, thereby contributing to local development, correction of regional disparities, and market expansion.

[1] Source: Ministry of Transport, Tajikistan
[2] Source: World Bank



Source: Basic Design Report

Figure 1: Roads to be Rehabilitated in this Project

E/N Grant Limit / Actual Grant Amount	63 million yen (detailed design) 3,432 million yen (Phase I) / 1,889 million yen (Phase II)
Exchange of Notes Date (/Grant Agreement Date)	December 2007 (detailed design) May 2008 (Phase I) / December 2011(Phase II) N/A (Phase I) / December 2011 (Phase II)
Implementing Agency	Ministry of Transport
Project Completion Date	November 2011 (Phase I) / June 2013 (Phase II)
Main Contractor	Phase I: Dai Nippon Construction / NIPPO CORPORATION (Joint venture) Phase II: Dai Nippon Construction
Main Consultants	Phase I: INGÉROSEC Corporation Phase II: Katahira & Engineers International
Basic Design	June 2007
Detailed Design	June 2008
Related Projects	【Grant Aid Project】 ● The Project for the Improvement of Dusti-Nizhniy Pyandzh Road (Phase I: 2006, Phase II: 2009) ● The Project for Improvement of Equipment for Road Maintenance in the Khatlon Region and Districts of Republican Subordination (2013) ● The Project for Improvement of Equipment for Road Maintenance in the Sughd Region and the Eastern Part of the Khatlon Region (2016) 【Technical Cooperation Project】 ● The Project for Improvement of Road Maintenance (2013-2016)

	【Other International Institutions, Aid Agencies, and others】 ● Asian Development Bank: Rehabilitation of Dushanbe - Kurgan Tyube - Dangara - Kulob Road (2001-2007) ● Asian Development Bank: Rehabilitation of Dushanbe - Kyrgyz border Road Phase I (2003-2009) ● Asian Development Bank: Rehabilitation of Dushanbe - Kyrgyz border Road Phase II (2005-2010) ● Asian Development Bank: Road Rehabilitation of CAREC Corridors 3 and 5 (2013-2017) ● Islamic Development Bank: Rehabilitation of Murgab - Kulma Road (2000-2002) ● Islamic Development Bank: Shagon - Zigar Road Construction Project Phase I (2003-2005) ● Islamic Development Bank: Shagon - Zigar Road Construction Project Phase II (2005-2007) ● Islamic Development Bank: Shagon - Zigar Road Construction Project Phase III (2011-2013) ● Iran: Anzob Tunnel Construction Project (2004-2008) ● The USA and Norway: Construction of Bridge in Nizhniy Pyandzh (2004-2007)

2. Outline of the Evaluation Study

2.1 External Evaluators

Yuko Kishino, IC Net Limited

Makiko Oleynikov, IC Net Limited

2.2 Duration of Evaluation Study

For this ex-post evaluation, the study was implemented as follows:

Duration of the Study: July 2015-September 2016

Duration of the Field Study: November 1-13, 2015 and February 7-12, 2016

3. Results of the Evaluation (Overall Rating: B[3])

3.1 Relevance (Rating: ③[4])

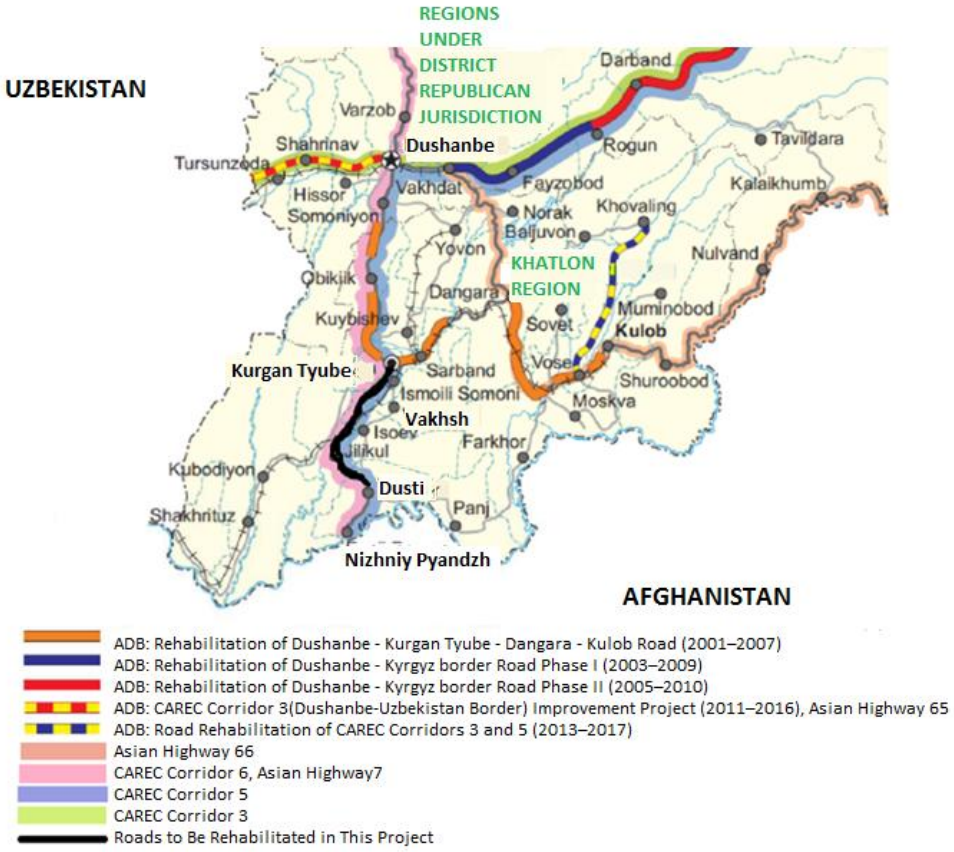
3.1.1 Relevance to the Development Plan of Tajikistan

Based on the long-term strategy, "National Development Strategy 2015," (2006)" targeting 2015, the Government of Tajikistan has drawn up a "Long-term Transportation Development Plan" every five years. To promote road investment for improving the transportation network as one of the main activities for facilitating economic growth, the plan was set to improve infrastructure systematically. The Ministry of Transport (hereafter referred to as the "MOT"), in charge of road improvement, has drawn up the "National Investment and Technology Program 2005-2007," aiming at improving the road and railway network for promoting economic growth.

[3] A: Highly satisfactory; B: Satisfactory; C: Partially satisfactory; D: Unsatisfactory

[4] ③: High; ②: Fair; ①: Low

Meanwhile, the improvement work of three highways of AH7, AH65, and AH66 in Tajikistan had been sequentially ongoing in Asian Highway Network[5] (hereafter referred to as "AH") promoted by UN initiatives. Especially, AH7 is an international road with a total length of 5,000 km including the targeted road of this project, which connects Yekaterinburg of Russia with Karachi of Pakistan. The ADB had been rehabilitating a part of the road between the capital city of Dushanbe and Kurgan Tyube since 2005, and the rehabilitation of the road between Kurgan Tyube and Dusti, positioned as an important route, was expected to enable the smooth flow of traffic.



