Kyrgyz Republic

FY2018 Ex-Post Evaluation of Japanese Grant Aid Project
"Reconstruction of Kok-Art River Bridge on Bishkek-Osh Road"
External Evaluator: Mimi Sheikh, International Development Center of Japan, Inc.

0. Summary

The objective of the project is to reconstruct the severely damaged Kok-Art River Bridge on Bishkek-Osh Road to ensure safe and smooth traffic flow on the bridge and the road, therefore, it contributes to strengthening the role of the Bishkek-Osh road as an important national highway. This project has been highly relevant to the development plan and needs of Kyrgyz Republic (hereinafter referred to as "Kyrgyzstan"), as well as being in keeping with Japan's ODA policy. In terms of efficiency, although the project cost was within the plan and all planned outputs were carried out, the timeframe exceeded that included in the plan. The efficiency of the project is therefore fair. The effectiveness and impact of the project are high. The project achieved the operational indicators selected at the time of the ex-ante evaluation; the traffic volume added as a supplementary indicator increased compared to the time of the ex-ante evaluation. Also, the interview with the bridge users confirmed that the bridge reconstruction project stabilized the transport of people and goods. From these results, it is believed that the project contributed to the smooth traffic on the Kok-Art River Bridge and the Bishkek-Osh Road to some extent. This project contributed to strengthening the role of the Bishkek-Osh Road as an important international corridor as well: the number of commercial vehicles on the Kok-Art River Bridge has increased, as well as the number of passengers and the volume of cargo in Jalal-Abad. In terms of the institutional, technical, and financial aspects and the current status of the operation and maintenance systems, no major issues have been observed. It was noted that the road maintenance skills of the Local Level Roads Management Unit was enhanced as compared to those measured at the time of an ex-ante evaluation by a cooperation with the "Project for Improvement of the Equipment for Road Maintenance in Osh, Jalal-Abad, and Talas Oblasts (2014)".

From the above, it can be said that the evaluation of this project is very high.

1. Project Description

Project location

Kok-Art River Bridge and the access road

1.1 Background

Kyrgyzstan is an inland country surrounded by Kazakhstan, Uzbekistan, Tajikistan, and China. It stretches east to west, and, in terms of topography, the Tian Shan Mountains extend along the border with China, and the Pamirs highland extend toward Tajikistan located in the south. Approximately 40% of the total land area is covered by mountainous regions with an altitude exceeding 3,000 m. The country's transport depends on about 34,000 km of road networks for about 95% of the movement of people and goods; therefore, the road infrastructure is an important aspect of the life of the people in Kyrgyzstan.

On the other hand, most of the road networks in Kyrgyzstan, including bridges and tunnels, were constructed during the former Soviet era. After independence, the roads and bridges were not sufficiently renovated due to the economic difficulties, and the quality of the roads has declined over the years. The deterioration of road conditions has hindered transportation and trade with neighboring countries, which negatively impacts essential parts of the lives of the Kyrgyz people, and consequently had become an obstacle for the economic growth of the country.

The Kok-Art River Bridge, the target of this evaluation study, is located in Jalal-Abad Oblast, on the southern part of the Bishkek-Osh Road, which is an important highway connecting the capital city Bishkek and the second largest city Osh with a total length of 672 km. The bridge was constructed more than 40 years ago and deteriorated extensively. Additionally, the bridge pier was damaged by the mudflow that occurred in 1998 and was in a dangerous condition. If the bridge were to collapse, the only highway connecting the southern and northern parts of Kyrgyzstan would have be severed. Consequently, the Government of Kyrgyzstan requested Grant Aid Project for the reconstruction of the Kok-Art River Bridge from the Government of Japan.

1.2 Project Outline

The objective of the project is to reconstruct the severely damaged Kok-Art River Bridge on the Bishkek-Osh Road to ensure safe and smooth traffic on the bridge and the road, and thereby it contributes to strengthening the role of the Bishkek-Osh road as an important national highway.

<Grant Aid Project>

Grant Limit / Actual Grant Amount		(Detailed Design) 52 million yen / 51 million yen (Construction) 1,196 million yen / 1,120 million yen
Exchange of Notes Date /Grant Agreement Date		(Detailed Design) February 2013 / March 2013 (Construction) July 2013 / July 2013
Executing Agency		Ministry of Transport and Communications: MOTC[1]
Project Completion		October 2015
Target Area		Suzak village in Jalal-Abad Oblast
Contracted Agencies	Construction	Iwata Chisaki Construction Corporation
	Consultant	Central Consultant Inc.
Preparatory Survey		February 2012 – December 2012
Related Projects		*ODA Loan* ・Bishkek-Osh Road Rehabilitation Projects (I) (II) (1997 and 1998) *Technical cooperation* ・The Project for the Capacity Building of Road Maintenance (2008 - 2011) ・The Project for Capacity Development for Maintenance Management of Bridges and Tunnels (2013 - 2016) *Grant Aid* ・ The Project for Reconstruction of

[1] The name of the executing agency was the Ministry of Transport and Communications (MOTC) at the time of planning. However, the transportation department became independent, and as a result, it became the Ministry of Transportation and Roads (MOTR). The executing agency is described as MOTR from the beginning in section 2. Outline of the Evaluation Study and in the sections that follow.

	Bridges in Chui Oblast (2009) ・The Project for Improvement of the Equipment for Road Maintenance in Osh, Jalal-Abad, and Talas Oblasts (2014) ・Avalanche Protection on Bishkek-Osh Road (2017) *Other Donors* ・Asia Development Bank (ADB); Central Asia Regional Economic Cooperation Corridor 3 (Bishkek-Osh Road) Improvement Project (2014 – 2020) ・World Bank; Bishkek and Osh Urban Infrastructure (2008 – 2015)

2. Outline of the Evaluation Study

2.1 External Evaluator

Mimi Sheikh, International Development Center of Japan, Inc.

