Kyrgyz Republic

FY2023 Ex-Post Evaluation Report of Technical Cooperation Project

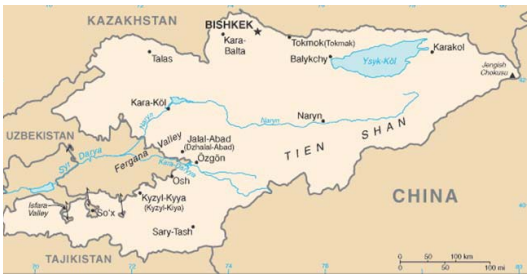
"The Project for Capacity Development for Road Disaster Prevention Management"

External Evaluator: Nobuko Shimomura, Almec Corporation

0. Summary

The technical cooperation project "The Project for Capacity Development for Road Disaster Prevention Management" (hereinafter referred to as "the project" or "this project") was implemented with the project objective of improving the capacity of relevant departments in the Ministry of Transportation and Communications (hereinafter referred to as "MOTC") that have jurisdiction over areas where avalanches and other slope hazards frequently occur on trunk roads in the region, to manage road disaster prevention. The project was implemented with the overall goal of improving road traffic safety in areas affected by slope/snow hazards. The project is in line with the country's relevant policies and development needs, which emphasize road disaster prevention since the Kyrgyz Republic has severe natural conditions that cause various types of disasters, and road transportation is the primary means of transportation at the time of the project formulation and the ex-post-evaluation. The project is consistent with Japan's development assistance policy and appears to be linked to related projects of JICA and other donors. Therefore, the relevance and coherence of this project is high. The project objectives were primarily achieved by clarifying the roles of relevant MOTC departments concerning road disaster management, improving their capacity to collect and analyze disaster-related data in the field and to build a database, and strengthening their capacity to plan investments in disaster preventive structures based on the data. Road disaster prevention using the results of this project is being realized under the ongoing grant aid projects and the planned ODA loan project. It is expected to bring about improved safety. However, the activities initiated under the project are not fully sustained after its completion, and achieving the overall goals still needs to be improved. Therefore, the effectiveness and impact of the project is moderately low. Although the project cost of this project was slightly higher than planned, the added inputs and activities were effective and appropriate to strengthen the outputs. The project duration was as planned. Based on the above, the efficiency of this project is high. Due to the MOTC's reorganization after the project's completion, the division of roles among MOTC's related departments regarding road disaster prevention became unclear. There are issues regarding the maintenance and dissemination of technology and the operation and maintenance of the equipment provided under the project. Therefore, the sustainability of the effects of the project is moderately low. In light of the above, this project is evaluated to be partially satisfactory.

1. Project Description



Project Location (source: ZenTech)

Hazard map signboard based on the project installed on the Bishkek-Osh road (source: Evaluator)

1.1 Background

As a landlocked country, the Kyrgyz Republic relies on road transportation for approximately 95% of its goods and people, and the country's road network, approximately 34,000 km, serves as the leading economic infrastructure for the people's daily lives and trade with the surrounding areas. Most of the road networks in the Kyrgyz Republic were constructed during the former Soviet Union era, followed by inadequate repair due to economic stagnation after independence in 1991. The road network, therefore, has been damaged and deteriorated, and the service life of road maintenance equipment has been exceeded.

Kyrgyz Republic is a mountainous country with about 90% of its land area above 1,000 meters above sea level and about 40% above 3,000 meters. Therefore, road disasters such as rockfalls, landslides, avalanches, and ground blizzards frequently occur on road sections in mountainous areas, resulting in human and material damage, regional isolation due to road closures, delays in the transportation of goods, and other severe effects of the disasters. MOTC, the implementing agency for this project, is in charge of the maintenance and management of major trunk roads in the country and has been carrying out rehabilitation and maintenance work in areas where road disasters have occurred. However, few preventive disaster countermeasures have been taken with structures such as slope protection works and avalanche barriers. Therefore, the above-mentioned road disasters have repeatedly occurred in disaster-prone road sections. With this background, the Kyrgyz government requested the Japanese government to undertake "The Project for

Landslide and rockfall hazard area on the Bishkek-Osh Road (source: Evaluator)

Capacity Development for Road Disaster Prevention Management" to deter road disasters and minimize the impact of damage.