Source: Material provided by ADB

Figure 2: Asian Highway Network

[5] This refers to the improvement project of the 140 thousand km of roads that run across 32 Asian countries. It aims to serve as the modern Silk Road by mainly using the existing road network.

The targeted road of the project at the time of the ex-post evaluation corresponds to the target section of the AH plan. Moreover, the project is also promoted as a part of the program of Central Asia Regional Economic Cooperation (hereafter referred to as "CAREC"), which is conducted in cooperation with the ADB, the European Bank for Reconstruction and Development, and the World Bank[6]. In addition, the "National Target Development Strategy for Transport Sector of the Republic of Tajikistan to the Year 2025 (2011)" emphasizes the need to improve transportation infrastructure that forms the foundation of economic growth, including the aging roads developed during the Soviet era and the roads devastated by civil war. The national midterm action strategy formulated in 2013, "Living Standard Improvement Strategy (2013-2015)," cites betterment of the economic environment by improving transportation infrastructure with road rehabilitation as an important issue in order to enhance connectivity between regions and to upgrade the living standard. As seen above, the importance of this project has consistently been high at the time of both planning and the ex-post evaluation. This project is relevant to the development plan and the sector plan of Tajikistan.

3.1.2 Relevance to the Development Needs of Tajikistan

At the time of planning, the road between Kurgan Tyube and Dusti targeted by this project was an important route as the south route section of a major arterial road network that radiates in four cardinal directions from the capital city of Dushanbe, as well as a road that connects the landlocked country of Tajikistan to the Arabian Sea.

At the time of the ex-post evaluation, the economy of Tajikistan showed noticeable slowdown due to the recession of the Russian Federation from 2014 and also to a weakened Tajik currency (somoni). Thus, trade with neighboring countries is becoming more important.

The targeted section of this project is a part of key arterial roads that lead to the neighboring country of Afghanistan and the surrounding countries as well as connecting the capital city with the Khatlon Region. The role as a road that addresses the growing traffic volume is becoming significant. Along with the economic growth of the Khatlon Region centering on agriculture, the domestic freight transportation volume of Tajikistan increased more than twofold from 30,466 tons at the time of planning to 73,201 tons (estimated value[7]) in 2015. In addition, the number of registered automobiles per thousand people is 47 (estimated value[8]), a 1.5-fold increase from 31 at the time of planning. As seen above, this project is considered significant in terms of regional development as well.

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[6] CAREC focuses on transportation, trade promotion, energy, and trade policy as priority areas and in the transportation area develops the policy to improve six wide-area arterial roads. The targeted road of the project fall under Corridor 5 and Corridor 6 of CAREC.

[7] The value during 2015 calculated by the evaluators based on data from Statistic Bureau of Tajikistan at the time of the ex-post evaluation.

[8] The value during 2015 calculated by the evaluators based on data from Statistic Bureau of Tajikistan at the time of the ex-post evaluation.

3.1.3 Relevance to Japan's ODA Policy

In the Country Assistance Program for the Republic of Tajikistan in April 2009, the Government of Japan aimed to implement assistance that would enable the promotion of regional cooperation in Central Asia by linking cities with road transportation infrastructure and promoting long-term improvement in distribution systems. Consequently, this project was highly relevant to Japan's ODA policy at the time of planning.

In the light of the above, this project has been highly relevant to Tajikistan's development plan and development needs both at the time of planning and ex-post evaluation, as well as Japan's ODA policy at the time of planning. Therefore, its relevance is high.

3.2 Efficiency (Rating: ①)

3.2.1 Project Outputs

The main outputs of this project were 59.9 km road improvement and rehabilitation of culverts[9]. Table 1 summarizes the planned and actual project outputs. The project was divided into Phase I and Phase II for implementation, which was not originally planned. At the stage of the detailed design of Phase I, the cost was found to exceed the E/N limit because of soaring prices. As a result, Phase II was separated. Despite some changes in the number of places for rehabilitation of crossing drainages in Phase II[10], the outputs were mostly completed as planned.

Table 1: Planned and Actual Project Outputs

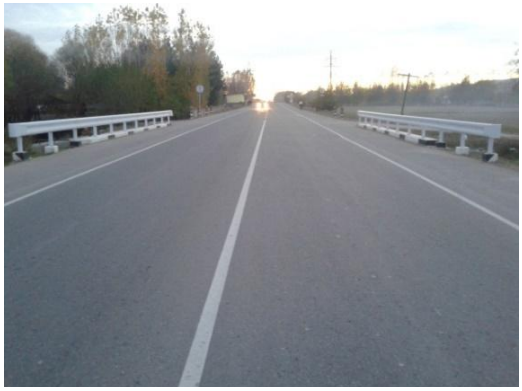
Improvement item		Initial plan 2008	Actual result (Phase I) 2011	Actual result (Phase II) 2013
Targeted section of this plan		59.9 km	42.0 km	17.9 km
Pavement structure	Surface work	Asphaltic concrete surface course, 5 cm (main track)	As planned	As planned
		Asphaltic concrete binder course, 5 cm (main track)	As planned	As planned
	Road bed work	Two-layered asphalt surface treatment: DBST (road shoulder)	As planned	As planned
		Upper layer roadbed 20 cm (crushed rock with particle size controlled)	As planned	As planned
		Lower layer roadbed 4 – 24 cm	As planned	As planned
Formation width		Width of main track: 7.0 m (two lines × 3.5 m)	As planned	As planned
		Width of road shoulder: standard 2.5 m	As planned	As planned
Rehabilitation of crossing drainage		40 places	38 places	
Rehabilitation of bridges		Rehabilitation of the existing 14 bridges (Span: 3.3 - 42.0 m)	Rehabilitation of the existing 9 bridges (Span: 3.3 - 42.0 m)	5 bridges (Span: 5.5 - 26.9 m)

[9] Culvert refers to a structure made of reinforced concrete for a ditch under a road, railway, or embankment.

[10] No information was available about the reason for the decrease in the number of places where crossing drainages were rehabilitated.

Source: Materials provided from JICA

The following are the changes in construction method from the detailed design in Phase I. The construction method for the section of 1.1 km in Kurgan Tyube City was changed from road base macadam to asphalt leveling[11], and pavement method on the surface of the road shoulder was changed from DBST[12] to asphalt. Change of the surface of the road shoulder aimed to enhance reliability, and was appropriate for this project that handled arterial roads.