2.2 Duration of Evaluation Study

The ex-post evaluation study was conducted according to the following schedule:

Duration of the Study: August 2018–November 2019

Duration of the Field Study: November 11, 2018–December 9, 2018

3. Results of the Evaluation (Overall Rating: A[2])

3.1 Relevance (Rating: ③[3])

3.1.1 Consistency with the Development Plan of Kyrgyzstan

At the time of the planning, the Government of the Kyrgyzstan included the transport and road sectors as priority areas in the *Medium-Term Development Plan (2012–2014)* and prioritized the improvement of the international highway network necessary to ensure access to local markets. In the *Road Sector Development Project (2007–2010)*, the Kok-Art River Bridge was recognized as the most important facility for the development of Bishkek-Osh road, which is Kyrgyzstan's international highway.

At the time of the ex-post evaluation, the *Sustainable National Development Strategy*

[2] A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory

[3] ③: High, ②: Fair, ①: Low

(2013–2017) emphasizes transport and communications as priority areas for economic development. In particular, from the standpoint that roads are Kyrgyzstan's main means of transportation, it is important to facilitate passenger and cargo transportation that meets the needs of the people, while upgrading, repairing and developing the vehicular transportation network as well. As a country participating in the Central Asian Regional Economic Cooperation (CAREC), led by the Asian Development Bank (ADB), Kyrgyzstan has also prioritized upgrading the international highway network in order to intensify the intra-regional transportation of passengers and cargo. The *Development program for 2018–2022: Unification, Trust, and Creation*, also states that the development of domestic road networks and international highway networks is vital for enhancing Kyrgyzstan's transport capacities and confirms the importance of road network development in the transport sector.

The *Road Sector Development Policy for 2016–2025* also clearly states that the repair and appropriate management of international highways and major national roads, as well as the introduction of their quality control system, are necessary. Additionally, interviews with the MOTR confirmed that the Kok-Art River Bridge is located along the Bishkek-Osh Road, an internationally important road connecting the northern and southern Kyrgyzstan and is a vital facility for passengers and cargo using the road.

From the above, the priority for road network development remains high in the transport policy of the Kyrgyzstan Government from the time of the ex-ante evaluation to the time of the ex-post evaluation. Therefore, this project, which supported the reconstruction of the Kok-Art River Bridge, is highly consistent with the development policy.

3.1.2 Consistency with Development Needs of Kyrgyzstan

The Kok-Art River Bridge is located in Jalal-Abad, on an important highway connecting Bishkek, the capital city of Kyrgyzstan, and Osh, the nation's second largest city. Jalal-Abad is bordered by Uzbekistan and is on the road leading to the south toward Tajikistan, where traffic is very high. If the bridge collapses, the only highway connecting the northern and southern parts of Kyrgyzstan will be severed, which may hinder domestic and international logistics and, consequently, the socioeconomic development of Kyrgyzstan. At the time the project began, the bridge had been corroded since it had been more than 40 years since its construction. Furthermore, the bridge pier was severely damaged by the mudflow that occurred in 1998, and the load bearing capacity was insufficient. Additionally, designing and constructing a pressed concrete bridge 89 meters long was difficult for the level of Kyrgyzstan skill at that time; therefore, it was necessary to use Japanese technology.

The traffic volume of the Bishkek-Osh road was very large even at the time of the ex-post

evaluation, and it was confirmed that the Kok-Art River Bridge played an important role in the smooth domestic and international transportation logistics of Kyrgyzstan. According to an interview with a truck driver, the bridge before reconstruction was not in good condition, so he or she had to drive carefully at low speed. Additionally, because there was a concern that the bridge might collapse when it rains heavily, the Suzak Bridge, located 1.5 km downstream of the Kok-Art River Bridge, was sometimes used. After the reconstruction, these safety concerns disappeared. Therefore, the reconstruction of the Kok-Art River Bridge is highly consistent with development needs both at the time of planning and at the ex-post evaluation.

3.1.3 Consistency with Japan's ODA Policy

The *Country Assistance Policy of Japan for Kyrgyzstan (February 2012)* prepared by the Japanese Ministry of Foreign Affairs states that "maintenance of transportation infrastructure and rectification of regional gaps" is one of the priority areas, with an emphasis on improving traffic on national and international roads. And it further states that "Japan will provide assistance centering on strengthening road maintenance and improving the traffic on national roads in transportation infrastructure, which is expected to stimulate logistics and have ripple effects on other industrial sectors." Therefore, this project is consistent with Japan's assistance policy.

This project has been highly relevant to the development plan and development needs of Kyrgyzstan, as well as fitting within Japan's ODA policy. Therefore, its relevance is high.

3.2 Efficiency (Rating: ②)

3.2.1 Project Outputs

The planned outputs from the Japanese and Kyrgyz sides were carried out as planned. Table 1 shows the planned and actual outputs. The existing bridge was widened from the original 0.75 m to 1.5 m and "a mount-up type" sidewalk was created to increase the safety of pedestrians by making the walkway higher than the road.

Table 1. Output of the Project (Plan/Actual)

	Plan (before the Project)	Actual (at the time of ex-post evaluation)
Japanese side		
1	Removing existing bridges (bridge length: 84.5 m, width: 10.1 m, RC-simple bridge girders)	As planned
2	Construction of a new bridge (bridge	As planned

	length 89.0 m, width 12.8 m, RCT girder bridge (3 spans), Construction of bridge access road (351 m))	
Kyrgyzstan side		
1	Removal of refueling stations, etc.	As planned
2	Land lease arrangements	As planned
3	Relocation of utility poles, etc.	As planned
4	Payment of bank transaction fees	As planned

Source: Information and answers to questionnaires provided by JICA

A bridge user on the newly enlarged sidewalk

A memorial at the Kok-Art River Bridge

3.2.2 Project Inputs

3.2.2.1 Project cost

The projected cost was 1,248 million yen (52 million yen for the detailed design study and 1,196 million yen for construction), and 1,171 million yen (51 million yen for detailed design and 1,120 million yen for the construction) was actually spent, which was within the planned amount (amounting to 93% of the planned budget)[4]. The reason why the cost of construction was kept lower than planned was that the contingency funds for the project were not fully used. The planned cost of the construction was 1,196 million yen, which included 78 million yen as contingency funds, while the actual contingency funds spent for this project was 2.5 million yen in total.