1.2 Project Outline

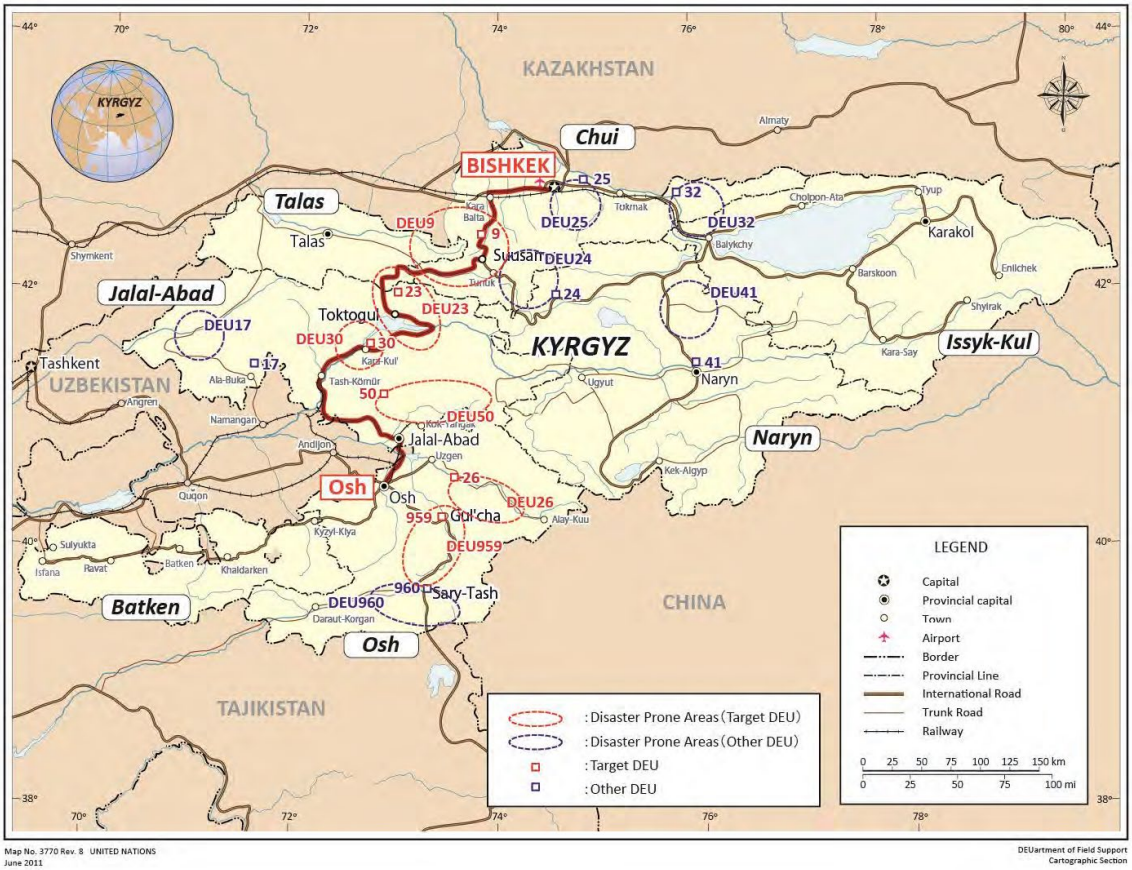
With the project purpose of improving the capacity of MOTC to implement road disaster management properly, the project sought to clarify the roles of relevant MOTC departments (Outcome 1) to enhance the capacity to collect and analyze disaster-related data in the field (Outcome 2), to build a database to accumulate disaster-related data (Outcome 3), and to enhance the capacity to develop investment plans for road disaster management based on the data (Outcome 4).