Appearance of the upper part of culvert 5, at the point 45 km away from Kurgan Tyube (starting point) (at the time of the ex-post evaluation)

Appearance of culvert 5, at the point 45 km away from Kurgan Tyube (starting point) (at the time of the ex-post evaluation)

3.2.2 Project Inputs

3.2.2.1 Project Cost

As for the project cost, the initial plan has been compared with the total actual result in Phase I and II. Because no information on the amount of the actual cost borne by the Tajikistani side was available, only the cost borne by the Japanese side has been evaluated. The total cost at the time of planning was 3,549 million yen, with 3,495 million yen borne by Japan (including the cost of the detailed design) and 54 million yen borne by Tajikistan. As shown in Table 2, the actual cost borne by Japan was 5,288 million yen (the total of Phase I, Phase II, and the detailed design). In 2008, when the detailed design began, inflation of 20% per year occurred. When considering the consumer price index in 2005 as 1.0, the index significantly rose to 2.1 in 2013. Although the exchange rate between USD and yen leaned to a strong yen from the time of planning[13], the cost borne by Japan at the time of basic design was significantly higher than planned, with a 151% rise over the initial plan due to a sharp increase in prices.

[11] Regarding the construction method for parallelizing to the surface layer with changing pavement thickness at the bottom layer, leveling using asphalt was carried out instead of road base using macadam.
[12] DBST is an abbreviation of Double Bituminous Surface Treatment. It is a simpler pavement method than that using asphalt.
[13] The average exchange rate in 2011 for Phase I was USD 1.00= 76.6 yen, and that in 2013 for Phase II was USD 1.00 = 97.63 yen, which leaned to strong yen compared with USD 1.00= 121.14 yen at the time of planning (2007).

Table 2: Planned and Actual Project Cost (unit: million yen)

		Initial plan	Phase I	Phase II	Phase I and Phase II Total of actual results	Compared with plan
		At the time of planning 2007	Actual result 2011	Actual result 2013		
Cost borne by Japan	Detailed design	63	63		63	100%
	Main body	3,432	3,353	1,872	5,225	152%
	Subtotal	3,495	3,416	1,872	5,288	151%
Cost borne by Tajikistan		54	No data	No data	-	-
Total project cost		3,549	-	-	-	-

Source: Materials provided from JICA

3.2.2.2 Project Period

The planned project period was 57 months in total from December 21, 2007 (Exchange of notes date of the detailed design) to July 2011. In contrast, the actual result was 66.2 months (116% of the planned one), from December 21, 2007 to June 24, 2013 (completion date of Phase II construction), which was longer than planned.

Table 3: Planned and Actual Project Period

Phase	Plan	Actual result	Actual result (total)
Phase I	From Dec. 2007 to July 2011 (57 months)	Dec. 2007 – (re-tendering in April 2009) – Nov. 2011 (49 months, 31 months from re-tendering to completion)	Dec. 21, 2007 to June 24, 2013 (66.2 months)
Phase II		Dec. 2011 – June 2013 (18 months)	

Source: Materials provided from JICA

According to the implementing agency, repeated failure of tender in Phase I brought about the delay in the start of construction work because of revision of cost and delayed asphalt material procurement from a neighboring country; however, the construction period was within the scope of the plan. The construction period of Phase II was within the scope of the plan as well. Thus, despite the fact that the project period exceeded the plan, it is fair to say that the construction itself was implemented without any major problem.

Consequently, both the project cost and project period significantly exceeded the plan. Therefore, the efficiency of the project is low.

3.3 Effectiveness[14] (Rating: ③)

3.3.1 Quantitative Effects (Operation and Effect Indicators)

It was expected that stable transportation of people and goods would be secured through implementing this project.

In the Ex-Ante Project Evaluation Report of Phase II, improvement of the average traveling speed between Kurgan Tyube and Dusti was set up as an evaluation indicator. Since data of the

[14] Sub-rating for Effectiveness is to be put with consideration of Impact.

average traveling speed are not available from the implementing agency, the changes before and after this project were examined by conducting an on-site survey on average traveling speed including an urban area as well as that excluding an urban area. In addition, this evaluation examined the extent to which the transportation volume has changed, using the annual average daily traffic and freight transportation volume in major sections as indicators.

(1) Improvement of average speed

The implementation of this project was expected to improve the average traveling speed. The table below is a summary of baseline values and target values at the time of planning, and actual values at the time of the ex-post evaluation.

Table 4: Plans and Actual Results of the Effect Indicators

	Baseline value	Target value [Note]	Actual value
	2008	2016	2015
	At the time of planning	Three years after completion	Two years after completion
Improvement of the average traveling speed that makes it possible to travel safely from a starting point (Kurgan Tyube) to an end point (Dusti) (excluding an urban area)	30 km/h	73 km/h	80 km/h
Improvement of the average traveling speed from a starting point (Kurgan Tyube) to an end point (Dusti) (including an urban area)	20 km/h	40 km/h	60 km/h

Source: Ex-Ante Project Evaluation Report, the answers of questionnaires to the implementing agency, and results of field survey conducted by study team

Note: The year of completion was 2013. The target completion year was 2016 in the Ex-Ante Project Evaluation Report. Actual values were as of November 2015.

In a running inspection conducted by a local consultant, the average traveling speed in the target sections excluding an urban area was 80 km/h, and the average traveling speed in the target sections including an urban area was 60 km/h, both of which exceed each target value (73 km/h and 40 km/h). The results show that the average traveling speed was improving.

(2) Increase in the annual average daily traffic and transportation volume of passengers and freight

Table 5 shows the annual average daily traffic volume[15] in the major sections. The daily traffic volume between Dusti and Kolkhozabod increased by 22% from 6,920 vehicles of baseline value in 2007 to 8,420 vehicles in 2016. The traffic volume during the same period between Kolkhozabod and Kurgan Tyube has roughly tripled, and the traffic volume in the city of Kurgan Tyube has approximately quadrupled. The increase in traffic volume in Kurgan Tyube, the capital city of the region, may have been caused by the rapid economic growth of the Khatlon Region. The possible reasons that the increase in traffic volume in Dusti, an endpoint of

[15] However, the data from 2014 and 2015 are annual average daily traffic volumes, while the data from 2008 and 2016 are only from a day traffic.

the road, is lower than that of other areas are that it is easily influenced by public safety around the border, and, according to a road expert, the registered number of the ordinary passenger cars has not increased in this area.