3.2.2.2 Project Period

The planned project period was 28 months, from March 2013 (date of commencement of detailed design) to June 2015 (date of project completion)[5]; however, the actual project

[4] In the field survey, it was confirmed that the portions of the Kyrgyz side, expected in the preparatory survey of the project, were all implemented. However, since the detailed expenditures for each item were not found, the difference between the planned and the actual cost were calculated using only the cost projected by the Japanese side.
[5] The number of months is calculated based on the JICA's ex-post evaluation reference.

period was 32 months, slightly exceeding the planned period (114% of the plan). One of the reasons for the delay was that a crawler-crane imported for the temporary pier construction in Phase 1 (of three phases) was stopped at a Vladivostok railway station for four weeks because the operation license of a truck for carrying the crane was expired. Another reason for the delay is due to a low temperature: the road work was stopped for twelve days. As for the former reason, the validity of the extension cannot be evaluated because the persons concerned at that time were not available for an interview. As for the latter reason, the extension was judged relevant because an unpredictable situation caused the delay.

From the above, although the project cost was within the plan, the project period exceeded the plan. Thus, the efficiency of the project is fair.

3.3 Effectiveness and Impact[6] (Rating: ③)

3.3.1 Effectiveness

3.3.1.1 Quantitative Effects (Operation and Effect Indicators)

The "traversable vehicle weight (tons)" was established as an operational indicator for measuring the quantitative effect of this project; however, it was judged that this indicator alone was insufficient to conduct the ex-post evaluation. Thus, using the data of the traffic volume survey carried out in the preparatory survey of the project, "vehicle traffic volume" and "pedestrian/bicycle traffic volume" were added as supplementary indicators to compare and analyze the difference between the ex-ante evaluation and ex-post evaluation. The actual values of each indicator are shown below.

(1) Traversable Vehicle Weight

As shown in Table 2, the actual traversable vehicle weight (in tons) of vehicles was 43 tons, compared to the target value of 43 tons; therefore, the project achieved the target value.

Table 2. Traversable Vehicle Weight (ton)

	Baseline	Target	Actual			
	2012	2018	2015	2016	2017	2018
		3 Years After Completion	Completion Year	1 Year After Completion	2 Years After Completion	3 Years After Completion
Traversable Vehicle Weight	30	43	43	43	43	43

Source: DEU-22

[6] Sub-rating for Effectiveness is to be put with consideration of Impacts.

(2) Traffic Volume on the Kok-Art River Bridge (supplementary indicator)

Traffic surveys on the Kok-Art River Bridge have not been conducted since the preparatory survey conducted in 2012. In 2018, a road development company in Azerbaijan conducted a vehicle traffic survey on the Kok-Art River Bridge, and the results (presented as a quarterly average) were used for this evaluation. Since pedestrians and bicycle traffic were not measured in the 2018 survey, a study was conducted with the help of the Local Level Roads Management Unit #22 (DEU-22). The survey was conducted only on weekdays (24 hours) due to staff shortages in the winter season: it was difficult to find staff who could assist with the survey on weekends.

As shown in Table 3, vehicle traffic volume per day increased drastically from 7,903 vehicles in 2012 to 14,190 vehicles at the time of ex-post evaluation. On the other hand, the daily traffic volume of pedestrians and bicycles has decreased from 95 total users in 2012 to 18 total users (including just three bicycles) in 2018. The reason for the decline in the number of pedestrians and bicycle users may be attributed to the low temperatures in November at the time of the ex-post evaluation, compared to April at the time of the ex-ante evaluation. According to an interview with the manager of the gas station near the Kok-Art River Bridge, there are fewer pedestrians in winter because there are no private houses or commercial buildings near the Kok-Art River Bridge. And because there are children and families who came to play in the river in the summertime, the number of users of the bridge increases. In summary, the number of pedestrians and bicycle users of the Kok-Art River Bridge was limited; however, the volume of vehicle traffic increased after (and presumably as a result of) the project.

Table 3. Traffic Survey on the Kok-Art River Bridge

	Baseline	Actual
	2012	2018
Number of vehicles/days	7,903	14,190
Number of pedestrian/bicycles riders/day	95	18
Survey date (Weekday)	24 April	Vehicles: quarterly average in 2018 Pedestrian: 28 November
Duration	24 hours	24 hours
Place	The Kok-Art River Bridge	The Kok-Art River Bridge

Source: DEU-22

3.3.1.2 Qualitative Effects (Other effects)

Interviews with the DEU-22 confirmed that the Kok-Art River Bridge has never been closed since the project was completed. Also, in the interviews with the users of the bridge, the long-distance truck drivers commented that before the project when the water volume of river increased due to rain, they often used the Suzak Bridge located 1.5 km downstream of the bridge instead of the Kok-Art River Bridge. After the bridge was reconstructed, they began using the Kok-Art River Bridge without any concerns. The bridge users knew that the Japanese Government reconstructed the bridge; however, no one knew that the project enhanced the flood resistance measures for the new bridge—many of them are confident that safety is guaranteed if Japan built the bridge. From these opinions, it can be concluded that the improvement of bridge enabled stable traffic flow between Bishkek and Osh and provided the bridge users with a stronger sense of security as compared to that before the project. Thus, the project was effective.