Overall Goal		The safety of the road traffic for slope/snow hazard areas in the jurisdiction of the project's road maintenance office is improved.
Project Purpose		The capacity of MOTC's relevant units in the Project (Headquarters, Road Maintenance Department (RMD), Main Roads Management Unit (UAD), and Local Level Roads Maintenance Unit (DEP[1]), is enhanced for the management of road disaster prevention (including road disaster inspection, preparing of road disaster prevention management plan and planning of budget for road disaster prevention)[2].
Outputs	Output 1	Responsibilities of MOTC on road disaster prevention, including specific duties to be performed by relevant units (HQ, RMD, PLAUD/UAD, and DEP) with necessary staffing in each, become clear.
	Output 2	The capacity of target PLAUD/UAD and DEP for inspection and analysis of road disasters is enhanced.
	Output 3	The capacity of RMD to operationalize a Database Management System for road disaster prevention is developed.
	Output 4	The capacity of RMD for preparing road disaster prevention management plans for the target areas is enhanced.
Total cost (Japanese Side)		336 million yen

[1] DEP is an abbreviation of Russian Дорожно- Эксплуатационный Пункт; ДЭП
[2] The organization was reorganized in 2022. See Figure 2 for details.

Period of Cooperation	April 2016 - May 2019
Target Area [3]	Sites with a high number of road disasters on national and international highways managed by MOTC, such as the Bishkek - Osh Road, Osh - Sary Tash-Irkeshtam Road, and Jalal Abad - Balykchy Road, based at the MOTC headquarters (location: Bishkek)
Implementing Agency	Ministry of Transport and Communication (MOTC)
Other Relevant Agencies/ Organizations	Kyrgyz Road Public Corporation, Ministry of Emergency Situations (MES), and Kyrgyz State University of Transport, Construction and Architecture (KSUTCA)
Consultant Organization in Japan	CTI Engineering International., LTD, Earth System Science, Co., LTD., Kokusai Kogyo Co., LTD, Central Nippon Expressway Co., LTD.
Related Projects	(Technical Assistance) ・ Project for the Capacity Building of Road Maintenance (2008 - 2011) ・ Project for Capacity Development for Maintenance Management of Bridges and Tunnels (2013 - 2015) ・ Road administration advisors(2008 - 2011, 2011 - 2014, 2014 - 2016, 2017 - 2020) ・ Feasibility Survey for Slope Disaster Prevention on Road (2017) ・ Core Human Resource Development for Road Asset Management Program: Long-term training of Kyrgyz road administration personnel (dispatched to universities) once every two years. Already dispatched two engineers. (ODA Loan) ・ Bishkek-Osh Road Rehabilitation Project (Ⅰ),(Ⅱ) (1997, 1998) ・ International Main Roads Improvement Project (2015) (Grant) ・ Project for Improvement of Workshops for Road Maintenance Equipment (2017) ・ Avalanche Protection on Bishkek-Osh Road (2017) ・ The Project for the Protection from Ground Blizzard on Bishkek-Osh Road (2021) ・ Project for the Improvement of Road Maintenance and Pavement Equipment in Batken (2022)

[3] According to the preliminary evaluation document, it is stated that "the sites with the highest number of road disasters on arterial roads managed by MOTC would be targeted," but in reality, these three roads were identified as those with the highest number of disasters during the detailed planning process.



Source: Project Completion Report for the Project for Capacity Development for Road Disaster Prevention Management

Figure 1 Project Target Area

1.3 Outline of the Terminal Evaluation[4]

1.3.1 Achievement Status of Project Purpose at the Terminal Evaluation

The project achieved the following outputs as planned: responsibilities of MOTC on road disaster prevention, including specific duties to be performed by relevant unites (HQ, RMD, PLUAD/UADs, DEPs) with necessary staffing in each, become clear (Output 1); capacity of target PLUAD/UADs and DEPs for inspection and analysis of road disaster is enhanced (Output 2); capacity of RMD to operationalize Database Management System for road disaster prevention is developed (Output 3); and capacity of RMD for preparing road disaster prevention management plans of the target areas is enhanced (Output 4). The project goal of "Capacity of MOTC departments for road disaster management improved" was achieved.

1.3.2 Achievement Status of Overall Goal at the Terminal Evaluation

[4] The information was based on the project completion report.

(Including other impacts.)