Table 5: Annual Average Daily Traffic Volume (unit: vehicle/day)

	Baseline value	Actual value	Actual value	Actual value
	2007	2014	2015	2016[Note 2]
	At the time of planning	One year after completion [Note 1]	Two years after completion	Three years after completion
1. Dusti - Kolkhozabod	6,920	5,160	6,162	8,420
2. Kolkhozabod- Kurgan Tyube	5,740	8,409	12,740	16,575
3. Kurgan Tyube City	9,671	31,305	36,351	31,818

Source: Baseline values are from the Basic Design Report, and actual values are from the Kurgan Tyube State Enterprise for Transport Management.
Note 1: The completion year indicates 2013 when Phase II was completed. The Ex-Ante Project Evaluation Report set 2016 as the target year.
Note 2: The values were obtained by measuring the daily traffic volume all day (24 hours) in the middle of February 2016. Because it is daily traffic volume in winter, the values are considered to be lower than the annual average daily traffic volume.

Looking at the freight transportation volume in Table 6, an increase in the whole nation can be seen while rail transportation is partially shifting to road transportation. Road freight transportation approximately doubled from 33.19 million tons in 2008 to 68.14 million tons in 2014. By contrast, as seen in Table 7, the freight transportation volume in the Khatlon Region rose more than threefold from 5.8 million tons in 2008 to 18.9 million tons in 2014. It exceeded 18.4 million tons in 2011 when the first phase was completed. Although the traffic volume and the freight transportation volume are largely influenced by factors other than this project, roads improved by this project may have contributed to an increase in the freight volume through facilitating smooth transportation by truck.

Table 6: Freight Transportation Volume from 2007 to 2015 (by means) (unit: ten thousand tons)

FY	2007	2008	2009	2010	2011	2012	2013	2014	2015
Total	4,500	4,773	5,686	6,119	6,166	6,840	7,225	7,469	8,000
-Road	3,047	3,319	4,231	5,075	5,240	5,999	6,551	6,814	7,320
-Rail	1,453	1,454	1,455	1,045	926	841	674	654	680
-Air	0.2	0.3	0.2	0.2	0.3	0.3	0.2	0.2	0.2

Source: Documents from Statistics Bureau

Table 7: Freight Transportation Volume in the Khatlon Region (unit: ten thousand tons)

Baseline value	Actual value	Actual value	Actual value	Actual value	Increase rate[Note]
2008	2011	2012	2013	2014	
At the time of planning	Two years before completion	One year before completion	Completion year	One year after completion	
580	1,842	1,984	1,806	1,890	326%

Source: Ex-ante project evaluation table, Statistics Bureau of the Khatlon region
Note: Comparison between baseline value and actual value in 2014

3.4 Impacts

3.4.1 Intended Impacts

Intended impacts caused by this project have been classified into the following four categories: "vitalization of social and economic activities," "expansion of market zone as a result of correction of regional disparities," "improvement of accessibility to medical and educational facilities," and "reduction of transportation cost of agricultural products." To confirm these, analysis using statistical data, an attitude survey by the beneficiary survey[16], and a survey on transportation businesses[17] have been conducted. The results are described below.

(1) Vitalization of Social and Economic Activities

Table 8 shows changes of population, regional GDP, and annual income per capita from 2008 to 2014 in the Khatlon region. Maintaining more than 20% in the growth rate of annual income per capita, a solid economic growth rate has been maintained in the entire region as well. This shows that the economy in the Khatlon region except for the year 2013 has been rapidly vitalized compared with the 4-7% GDP growth rate of the entire country. Although causal relationship with this project is unclear, it is reasonable to consider that the enhanced efficiency in transportation of freight and passengers by road improvement facilitated economic growth as initially planned.

Table 8: Population and Economic Situation in the Khatlon Region

Year	Khatlon Region						Whole country
	Population		Regional GRP		Annual income per capita		GDP
	(Thousand people)	Growth rate	(Million somoni)	Growth rate	(Somoni)	Growth rate	Growth rate
2008	2,642	-	4,904	-	1,828	-	-
2009	2,700	2%	5,207	6%	2,233	22%	4%
2010	2,694	0%	6,495	25%	2,796	25%	7%
2011	2,766	3%	8,051	24%	3,600	29%	7%
2012	2,832	2%	9,800	22%	4,381	22%	7%
2013	2,899	2%	10,224	4%	6,047	38%	7%
2014	2,972	3%	11,693	14%	7,383	22%	7%

Source: Data on Khatlon Region- Statistics Bureau, National GDP data growth rate – World Bank

[16] As for the beneficiary survey, in cooperation with the government of the Khatlon Region, four places (Rumi District, Mehrobod village in Bokhtar District, Vakhsh District, and Kurgan Tyube City in Bokhtar District) were selected. With the support of the chief of each city or district, a study team visited the central part of the city and district on the day designated by the chief to conduct an interview with the adults who applied to the interview at the local government office. Vakhsh District was not included in the target area of this project; the evaluators intended to compare the changes in the target area and those in other areas. Because of the time constraints on conducting the beneficiary survey, valid responses numbered only 69 under the support from a district chief. The breakdown was 47 men (68%) and 22 women (32%). By area, distribution was 17 from Rumi District (25%), 17 from Mehrobod village in Bokhtar District (25%), 17 from Vakhsh District (25%), and 18 from Kurgan Tyube City in Bokhtar District (25%). Therefore, the survey samples have not been selected truly at random. The results may be reflected by the extreme intention of the residents who feel positive or negative impacts and who are willing to express their opinion. Thus, it is highly possible that both extremely positive and negative opinions noticeably appear.

[17] A questionnaire survey was conducted on five transportation companies (two in Kurgan Tyube City, two in Qumsangir District, and one in Vakhsh District) at three major city blocks along Kurgan Tyube - Dusti road in the Khatlon Region.

(2) Expansion of market zone as a result of correction of regional disparities

In the beneficiary survey, use (or non-use) of the targeted road in this project and transportation means both before the implementation of this project and at the time of the ex-post evaluation have been checked in 1) access to products and service, 2) going to a market including shopping, 3) commuting to workplace, 4) going to a local government office. The results reveal that 90% of the residents in Rumi District, Mehrobod village, and Kurgan Tyube City were using the road.

In the survey, 47 beneficiaries who are using the road in Kurgan Tyube City and two Districts excluding Vakhsh District were asked whether the access to the shop in which they purchase daily necessities had become convenient and whether price, range, volume, and purchasing cost of daily necessities in the store have changed. To the question above, they gave the following comments: the time required for purchasing daily necessities has been reduced, or the access to the shop has become easier compared to before the project was implemented (46 out of 47), daily necessities became less expensive (35 out of 47), and cost for purchasing goods has reduced (26 out of 47).

It is assumed that the project implementation led to promotion of distribution of goods by truck through smooth road transportation and reduction of transportation cost, thereby increasing the quantity of materials that have been delivered to the shops in the target area.

In other words, it indicates the possibility that this project has contributed to an increase in the range and quantity of daily commodities.

Table 9 shows the changes in the average time required for going to their workplace and market. All the road users responded that the average time required for going to their workplace and market has been reduced after the project was implemented; therefore, there is a possibility that this project has contributed to reduction of the average time required for going to their workplace and market. In contrast, many citizens do not use the targeted road of this project when they go to a local government office, both before the project was implemented and at the time of the ex-post evaluation even when they live near the targeted road of this project.