As for another effect, interviewees from DEU-22 and bridge users commented that before the project drivers needed to slow down to cross the bridge when a pedestrian was on the bridge because the sidewalks were narrow. However, they can cross the bridge with much less concern about pedestrians and without changing their speed on the bridge after the project. Police officers who monitor speed violations on the bridge also commented that the enlargement of sidewalks on the bridge reduced the potential risks to pedestrians. It can be said that the expansion of the sidewalks has reduced the possibility of pedestrian traffic accidents.

BOX: Voice of Users of the Kok-Art River Bridge

During the field survey, a questionnaire-based interview was carried out for 10 groups (a total of 23 people) of Kok-Art River Bridge users. The opinions on the changes before and after the reconstruction are as follows.

"In the past, some people used the Suzak Bridge, but since the Kok-Art River Bridge as been updated, the number of car drivers who chose the Kok-Art River Bridge has increased, and the number of bridge users seems to be increasing as compared to before. The sidewalk has been widened, and bicycles, cattle, and horses as well as people can safely cross the bridge today."
(Manager of a gas station located 50 meters north of the Kok-Art River Bridge)

"There were many potholes on the bridge before it was replaced, and I was worried that the bridge might collapse when flooding. After the bridge was replaced, I was very glad because I was no longer worried about it. On the other hand, many drivers were over speeding because the bridge became better. Although accidents have not yet occurred on the Kok-Art River Bridge, we are strengthening the control near the bridge."
(Police oficers who control on traffic violations at the access road to the Kok-Art River Bridge)

"We used to step on the brakes before passing the bridge, because there were a lot of holes, so that the cargo wouldn't be affected. After the replacement, the surface of the road became very smooth and comfortable. It seems that the pedestrian's safety has also increased because the sidewalk and the driveway on the bridge are clearly separated. The Kok-Art River Bridge looks beautiful and pleasing." (25-ton truck drivers carrying cargo from Bishkek to Osh via Jalal-Abad once a week.)

"I feel that after the bridge was replaced, the level difference at the point where the bridge transitioned from the access road was fixed, and the asphalt quality became good and smoothly crossed. I had been worried about the condition of the bridge because it was not good. I now use the bridge with peace of mind, though I was anxious in the event of heavy rain."
(A group of drivers of tanker trucks, traveling frequently from Bishkek to and from Tajikistan through Osh.)

"I use this bridge almost every day for commuting. There were times that flood blocked the bridge in the past, but after replacement, it had never happened, and the convenience improved." (A family working in Jalal-Abad city and residing in Suzak village)

3.3.2 Impacts

3.3.2.1 Intended Impacts

At the time of planning, “contributing to the economic development of Kyrgyzstan” was selected as the impact of the project—it is an overwhelming outcome for the reconstruction of a single bridge, and no concrete indicators were established to measure it. Therefore, it was necessary to redefine the logic of the project and supplement the indicators at the time of the ex-post evaluation.

The Kok-Art River Bridge is located along the Bishkek-Osh Road in Jalal-Abad, 624 km south of Bishkek and about 106 km north of Osh, and most of the passengers and land cargo from Jalal-Abad are transported to other areas using the same road. Based on this fact, the project's impact was redefined as “contributing to strengthening the role of the Bishkek-Osh road as an important highway” at the time of the ex-post evaluation.

To measure the impact, the following supplementary indicators were established: (1) the commercial/non-commercial vehicle ratio on the Kok-Art River Bridge on weekdays, (2) the volume of goods transported by car in the Jalal-Abad oblast, and (3) the number of passengers carried by Vehicle in the Jalal-Abad oblast. The supplementary indicators used to evaluate the project were approved by MOTR. The achievement level of the supplementary indicators areas follows.

(1) Commercial/non-commercial vehicles ratio on weekdays on the Kok-Art River Bridge (supplementary indicator)

As shown in Table 4, the commercial/non-commercial vehicles ratio on weekdays on the Kok-Art River Bridge (supplementary index) was 10.3% (780 of 7,903 vehicles) at the time of planning (2012), compared with 17.3% (2,454 of 14,190 vehicles) at the time of ex-post evaluation, indicating that the number of commercial vehicles has increased since the time of planning.[7]

Table 4. The Number of Commercial Vehicle on the Kok-Art River Bridge

	Baseline	Actual
	2012	2018
Number of Vehicles/day	7,903	14,190
Commercial Vehicle over 2 tons/day	780	2,454
Commercial vehicles ratio	10.3%	17.3%

Source: DEU-22

[7] The value at the time of planning was calculated by the data presented in the preparatory survey, and the value at the time of ex-post evaluation was calculated by the traffic survey conducted by the road development company in Azerbaijan. A commercial vehicle was defined as being 2 tons or more.

(2) Volume of goods transported by vehicle in the Jalal-Abad oblast (supplementary indicator)

The annual volume of goods transported by vehicle from 2013 to 2017 in Jalal-Abad is shown in Table 5 below. It increased by about 300,000 tons from 2.1 million tons in 2013 to 2.4 million tons in 2017.

Table 5. The Volume of Goods Transported by Vehicle

Unit: million tons

	2013	2014	2015	2016	2017
Jalal-Abad Oblast	2.1	2.1	2.4	2.0	2.4

Source: Prepared based on the data of National Statistical Committee of the Kyrgyz Republic

(3) Number of passengers carried by vehicle in Jalal-Abad (supplemental indicator)

The annual number of passengers from 2017 in Jalal-Abad was 33,017,000 persons, which is an increase of approximately 2,724,000 persons since 2013 when approximately 30,293,000 passengers crossed the bridge, as shown in Table 6 below.