Based on the Short-Term Road Disaster Prevention Management Plan prepared during the project, MOTC identified the following four road disaster prevention measures, and progress has been made on the following four projects: 1) monitoring of landslides at the 85.5 km point on the Bishkek-Osh road and securing a budget for countermeasure works (horizontal drainage boring) to reduce the risk of landslide occurrence at this point (5 million Kyrgyz Som: approximately 8 million yen), 2) sharing road disaster information by SNS, 3) preparation and distribution of hazard maps, and 4) installation of warning signs in areas highly prone to road disaster. Suppose preventive action activities related to road disaster prevention, including these projects, were continued. In that case, the overall goal of "the safety of the road traffic in the selected disaster-prone areas of the targeted DEP is improved" was expected to be achieved within three to five years after the project's completion.

1.3.3 Recommendations from the Terminal Evaluation

This project was positioned as the beginning of road disaster prevention management in the Kyrgyz Republic, and it was necessary to continue implementing countermeasure works for road disaster prevention after completing this project. Specifically, it was necessary to ensure that the budget for road disaster prevention was secured every year, that training programs on road disaster prevention were also conducted every year, and that the number of participants in RO-RMD/UAD and DEP was increased as engineers with educational programs on road disaster prevention were needed not only in the sites covered by this project but also in other areas. However, it was feared that if these were difficult to achieve, there was a risk that the overall goals might not be achieved. Therefore, the following activities were proposed to continue implementing appropriate road disaster management and achieve each of the following indicators.

(Indicator 1) In reference to the project experiences and manuals produced by the project, the Short-Term Road Disaster Prevention Management Plan continues to be prepared by RMD and MOTC every year.

- ✓ Updating of disaster records in the database system.
- ✓ Updating the road disaster prevention priority list in the short-term plan based on the disaster record.
- ✓ Conduct joint coordination meetings with MES and related agencies to share road disaster data, exchange opinions, and discuss the utilization of the road disaster prevention priority list.

✓ Conduct training programs on road disaster prevention management to enhance the capacity of MOTC officials and personnel.

(Indicator 2) Road disaster prevention work is implemented based on the Short-Term Road Disaster Prevention Management Plan prepared by the RMD of MOTC.

✓ Allocation of budget for road disaster prevention works.

✓ Conduct road disaster prevention works.

✓ Monitor landslides at 85.5 km along the BO Road (quarterly).

Since RMD is the department in charge of structural and non-structural measures necessary for road disaster management and updating the Short-Term Road Disaster Management Plan, RMD was proposed to plan an appropriate road disaster management plan based on the following activities as an implementation system.

✓ Management of the database system by collecting nationwide disaster records and countermeasures.

✓ Preparation of a road disaster prevention priority list nationwide from the database.

✓ Preparation of the required budget for road disaster prevention works nationwide.

✓ Management of nationwide road disaster prevention works.

✓ Management of training programs for road disaster prevention works.

2. Outline of the Evaluation Study

2.1 External Evaluator

Nobuko Shimomura, Almec Corporation

2.2 Duration of Evaluation Study

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

Duration of the Study, October 2022 – March 2024

Duration of the Field Study: May 11– June 1, September 28 – October 4, 2023

3. Results of the Evaluation (Overall Rating: C[5])

3.1 Relevance/Coherence (Rating: ③[6])

3.1.1 Relevance (Rating: ③)

3.1.1.1 Consistency with the Development Plan of Kyrgyz Republic

At the time of the project's formulation, the Kyrgyz government had identified the road sector as one of the priority areas in its Sustainable National Development Strategy 2013-2017, focusing on ensuring access to markets in the surrounding areas

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

[6] ④: Very High, ③: High, ②: Moderately Low, ①: Low

and the country. This project contributes to this strategy, as it aims to improve the capacity of the road sector to prevent disasters by identifying and addressing hazardous areas of roads and by training human resources in the road sector.

The National Development Strategy 2018-2040 (Long-term Plan) and the National Development Program of the Kyrgyz Republic - 2026 (Medium- and Long-term Plan)[7], which are the development policies at the time of project completion, call for reducing disaster risks and promoting disaster preparedness at all levels of the country and the local level, since the republic has a high disaster frequency under low population density, which makes road maintenance difficult, further need improving access and maintenance of the road sector. Furthermore, the government notes that road infrastructure development and improvement have not kept pace with the increase in transport demand due to financial constraints[8]. The Road Sector Development Strategy (2015-2025) also covers road management from the perspective of ensuring traffic safety and describes that the government will promote policies to improve road safety. In the Road Sector Development Strategy (2023-2030), given the current status of road transport as the primary means of transportation in the Kyrgyz Republic, the maintenance and development of the road network is considered a major priority, which includes the development of international transportation corridors, maintaining and improving the country's paved road network, and the project will promote public-private cooperation in the road sector.