Table 9: Average Time Required for Going to Workplace and Market (unit: minute)

	Workplace		Market	
District/City	Before the project	After the project	Before the project	After the project
Rumi District	26	17	35	21
Mehrobod village in Bokhtar District	22	19	23	16
Kurgan Tyube City in Bokhtar District	25	22	16	12

Source: Beneficiary survey

(3) Improvement of accessibility (required time) to medical and educational facilities

As shown in Table 10, the beneficiary survey revealed that the time required for each action tended to be reduced in going to a medical facility. Forty respondents (10 in Rumi District, 13

respondents in Mehrobod village, and 17 in Kurgan Tyube City)[18] who answered that they use the roads for going to a medical facility, were asked to answer how much time (minutes) is required for going to the nearest medical facility in their district both before and after this project.

Table 10: Changes in Average Time Required for Going to a Medical Facility (unit: minute)

District/City	Before the project	After the project
Rumi District	24	17
Mehrobod village in Bokhtar District	27	21
Kurgan Tyube City in Bokhtar District	18	13

Source: Beneficiary survey

In Mehrobod village, the average required time has been reduced by 6 minutes from 27 minutes before this project to 21 minutes. In Rumi District, the average required time has been reduced by 7 minutes from 24 minutes before this project to 17 minutes. The citizens of Kurgan Tyube, who use this road for going to a medical facility, reduced the average required time by 5 minutes from 18 minutes to 13 minutes. Consequently, there is a possibility that this project has led to reduction of the required time by smooth road traffic.

Meanwhile, questions about the access to an educational facility were also asked. It was confirmed that many of the citizens did not use the roads both before the project and at the time of the ex-post evaluation even though they lived near the targeted road of this project.

Out of 69 families, 60 students (elementary, junior high, and high school students) go to school on foot without using the roads. However, all nine students who use the roads in relatively large cities including Mehrobod village and Kurgan Tyube City take a bus. The average time required for going to school with this road has been reduced from 18 minutes to 13 minutes.

As seen above, there is a possibility that road rehabilitation of this project improved trafficability, thereby contributing to reduction of required time for going to school or a medical facility.

(4) Reduction of transportation cost of agricultural products

According to the interviews with five transportation businesses of agricultural products (14 years in business on average), no change was seen in the travel distance between before and after this project. All five companies responded that the maintenance cost for their trucks

[18] The breakdown of the sexes in each district is as follow; Mehrobod village in Bokhtar District 13 people (five men, eight women), Rumi district 10 people (six men, four women), Kurgan Tyube City in Bokhtar District 17 people (ten men, seven women).

decreased by 500 somoni (approximately 9,000 yen[19]) per month on average compared to that before this project. There is a possibility that improvement of road pavement by this project lowered the cost of repairing vehicles, thereby reducing the maintenance cost.

3.4.2 Other Impacts

(1) Impacts on the Natural Environment

At the time of planning, this project was evaluated to have little negative impact on the natural environment because it was rehabilitation of the existing road. An Environmental Management Plan and Environmental Monitoring Plan were submitted by the implementing agency to the Environmental Management Agency, and a project implementation permit was issued on June 2008[20]. In the beneficiary survey, what the largest number of respondents pointed out as a negative impact was noise and vibration during operation of the project (17 out of 52). At the time of the ex-post evaluation, no negative impact was pointed out in the beneficiary survey.

(2) Land Acquisition and Resettlement

The targeted road of this project was on the existing road, and the width for the targeted road of this project had been secured. Thus, no land acquisition or resettlement took place, and there was no problem throughout the project.

(3) Others

At the time of planning, it was indicated that it would be necessary to control the negative impact on traffic safety because the targeted road of this project, which would ease the bottleneck, would cause cars to go faster and trucks to drive easily. It was advised that the Tajikistan government should note setting up traffic safety facilities as soon as possible and carrying out traffic safety education. Through the beneficiary survey and interviews with the traffic police during this field assessment, it was indicated that driving manner should be improved, as traffic safety education and awareness-raising activities were not carried out.

3.4.3 Positive/Negative Impacts on Women and Maternal and Child Health

(1) Impact on Women

As for impact of this project on women, the following items were examined with data obtained from the beneficiary survey: income improvement by gender; time required for going

[19] 1 somoni = approximately 16 yen (As of November 2015)

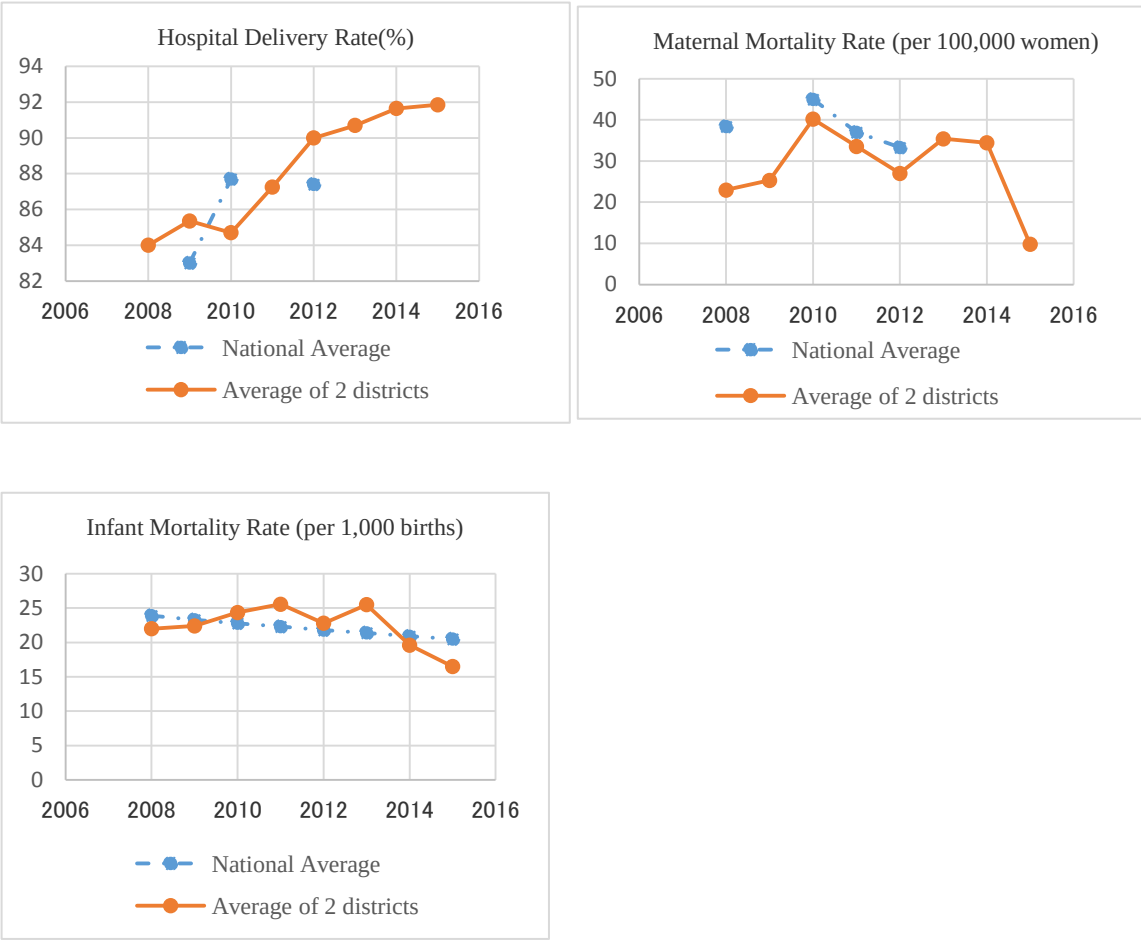
[20] Though there was no information provided by the implementing agency on the EIA report, the mitigation measures on the basis of the environmental management plan and environmental monitoring plan, nor on the status of implementing monitoring activities or status of measures against the environmental impact, according to the construction supervision consultants, there were no environmental problems due to the implementation of this project.