Table 6. The Number of Passengers Carried by Vehicle

Unit: 1,000 persons

	2013	2014	2015	2016	2017
Jalal-Abad Oblast	30,293	31,367	31,164	32,074	33,017

Source: National Statistical Committee of the Kyrgyz Republic

As mentioned above, the supplementary indicators (1), (2), and (3) are all increasing, and it can be concluded that the Kok-Art River Bridge is used more frequently than before the reconstruction. Additionally, from the aspect of "strengthening the role of the Bishkek-Osh Road as an important highway," efforts were made to collect other data such as changes in the number of commercial vehicles on the Bishkek-Osh Road (2013 vs. 2018), changes in passenger and freight traffic on the Bishkek-Osh Road (2013 vs. 2018), and changes in the average driving speed between Bishkek and Osh (2013 vs. 2018); however, these data were not regularly monitored.

The interviews with MOTR and ADB confirmed that the number of commercial vehicles, the number of passengers and the amount of freight transported on the Bishkek-Osh Road, which is an international highway have been increasing every year. Also because the Bishkek-Osh Road is an important trade route to China, Kazakhstan, Uzbekistan, and Tajikistan, the stable traffic flow on the Kok-Art River Bridge contributes to the smooth transportation of passengers and cargo on the road. Based on these findings, the project contributed in part to strengthening the role of Bishkek-Osh road as a nation's important highway.

3.3.2.2 Other Positive and Negative Impacts

(1) Impact on the Natural Environment

This project was classified as being category B, based on the JICA Guidelines for Environmental and Social Considerations (2010). It is a bridge reconstruction project, and not categorized as a large-scale bridge; in other words, the construction site does not necessarily have environmentally influential or sensitive characteristics. It was also confirmed that the environmental impact assessment report for the project was completed and approved in September 2012. The environmental impact during and after the reconstruction was reviewed by visiting the project site and interviewing DEU-22 personnel and people working at commercial facilities near the bridge. As a result, it was found that while an environmental impact assessment was completed by a third party, the environmental monitoring had not been carried out because the third party confirmed that the project does not have any negative impact on the environment. The environmental impact assessment report produced by the third party, a piece of evidence for evaluating the project, was not kept by the executing agency; however, the site study confirmed that there was no residential area near the bridge and therefore, no documented opinions about, for example, noise issues caused during construction. Therefore, it was concluded that there was no positive or negative impact on the natural environment.

(2) Resettlement and Land Acquisition

In this project, one cafe and one gas station were required to be relocated in order to install a temporary bridge[8]. The gas station agreed to have DEU-22 pay only the land rental fee during the installation of the temporary bridge, and it was confirmed that there have been no complaints since then.

(3) Other impacts

(Impacts expected at the time of planning)

Other effects expected in this project are: “stabilize and accelerate access to neighboring countries as international corridors,” “contribute to economic development in Kyrgyzstan,” and “increase the accessibility to the southern region, which is relatively lagging behind the northern region, by providing a stable transportation route and therefore contributing to economic development and poverty reduction in the southern region.

In interviews with MOTR and ADB, opinions were expressed that the effect of the project

[8] It was difficult to gather sufficient information during the field survey about the café, including the response of the executing agency at the time of relocation. Therefore, this is not considered in assessing impact. The JICA Kyrgyz Office has been requesting MOTR to examine the facts regarding the compensation for the café and undertake any necessary action in keeping with the guidelines if necessary (as of August 2019).

on the economic development of Kyrgyzstan might be limited, considering the size of the project; however, the stability of the traffic on the Bishkek-Osh road had substantially affected the economy of the country. Accordingly, the nominal GDP of Kyrgyzstan in 2017, as shown in Table 7, has increased slightly in comparison to that at the time of planning; however, it is certainly difficult to conclude that this is due to this project.

On the other hand, the regional GDP of Jalal-Abad increased by approximately 1.6 times from 2013 to 2017, based on the available data, and the unemployment rate of the region is also in a state of decline (see Tables 8 and 9).

Although it is difficult to analyze the relationship among these figures, the economic development in Jalal-Abad and this project, considering the facts that every resident and businessperson located in the Suzac village in Jalal-Abad use the Kok-Art River Bridge to get to Bishkek, Osh and neighboring countries such as Tajikistan, Uzbekistan, and China and considering the fact that the number of commercial buildings near the bridge has increased based on interviews conducted near the project site, it can be concluded that this project had some effect on revitalization and poverty reduction in the Jalal-Abad region.

Table 7. Nominal GDP of Kyrgyzstan (current billion US$)

2012	2013	2014	2015	2016	2017
6.605	7.335	7.468	6.678	6.813	7.564

Source: Statistical Data, World Bank

Table 8. Gross Regional Product of Jalal-Abad (million KGS)

2013	2014	2015	2016	2017
37,509	43,047	49,228	52,614	61,206

Source: Jalalabad Regional Administration

Table 9. Unemployment Rate in Jalal-Abad (%)

2013	2014	2015	2016	2017
8.2	7.6	7.7	7.5	7.2

Source: Jalalabad Regional Administration

(Impact not expected at the time of planning)

According to a police officer who responded to the interview, the number of speeding infractions on the Kok-Art River Bridge and its access road increased due to the improved road conditions after the reconstruction. Although these facts were noted, interviews with DEU-22 staff and the police officers confirmed that there were no traffic accidents resulting in injury or death on the Kok-Art River Bridge nor on its access roads from the time of project planning to the time of the ex-post evaluation. Furthermore, the police have been taking appropriate measures to manage such issues as strengthening traffic control near the

bridge in response to these situations. Therefore, it is concluded that a negative impact of this project on traffic infractions has not occurred, although monitoring continues to be necessary.

In summary, the project achieved the operational indicators selected at the time of the ex-ante evaluation, the traffic volume added as a supplementary indicator increased, as compared to the time of the ex-ante evaluation, and interviews with bridge users also confirmed that the bridge reconstruction project stabilized the transport of people and goods. From these results, it is believed that the project contributed to the stabilized traffic on the Kok-Art River Bridge and the Bishkek-Osh Road to some extent. Also, this project contributed to strengthening the role of the Bishkek-Osh Road as an important international corridor: the amount of commercial vehicle use on the Kok-Art River Bridge has increased, and the number of passengers and the volume of cargo in Jalal-Abad has increased.