At the time of project formation, the Kyrgyz government did not necessarily view this project as a climate change adaptation measure. Still, it is a project contributing to disaster reduction, an adaptation measure. The increase in glacial lake failures, floods, and landslides due to the effects of climate change has increased awareness of the importance of taking measures against threats that can cause significant damage, and numerous government documents[9], including the aforementioned "National Development Strategy 2018-2040" and "Presidential Decree on Environmental Management and Climate Sustainability," call for the implementation of specific adaptation measures.

Considering the above, the project is consistent with the road sector development and disaster management policies during planning and the ex-post evaluation. It is

[7] National Development Program of Kyrgyz Republic until 2026
Национальная программа развития Кыргызской Республики до 2026 года
[8] Resolution of the Cabinet of Ministers of The Kyrgyz Republic of February 10, 2023, No. 71
[9] https://www.undp.org/kyrgyzstan/blog/glaciers-kyrgyzstan-how-they-are-disappearing (UNDP Website), https://reliefweb.int/report/kyrgyzstan/interim-workshop-implementation-undp-project-reducing-risks-and-vulnerability-glacial-lake-outburst-glof-and-mudflows-kyrgyzstan-was-conducted-center#:~:text=Due%20to%20climate%20change%20and,are%20located%20in%20glacial%20zones. (Reliefweb Website)

found to be consistent with the policies and measures.

3.1.1.2 Consistency with the Development Needs of the Kyrgyz Republic

As described in "Background," rockfalls, slope failures, avalanches, and other disasters frequently occur on roads in the mountainous regions of the Kyrgyz Republic, resulting in human casualties, property damage, and long-term traffic disruptions. In response, the Kyrgyz Republic was required to control damage through inspecting, evaluating, and determining damaged areas, selecting countermeasure methods, and planning. MOTC recognizes that disaster damage control is insufficient but will become more critical in the future[10]. Therefore, the above-mentioned development needs were maintained at the time of the ex-post evaluation.

3.1.1.3 Appropriateness of the Project Plan and Approach

Based on the lessons learned from the earlier "Road Maintenance Capacity Project," it is crucial to clarify the scope of responsibility of each organization as well as to improve the capacity of the organizations to which technology transfer is to be applied; this project attempted to clarify the scope of responsibilities of MOTC by examining the division of work related to disaster management within the department and organization in the MOTC. The ex-ante evaluation also stated that this would ensure efficient project effectiveness and sustainability, and as planned, the scope of responsibility within MOTC was clarified during the implementation of this project.

On the other hand, the demarcation between MOTC and the Ministry of Emergency Situations (MES) for disaster management was not fully considered during the project formulation study done by JICA, and the commitment of MES was limited. After the start of the Project, the MES, primarily responsible for disaster management, and the MOTC made a groundbreaking attempt in the project to collaborate with the Joint Coordination Committee and training sessions held regularly to learn road disaster management techniques. However, it remained at the level of sharing the technical content provided by the project. The collaboration did not go as far as establishing a system with the MES regarding the operation of weather observation equipment provided to the MOTC under this project. The failure to cooperate with MES on weather observation may be due to the fact that disaster management is not specified

[10] According to the Kyrgyz authorities and international organizations, the number of disasters has increased in recent years due to climate change, including glacial lake collapse and changes in snowfall and rainfall. Glaciers, which used to cover 4% of the country, have shrunk to 3.4%, and glacier collapses in various regions are causing damage. (https://www.undp.org/kyrgyzstan/blog/glaciers-kyrgyzstan-how-they-are-disappearing, confirmed July 2023). In Toktogal town along the Bishkek-Osh Road, officials from the MES expressed concern about the possibility of further increase of damage from shrinking glaciers in the future.

in the responsibilities of MOTC institutionally and that weather observation is centrally the responsibility of the MES, which was not fully considered during detailed planning. Although MOTC was the implementing agency for this project, it would have been desirable to consider a cooperative approach after carefully examining the division of roles with the Ministry of Emergency Situations and the Prime Minister's Office in the administration of disaster prevention, including road disaster prevention.