to various places; whether or not the access to a shop for purchasing daily necessities mentioned above becomes convenient; whether any difference can be seen in daily necessities in the store with regard to price, range, volume, and purchasing cost. However, no gender difference was found in data, and no impact on women could be confirmed in these points. However, as described below in (2) Impact on Maternal and Child health, thanks to the implementation of this project, it was confirmed that there was a high possibility that the travel time to the medical facility by pregnant women had been reduced. So with such specificity, it can be said that there was a positive impact on women.

(2) Impact on Maternal and Child Health

Regarding impact of this project on maternal and child health, the following analyses were employed: 1) comparative analysis of macroeconomic indicators, 2) beneficiary survey and Focus Group Discussion. In a macro-data survey, data from 2008 to 2015 on maternal and child health of national average and Rumi District, Qumsangir District, and Bokhtar District in the Khatlon Region were obtained[21].

[21] However, by omitting the data from Bokhtar District, a two-prefecture average was used. According to JICA, the Bokhtar District Central Hospital is used by one-third of the population, while the remaining two-thirds of the population give birth in a state hospital in Kurgan Tyube city using the targeted road of the project. The population that uses the District Central Hospital, do not live by the targeted road of this project. When residents travel there for giving birth, they not use the project road. For this reason, the data from Bokhtar District was not used.



Source: Material from the Khatlon Region Ministry of Health

Figure 3: Changes in Macro Indexes of Maternal and Child Health

As shown in Figure 3, although the hospital delivery rate in two Districts has tended to rise year by year, it fell a little after the implementation of the project, and then turned to a rise a year later.[22] The maternal mortality rate fell by 25 points from 35 per 100,000 live births in 2014 to 10 in 2015, two years after the implementation of the project, showing a substantial improvement. The average child mortality rate in the target area became lower than that of the national average a year after the implementation of the project (2014). Since then, it has shown a tendency to decline. It is assumed that improvement of access to medical facilities through using the targeted road of the project led to an increase in the number of women who hoped to give birth at a hospital instead of at home. In fact, the number of hospital deliveries increased. Thus, maternal and child mortality rates may have declined.

[22] It is difficult to compare the national average with the two districts because some national macro data are missing.

In the beneficiary survey regarding impacts on maternal and child health[23], interviews were conducted with women who had experience of pregnancy and childbirth in the past five years. Upon examining the time required for going to a medical facility for maternal medical checkups, it shortened by an average of 16 minutes in Rumi District, and by an average of 12 minutes in Kurgan Tyube City, as seen in Table 11. In contrast, it shortened by only two minutes in Vakhsh District where the targeted road of this project was not used. Consequently, the implementation of this project may have helped reduce the time required for going to a medical facility for maternal medical checkups.

Table 11: Changes in the Time Required for Going to a Medical Facility for Medical Checkup before and after Childbirth[24] (unit: minutes)

	Medical facility	
District/City	Before the project	After the project
Rumi District	33	26
Kurgan Tyube City	31	19
Vakhsh District	16	14

Source: Beneficiary survey on maternal and child health
Note: Vakhsh District is not included in the target area of this project.

According to the Focus Group Discussion among obstetrician-gynecologists and nurses at the medical facilities in Rumi District and Kurgan Tyube City,[25] before the project, the average time required for moving between a local hospital in Rumi District and the central hospital in Kurgan Tyube City was 40 to 45 minutes. After the project, it was shortened by 30 minutes to 10 to 15 minutes. In addition, when a woman with a complication gives birth, time required for moving to the central hospital has been shortened. Therefore, improvement of access to health service by implementation of this project enabled early treatment of delivery with a complication. Therefore, the project might have partially contributed to improving health

[23] In this survey, interviews were conducted with mothers and children who lived in Kurgan Tyube City in Bokhtar District, Mehrobod village in Bokhtar District, and Rumi District, which were in the target area, as well as Vakhsh District, which was not in the target area, in the Khatlon Region. As with the beneficiary survey, it was conducted in cooperation with the regional government. The interviews were conducted under the assistance of the deputy director of the Bureau, asking the government to invite women who had experience of childbirth in the past five years. Out of 51 total interviewees, 13 women live in Kurgan Tyube City in Bokhtar District, 13 women live in Mehrobod village in Bokhtar District, 13 women live in Vakhsh District, and 12 women live in Rumi District. The interviews were conducted with the women who came to each governmental office on the issues related to obstetrics and gynecology as well as infants. The questions of the interview include access to a medical facility, transportation means to the facility, medical checkup before and after childbirth, hospital delivery, and costs of pregnancy and delivery. There is a possibility that interpretation of evaluation based on the survey result would be overrated, because the surveyed women were cooperative.

[24] This analysis is exclusive of the data from Mehrobod village in Bokhtar District. According to JICA, pregnant women who go to a medical facility for medical checkup before and after childbirth at Bokhtar District Central Hospital do not reside along the project road. For a medical checkup, the women usually go to a regional hospital or a health center close to their home, and the women who live in Bokhtar District rarely use the project road to go to those medical facilities.

[25] Under the aid from the Director of Medical Service Bureau of Ministry of Health located in Kurgan Tyube City, a Focus Group Discussion with medical service workers of the central hospital was conducted at Rumi District and Bokhtar District twice. In the 1.5-hour discussion, comments about changes in care and emergency medical service related to before childbirth and delivery, as well as changes in conditions of expectant and nursing mothers comparing before and after road improvement, were received from six doctors, three nurses, and one midwife.

condition of mothers and infants.