From the above, this project has achieved its objectives. Therefore, effectiveness and impacts of the project are high.

3.4 Sustainability (Rating: ③)

3.4.1 Institutional/Organizational Aspect of Operation and Maintenance

Although the executing agency in the planning phase was the Ministry of Transport and Communication (MOTC), the Ministry of Transport and Roads (MOTR) was the executing agency at the time of ex-post evaluation because the Transport Department became independent due to an organizational change. Although the organization’s name was changed, there have been no changes in the responsibilities and roles of MOTR, the Bishkek-Osh Main Roads Management Unit (BOUAD), or DEU-22 regarding the management and maintenance of the Kok-Art River Bridge.

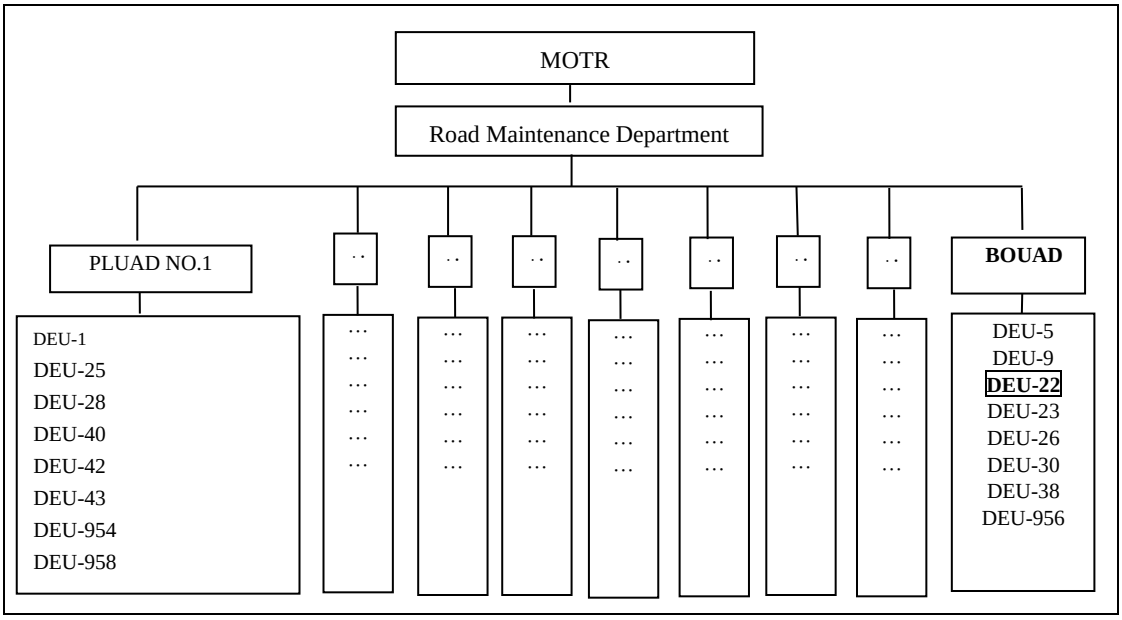

Chart 1 Organization Chart of Ministry of Transportation and Road

Source: The Preparatory survey report (December 2012)

As shown in the organizational chart of the MOTR, the operation, maintenance and management of the Kok-Art River Bridge is carried out by DEU-22 under the supervision of BOUAD, which is a subordinate organization of the MOTR, and the structure is the same as it was at the time of the ex-ante evaluation. Additionally, interviews with relevant organizations confirmed that there were no problems with the coordination structure and communication among organizations.

The number of DEU-22 staff was reduced slightly from 54 at the time of the ex-ante evaluation to 47 at the time of the ex-post evaluation. The reasons for this, as confirmed by BOUAD and DEU-22, the number of DEU staff is not always fixed, but it is common to reduce the number of staff during winter when the operation and maintenance works of roads and bridges is reduced[9]. As a result, the number of staff was slightly smaller at the time of ex-post evaluation than that at the time of ex-ante evaluation but there is enough staff to undertake the daily operation and maintenance of the Kok-Art River Bridge.

From the above, it is judged that the sustainability of the structure and system of the operation, maintenance and management of the Kok-Art River Bridge at the time of the ex-ante evaluation has been maintained, and no problem has been identified.

[9] Asphalt is required for the maintenance and management of roads and bridges; however, the asphalt factory is closed during the winter, so large-scale road repairs cannot be carried out. Also, operations such as pothole repair and overlay cannot be performed when the road surface is frozen. The main work of DEU during the winter is the maintenance of road maintenance equipment, daily management work, snow removal work, and the application of antifreeze materials in the snowfall area.

3.4.2 Technical Aspect of Operation and Maintenance

Daily inspection and cleaning of bridges is required for operation, maintenance and management of the main body of the Kok-Art River Bridge and its ancillary facilities such as the access roads, and the DEU-22 staff can adequately undertake these tasks since advanced skills are not needed. The DEU-22 operates and maintains three bridges: the Suzak Bridge, the Bragobe Beshenka Bridge, and the Kok-Art River Bridge. It was confirmed by on-site inspections and interviews with the DEU-22 that these three bridges, including the Kok-Art River Bridge, are generally well managed and maintained by DEU-22.

The procedures for the operation, maintenance, and management of bridges exist; on the other hand, operation manuals have not been prepared, and periodic training for the operation, maintenance, and management of the bridges has not been conducted. According to interviews with BOUAD and MOTR, if bridge damage occurred that could lead to the collapse or repair of the bridge due to large-scale natural disasters, there is a mechanism to dispatch technical support from MOTR's Road Maintenance Department via the BOUAD to DEU-22 as necessary. Thus, the DEU-22 staff does not need advanced bridge maintenance and management skills.