In addition, as a result of MOTC's reorganization in April 2022, local DEPs are changed to contractors performing road maintenance services upon the request of the RMD, and the organizational description scope clarified in this project has also changed. In addition, the reorganization was regarded as part of the reasons for the failure to continue the road disaster management cycle and data collection, which were elaborated on in the later part of this report. As a result, this lesson of clarifying the scope of responsibilities of the relevant departments of the implementing agency to ensure efficient project effectiveness and sustainability was applied, but more effort was needed.

The project's effectiveness, impact, and sustainability were all judged to be "Moderately Low." This is attributed to these issues in the project plan, approach, etc.

On the other hand, there are some notable approaches to this project. Although road disaster management had not been paid high attention in the Kyrgyz Republic, this project provided MOTC with a technical starting point for road disaster management through practical training, including field visits. For example, as part of efforts to improve disaster inspection and analysis capabilities, landslide monitoring was conducted jointly by the project experts and MOTC officials in areas prone to landslides; the trainings were conducted with the participation of MES officials and university staff and students, which promoted cooperation among all parties involved and improved disaster prevention techniques. In particular, the snow fence pilot project was not included in the original plan, but it was very appropriate. It was devised so the participants could understand the precise results of the structural measures for road disaster prevention.

Based on the above, it cannot be described that the project approaches undermined the relevance of this project, although some issues can be pointed out in the project plan and approach.

3.1.2 Coherence (Rating: ③)

3.1.2.1 Consistency with Japan’s ODA Policy

This project is consistent with the critical objective of Japan’s Country Assistance Policy for the Kyrgyz Republic, "Maintenance and Management of Transport

Infrastructure and Reduction of Regional Disparities." It is positioned in the "Logistics Promotion Program for Enhancing Export Competitiveness." The JICA Country Analysis Paper also analyzed "Transport Infrastructure Development" as a critical issue. Therefore, this project aims to reduce road disaster risk, consistent with Japan's development cooperation policy.

3.1.2.2 Internal Coherence

In this project, meteorological equipment was installed at two mountain passes on the Bishkek-Osh Road to observe the volume of winter snowfall, snowstorms, and others. Using this observation data, past meteorological observation data by the MES, and topographical data of MOTC, the maximum snowstorm volume with a 30-year probability and the blowing distance of ground blizzard (Distance where the wind blows across) were estimated, enabling the scale and layout of snow fences against the scale of the expected ground blizzard. The observation data from this project was used for the planning and preparatory study for the grant project "The Project for the Protection from Ground Blizzard on Bishkek-Osh Road," conducted in 2019, and the project was efficiently prepared without additional weather observations.