As seen above, this project greatly improved the average traveling speed between Kurgan Tyube and Dusti, and shortened the required time to a market or a medical facility. An increase in the transportation volume of people and goods has been confirmed through changes in the freight transportation volume and the annual average daily traffic. The result of the beneficiary survey described above shows the possibility that this project has a positive impact on vitalization of social and economic activities and reduction of transportation cost, as well as partial contribution to improvement of maternal and child health indexes. However, the survey results may be biased due to the sampling of the beneficiary survey, and factors other than road rehabilitation, for example, the economic growth rate of the whole nation and access from a house to the targeted road of this project, are associated with these impacts. Therefore, it cannot be asserted that the project has had an impact with only the survey results.

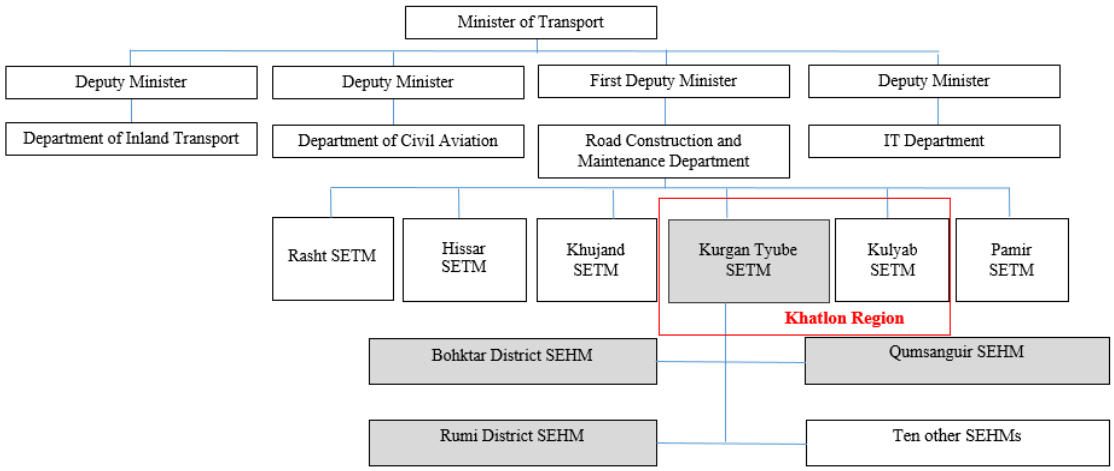
Consequently, this project has largely achieved its objectives. Therefore, the effectiveness and impact of the project are high.

3.5 Sustainability (Rating: ③)

3.5.1 Institutional Aspects of Operation and Maintenance

The MOT, the implementing agency of this project, has set up the Road Construction and Maintenance Department under the direct control of the First Deputy Minister as an institution that governs the matters regarding road construction.

Six SETM are set up under the Road Construction and Maintenance Department to carry out maintenance of roads and bridges. The MOT commissions technical work of roads including research, planning, and design to the Road Design and Research Institute that was privatized in 2006.



Source: prepared from the documents provided by the implementing agency

Figure 4: Relationship Diagram of the Organizations Related to the Project in the Ministry of Transport (MOT)

The Kurgan Tyube SETM, one of the six SETMs, operates SEHMs located in 13 Districts of west Khatlon Region. The target section of this project (Kurgan Tyube-Dusti) extends over the three Districts of Bokhtar District, Rumi District, and Qumsangir District in the Khatlon Region, and SEHMs of these three Districts carry out maintenance of 15 km, 30 km, and 15 km respectively. The SEHM of each District consists of the Construction and Maintenance Division, Personnel Division, Administration Division, Machinery Division, Equipment Division, and Material Management Division, with 5-6 managers, 8-16 engineers, 6-11 operators, and 16-21 workers. The total number of personnel in SEHM hovers around 42-46, keeping about the same number of personnel at the time of planning. According to the MOT, road maintenance is implemented smoothly. As seen above, no problem is seen in the institutional aspect.

3.5.2 Technical Aspects of Operation and Maintenance

Each SEHM frequently conducts road inspection, and grasps the damaged condition of road surfaces. It can be also inferred from on-the-spot survey that inspection and cleaning are mostly carried out without any problems. “The Project for Improvement of Road Maintenance,” a JICA technical cooperation project that was ongoing at the time of the ex-post evaluation, is carrying out inspection of pavement and improvement of capability to repair pavement for the Kurgan Tyube SETM, along with the Hissar SETMs, and during fiscal year 2016, also added the Khujand and Kulyab SETMs as the new target areas. Support provided includes establishment of a maintenance cycle, and support for preparing a guideline for repairing pavement/pavement inspection. “The Project for Improvement of Equipment for Road Maintenance in Khatlon Region and Districts of Republican Subordination,” a JICA grant aid project, provided 118 items of equipment for road repairs, including an asphalt plant, and the equipment was operated

by the engineers who received technology transfer at the project for improvement of road maintenance. As seen above, no major problem is found in the technical aspect.

3.5.3 Financial Aspects of Operation and Maintenance

Changes and details in the finance of SEHM and the MOT that supervises operation and maintenance of this project have been analyzed. Budget for maintenance of national roads is allocated from the National Treasury Bureau of Ministry of Finance upon application from the MOT. This budget for road maintenance is reallocated to the SETMs and SEHMs every year. As shown in Table 12, in recent years, the budget of the whole MOT stays around 4% of the national budget. The budget for road maintenance has been at the level of about 9% of the whole MOT budget from 2008 to 2016 on average. By contrast, the growth rate of the budget has been slowing down from 2013 to 2015/2016. According to the person in charge of finance, this was to adjust against business slowdown, and the necessary budget for maintenance cost of this project is secured. In the future, no drastic change in annual budget, income, and expenditure is expected.

Table 12: Budget and Executed Amount of the MOT (unit: ten thousand somoni [Note 1])

Items / Year	2008	2009	2010	2011	2012	2013	2014	2015	2016 (amount applied)
Annual National Budget	447,600	557,900	653,600	829,200	1,016,000	1,205,800	1,390,100	1,527,800	1,833,000
Budget and executed amount of MOT	27,400	36,400	36,200	42,400	50,400	54,400	61,400	63,700	64,500
Proportion of MOT budget that accounts for national budget (%)	6%	7%	6%	5%	5%	5%	4%	4%	4%
Road maintenance budget of MOT and executed amount[Note 2]	2,500	3,000	3,400	3,800	5,000	5,600	5,700	6,000	6,000
Proportion of maintenance budget that accounts for MOT budget (%)	9%	8%	9%	9%	10%	10%	9%	9%	9%
Growth rate of MOT maintenance budget (%)		20%	13%	12%	32%	12%	2%	5%	0%

Source: MOT
Note 1: 1 somoni = approximately 14 yen (as of February 2016)
Note 2: According to the MOT, the budget amount and executed amount are the same.