DEU-22 is subject to JICA's Grant Aid under "the Project for the Improvement of the Equipment for Road Maintenance in Osh, Jalal-Abad, and Talas Oblasts (2014)." The project provided DEU-22 with two asphalt cutters, two vibrating compactors, two hand breakers, one air compressor, one asphalt sprayer, one hand-guide roller, and one truck with a crane in 2015. DEU-22's mechanics are trained in the operation and maintenance of equipment at Bishkek and had no problems with handling the equipment. Heavy machinery, such as asphalt finishers and tire rollers, are installed in DEU-26 also under the supervision of the BOUAD and can be borrowed as needed. Since DEU-22 has much experience in repairing potholes using similar equipment and also has experience in road paving projects, they will be able to deal with large-scale repairs, such as overlays, that will be needed in the future.

Most DEU-22 staff members were hired before the implementation of the project and are very experienced in their field; thus they understood the importance of the operation and maintenance of bridges according to interviews with DEU-22 staff.

On the other hand, with the economic development of Jalal-Abad city, where DEU-22 is located, young people generally tend to find jobs in private companies with higher salaries than that of public employees, making it more challenging for DEU-22 to find and hire young people. However, the retirement age is 63 years old for Kyrgyz males and 58 years old for female, and veteran employees of DEU 22 subject to this study could continue to work for more than 15 years until their retirement[10]. Therefore, there is no urgency to hire

[10] The staff of DEU-22 is all male except a secretary.

young technicians, at present. Although the number is small, there are some younger staff members, and the technology transfer from the veteran staff is carried out on a daily basis.

Additionally, JICA's technical cooperation, “the Project for Capacity Development for Maintenance Management of Bridges and Tunnels (2013–2016)” aims to improve the preventive maintenance capability of bridges and tunnels based on the inspections results provided by MOTR. The development of databases on bridges and tunnels and the capacity development of DEU to conduct daily maintenance and management for bridges and tunnels are also covered in the project. The staff of the above technical cooperation project visited the construction site of the Kok-Art River Bridge; the DEU-22 staff accompanied them and gave their opinions on the maintenance and management of the bridge.

As described above, the status of the Kok-Art River Bridge at the time of the ex-post evaluation was good, and the bridge is properly operated and maintained by the DEU-22. Therefore, the status of the operation and maintenance of this project is considered to be good.

3.4.3 Financial Aspect of Operation and Maintenance

Expenses for the daily operation and management of the Kok-Art River Bridge are paid from DEU-22’s budgets. In the case of damage that may cause bridge collapse or other repairs necessary due to major natural disasters, MOTR’s emergency budget is available. Since the Kok-Art River Bridge was reconstructed, no major problems have arisen, and everything has been managed within the DEU-22's budgets. Interviews with DEU-22 employees also confirmed that the costs of operation, maintenance and management of the Kok-Art River Bridge was reasonably secured.

Tables 10, 11, and 12 below show the expenditures of MOTR, the BOUAD, and the DEU-22 for road maintenance[11]. As can be seen, the expenditures for road maintenance in these three organizations have increased in comparison to the earliest year with available data in each organization. The JICA Bridge and Tunnel Maintenance Capacity Project (2013–2015), which was conducted at the same time as this project, supports the calculation of construction costs for the maintenance and management of bridges based on the results of

[11] In the field survey, budget data between 2014 and 2018 for road maintenance was requested to MOTR; however, concerning MOTR and BOUAD, only the data on expenditures in 2016, 2017, and 2018 were available (as of December). The department's administrative staff manages the MOTR data, but due to the extremely high percentage of resignations, the organization is facing chronic staff shortage. The person who supported the ex-post evaluation had been working for MOTR for just over a year and a half and found only the last three years of data—the person neither knew the location of the data nor had time for data collection. For this reason, data from 2012 and 2013 presented in the JICA's preparatory survey report for the Avalanche Protection on Bishkek-Osh Road (2015, p6) were used in table 10 with MOTR's approval. In an interview with ADB, it was established that since MOTR’s budget for road maintenance in FY 2018 was about 2 billion KGS, which exceeded the World Bank's recommended budget for road maintenance per kilometer, there were no budget problems. The financial sustainability of management and maintenance was evaluated with a comprehensive examination of all of the above information.

inspections led by the MOTR. The results of this project are expected to further improve the finances for the future operation and maintenance of the Kok-Art River Bridge.

Table 10. Expenditure for Road Maintenance by MOTR

(Unit: 1,000 KGS)

2012	2013	2016	2017	2018 (latest)
1,274,132	1,368,785	1,866,827	1,999,496	1,894,813

Source: MOTR

Table 11. Expenditure by BOUAD

(Unit: 1,000 KGS)

2016	2017	2018 (latest)
319,436	527,784	434,355

Source: BOUAD

Table 12. Expenditure by DEU-22

(Unit: 1,000 KGS)

2014	2015	2016	2017	2018 (latest)
22,371	30,326	44,883	44,249	29,395

Source: BOUAD

In sum, there are no particular issues with regard to the financial aspect of the operation, maintenance and management of this project.

3.4.4 Status of Operation and Maintenance

The DEU-22 conducts the following operations once every two weeks on the three bridges under its jurisdiction, including the Kok-Art River Bridge: drainage pipes on the bridge surface and around the bearings, removal and cleaning of sand and dust accumulated in the drainage ditches, and removal of rocks and driftwood.

DEU-22 staff cleaning the bridge

Drainage ditch prior to periodic cleaning

As a result of the site inspection, it was confirmed that the regular cleaning by the staff of the DEU-22 was carried out by using an appropriate number of workers and appropriate cleaning tools. Since the DEU-22 office is located in the immediate vicinity of the bridge,

inspections and repairs of the embankment works, monitoring of overload, and the installation of speed-limit signs are carried out almost every day by the chief of the DEU-22 office and his staff. It was also confirmed that the condition of the bridge was checked frequently on days of heavy rain and the following day via site visit. Traffic safety workers' conditions, such as painting road markings, are good at the time of ex-post evaluation, and re-painting will not be necessary for several years[12].

When the site was inspected during the ex-post evaluation study, the police were patrolling for traffic violations on the road crossing from Kok-Art River Bridge toward Osh. According to the police officers, many drivers tend to speed after passing the Kok-Art River Bridge, so they monitor the areas several times a week. They also control overloading at the same time as the speed control, although overloading is regulated at the borders. From the above, the operation, maintenance, and management of this project are well conducted.

No major problems have been observed in the institutional/organizational, technical, financial aspects and current status of the operation and maintenance system. Therefore, sustainability of the project effects is high.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

The objective of the project is to reconstruct the severely damaged Kok-Art River Bridge on Bishkek-Osh Road to ensure safe and smooth traffic flow on the bridge and the road, therefore, it contributes to strengthening the role of the Bishkek-Osh road as an important national highway. This project has been highly relevant to the development plan and needs of Kyrgyzstan, as well as being in keeping with Japan's ODA policy. In terms of efficiency, although the project cost was within the plan and all planned outputs were carried out, the timeframe exceeded that included in the plan. The efficiency of the project is therefore fair. The effectiveness and impact of the project are high. The project achieved the operational indicators selected at the time of the ex-ante evaluation; the traffic volume added as a supplementary indicator increased compared to the time of the ex-ante evaluation. Also, the interview with the bridge users confirmed that the bridge reconstruction project stabilized the transport of people and goods. From these results, it is believed that the project contributed to the smooth traffic on

[12] According to the additional data submitted by the JICA Kyrgyz Office, as of February 2019, white and yellow-orange staining streaks were observed at the lateral tightening end at the mid-point for three out of four piers. These concerns were found after the field survey of this evaluation was undertaken from November to December 2018 (only a one-time visit). It is necessary to investigate further whether or not corrosion has occurred in the internal reinforcing bars and PC fixing parts. Because this cannot be clarified by the end of the ex-post evaluation, the concern is not taken into consideration when analyzing the sustainability of the project; however, a follow-up to this case is stated in 4.2 Recommendations.

the Kok-Art River Bridge and the Bishkek-Osh Road to some extent. This project contributed to strengthening the role of the Bishkek-Osh Road as an important international corridor as well: the number of commercial vehicles on the Kok-Art River Bridge has increased, as well as the number of passengers and the volume of cargo in Jalal-Abad. In terms of the institutional, technical, and financial aspects and the current status of the operation and maintenance systems, no major issues have been observed. It was noted that the road maintenance skills of the Local Level Roads Management Unit was enhanced as compared to those measured at the time of an ex-ante evaluation by a cooperation with the "Project for Improvement of the Equipment for Road Maintenance in Osh, Jalal-Abad, and Talas Oblasts (2014)".

From the above, it can be said that the evaluation of this project is very high.

4.2 Recommendations

4.2.1 Recommendations to the Executing Agency

As of February 2019, white and yellow-orange soil streaks were observed at the lateral tightening end at the mid-point of three of the four piers. These were found in the final stages before completion of this ex-post evaluation report after the field survey. Further investigation into this issue is necessary. It is recommended that the Road Maintenance Department and the DEU-22 of the MOTR conduct detailed studies on the bridge piers and take necessary measures to address any problems identified.

4.2.2 Recommendations to JICA

Considering the above, the department in charge of this project at the JICA headquarters and the JICA Kyrgyz Office continue to monitor the case and advise the MOTR Road Maintenance Department and DEU-22 as required.

4.3 Lessons Learned

<u>The sustainability of the operation and maintenance of the bridge and road project is enhanced by collaborating with other supports such as the provision of road maintenance equipment</u>

In this project, the "The Project for Improvement of the Equipment for Road Maintenance in Osh, Jalal-Abad, and Talas Oblasts (2014)" and the "The Project for Capacity Development for Maintenance Management of Bridges and Tunnels (2013–2015)" were implemented by the JICA at almost the same time, and it was confirmed that these projects enhanced the sustainability of this project. In supporting bridge and road projects through financial assistance, it is essential for sustainability after the completion of projects that the responsible department thoroughly reviews the

technologies and equipment of the organizations in charge of the operation, maintenance and management of the bridges and roads in question at the time of project planning and examines the possibility of synergies through additional support as needed.

It is important that appropriate indicators be selected and monitored during the planning or implementation of similar projects.

In the preparatory survey conducted for this project, a traffic volume survey was carried out; however, it was not established as an indicator to measure the quantitative effect of the project, and thus, monitoring of the indicator by the executing agency was not carried out.

Also, “contributing to the economic development of Kyrgyzstan” was selected as the impact of the project, which is an overwhelming effect for the reconstruction of a single bridge to have and no concrete indicators were established to measure it. Therefore, it was necessary to redefine the logic of the project and supplement this indicator at the time of the ex-post evaluation. Since the indicators of the effectiveness and impact of a project are crucial for monitoring and conducting ex-post evaluation after completion of the project, the JICA should thoroughly review its indicators in order to ensure that basic indicators such as traffic volume and the impact indicators are selected appropriately at the time of project planning.

In this project, the implementing agency was not sufficiently aware of the establishment of the indicator. Unlike technical cooperation projects, financial cooperation projects do not prepare a Project Design Matrix (PDM) with executing agencies. Therefore, the JICA should ensure that the indicators are capable of measuring the achievement of the project appropriately, including how to collect the data, and who will manage and monitor the data during the project planning and implementation. The agreed matter should be recorded in a document for future use, thereby enabling the thorough monitoring and smooth implementation of ex-post evaluations.