At the time of planning, the annual maintenance cost of the targeted road of the project was estimated to be approximately 0.24 million somoni. This was equivalent to 1.1% of the annual

road maintenance budget of the MOT, which was about 20.9 million somoni, in 2006, and it was considered that the MOT would be able to fully bear the cost.

Along with an increase in the overall maintenance budget of the MOT, the maintenance budgets of the SEHMs of Bokhtar District, Rumi District, and Qumsangir District are consistently increasing. As shown in Table 13, the 2015 total budget for road maintenance of the three Districts was 0.84 million somoni, and accounted for 1.4% of the annual budget (60 million somoni) for road maintenance of the MOT in 2015.

The budget is somewhat rising compared to the expectation at the time of planning, which is within the scale that can be borne for maintenance work. In addition, according to the implementing agency, the targeted road of this project has high priority in maintenance because it is regarded as a key arterial road. On the whole, although the growth rate of the budget for road maintenance of the MOT is declining, the budget and executed amount of SEHM that manages the targeted road of this project have been maintained at a high level at the moment. Therefore, there is no problem in the financial aspects.

Table 13 Maintenance Budget and Executed Amount in SEHM of Each District [Note]

(unit: ten thousand somoni)

Detail / FY	2012	2013	2014	2015	2016
Bokhtar District total	40	57	61	65	66
- Road maintenance (A)	22	33	35	32	36
Rumi District total	39	48	50	53	57
- Road maintenance (B)	21	23	23	23	26
Qumsangir District total	47	53	58	61	66
- Road maintenance (C)	26	26	29	29	32
Total road maintenance (A+B+C)	69	82	87	84	94

Source: Prepared by evaluators based on documents provided from the Ministry of Transport
Note: According to the MOT, budget amount and executed amount are equal.

3.5.4 Current Status of Operation and Maintenance

The Defects Inspection Report in 2013 pointed out that judging from weeds in side ditches and slopes as well as cleanliness of the road, the road condition was not considered satisfactory and needed improvement.

At the time of the ex-post evaluation, cleaning staff members cleaned this national road every day. The necessary maintenance work including weeding of side ditches, preventing plant from overgrowth, sediment removal, and water leakage control were being carried out. In contrast, some cracks in the road as well as at the joint part between culvert and road, which were generated through normal use, were found here and there. These cracks had already been confirmed at the inspection held every spring and fall, and repair works for them will be successively implemented within a year. Based on these above, no issue can be found in operation and maintenance.

Repairing the cracks of the road surface by sealing
(At the time of the ex-post evaluation)

Road condition after repair
(At the time of the ex-post evaluation)

Consequently, no major problems have been observed in the institutional, technical and financial aspects of the operation and maintenance system. Consequently, the sustainability of the project effects is high.

4. Conclusion, Lessons Learned, and Recommendations

4.1 Conclusion

This project was implemented in order to secure stable transportation of people and goods and contribute to local development, correction of regional disparities, and market zone expansion by rehabilitating the road between Kurgan Tyube and Dusti in the Khatlon Region in south Tajikistan.

Both at the time of planning and at the time of ex-post evaluation, this project has high relevance because it meets the development plan and development needs of Tajikistan, and is in accord with Japan's ODA policy at the time of planning. The targeted road of the project has been fully used with a large increase in the freight volume. After the completion of the project in 2014, the economic growth rate of the Khatlon Region is higher than that of the entire country. The project may have partially contributed to vitalizing social and economic activities. For example, in the beneficiary survey, many of road users replied that access to public facilities has been improved. Thus, the project achieved high effectiveness and impact. However, influenced by soaring prices, this project cost was found to exceed the limit of grant aid project at the time of the detailed design. Therefore, the original plan was divided into two phases for implementation. Consequently, although the project outputs were accomplished mostly as planned, both the project cost and the project period greatly exceeded the plan. Therefore, the efficiency of the project is low. The SEHM of three Districts are in charge of operation and maintenance of the project, and conduct regular inspection under the jurisdiction of the Kurgan

Tyube SETM. Holding necessary personnel, the SEHMs have no problem with maintenance system. They secure the cost for maintenance, and the budget is expected to increase in the future as well. No problems have been observed in the institutional, technical, and financial aspects of the maintenance system. Consequently, the sustainability of project effects is high.

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

4.2 Recommendations

4.2.1 Recommendations to the Implementing Agency

None

4.2.2 Recommendations to JICA

None

4.3 Lessons Learned

(1) Necessity of close examination of the priority of the targeted road in a project and support for medium-term capacity improvement related to maintenance

In this project, SEHMs of the Districts handle maintenance in a steady manner because they fulfilled various conditions including appropriate staff size, assigning the right person in the right place, stable organization, and sufficient maintenance budget. Furthermore, presumably, it is mainly because the improvement of medium term maintenance capacity by a technical cooperation project led to strengthening the management capacity of SEHMs of the Districts. In addition, it is fair to say that the following factors brought about high evaluation rate on sustainability:

- This project had politically high priority because it was a part of an international corridor, thereby given high priority in rehabilitation by the MOT and major donors, and
- The importance of securing the maintenance budget had been indicated from the time of planning.

As mentioned above, when implementing a project of road improvement and rehabilitation, JICA needs to examine carefully the significance level of the targeted road of the project as well as the budget allocation for maintenance cost from the planning stage, and to consider the necessity of support for medium-term capacity improvement, including technical support to maintenance organizations.

(2) Enhancement of the project cost estimation and equipment procurement methods for minimizing the impact on the project cost variation due to external factors

The project cost during the detailed design stage was influenced by inflation, whereby the prices soared beyond the limits set by the exchange of notes. As a result, the project was divided

into two phases. Nevertheless, there was failure in bidding due to the cost divergence between the estimated cost and inflated costs. There were also construction delays due to the delay in material procurement from neighboring countries such as Uzbekistan. All of this resulted in a lower efficiency rating of the project.

In a country such as Tajikistan where there is a concern about social and economic factors, it is important for JICA to carry out a feasibility study and detailed design study with risks in mind such as inflation of materials and equipment prices and the repeated unsuccessful bidding due to unavoidable factors unforeseeable in the planning stage. For example, JICA should consider various risks in the project's target countries by incorporating the knowledge of experts, and carry out an analysis of the probability of inflation in the materials and equipment prices, such as the analysis of the factors that cause the fluctuation of the project cost during the detailed design stage, and carefully verify the validity of the project cost estimation. In addition, it is also important to secure multiple routes to procure materials and equipment first based on past experience, and then to promptly respond to issues that arise and expedite paperwork in order to minimize the influence of the fluctuation of project costs during the project implementation.

End