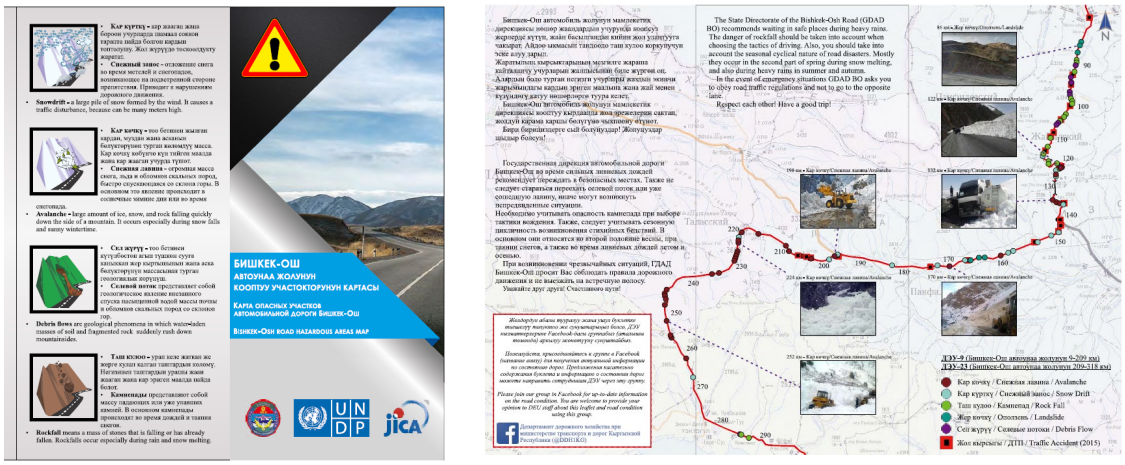
3.1.2.3 External Coherence

This project is the first support in the Kyrgyz Republic to specialize in road disaster prevention. Still, it also contributes to the promotion of climate change countermeasures (adaptation measures) as outlined in the "Nationally Determined Contributions (NDC)" under the Paris Agreement. It contributes to understanding disaster risks as Priority Action 1 for implementing the Sendai Framework 2015-2030 for Disaster Risk Reduction. The project is positioned as a direct contribution to the Kyrgyz government's understanding of the mechanisms of occurrence of various disaster risks and their countermeasures.

ADB has continued to support database management for road assets since 2008, and the bridge and tunnel database was integrated with HDM-4, which constitutes the database created with ADB's support after the completion of this project[11]. On the other hand, ADB also highly evaluated the significance of the disaster prevention database developed by the Project. Since the completion of the Project, MOTC has

[11] HDM-4 is a road development and management system (computer software) mainly for evaluating road investment options and can be applied to road management, road construction planning, evaluation of financing conditions, budget allocation studies, road network performance forecasting, project evaluation, and policy impact studies. The system structure consists of a data manager for data input, an internal model for forecasting pavement serviceability, maintenance, and repair work costs, road user costs, etc., and an analysis tool for evaluating road investment choices according to target roads. (Japan Society of Civil Engineers, http://library.jsce.or.jp/jsce/open/00035/2003/58-5/58-5-0630.pdf)

been considering integrating this database into ADB's Road Asset Management Database. However, ADB has no experience in assisting in road disaster prevention. ADB officials, having participated in JICA's Joint Coordination Committee and the final seminar of this project to understand the project results, integrated the bridge database into the ADB's database for road asset management. The project has been completed with ADB's technical assistance. It was mentioned that the collaboration with JICA is essential to review and integrate the database for disaster management, which has not yet been integrated. The linkage mentioned above of the project's disaster management database was not envisioned at the time of planning, but ADB and MOTC discussions are continuing.



Source: Activity Report for the Project for Capacity Development for Road Disaster Prevention Management

Hazard map of the Bishkek-Osh Road summarizing the results of the project

The information on hazardous areas identified by this project was compiled into hazard maps as described above. With the support of the United Nations Development Program (UNDP) [12], pamphlets were prepared and distributed to schools in the vicinity of hazardous areas. In addition, a large signboard was installed at the entrance of the Bishkek-Osh Road to inform drivers unfamiliar with this road about the hazardous areas.

Although some issues are pointed out in the project plan and approach, they do not undermine the relevance of the project. The project is entirely consistent with the development plan of the Kyrgyz government and its development needs. It is also in line with Japan's development cooperation policy, and there are specific collaborations

[12] The support was done under the Strengthening Integrated Risk Governance Capacities of the Kyrgyz Republic and Regional Cooperation in Central Asia (2018 - 2022)

with ongoing JICA projects and projects implemented by international organizations beyond what was envisioned at the time of planning. Therefore, its relevance and coherence are high.

3.2 Effectiveness and Impacts[13] (Rating: ②)

3.2.1 Effectiveness

3.2.1.1 Project Output

To achieve the project goal of improving the capacity of MOTC to implement road disaster management properly, this project clarified the roles of relevant MOTC departments (Outcome 1), improved the capacity of MOTC to collect and analyze disaster-related data in the field (Outcome 2), built a database to accumulate disaster-related data (Outcome 3), and the RMD's capacity to formulate road disaster management plans for the project sites was improved (Outcome 4). According to the project completion report, the following activities were carried out for each outcome, and all set indicators were achieved. In addition, several RMD counterparts acquired the capacity to serve as instructors to train other staff members.

- Outcome 1 (achieved): the roles and activities of the central (MOTC headquarters, RMD headquarters) and regional (RMD regional offices, DEP) offices for road disaster management were clarified, which was institutionalized in November 2018 by the RMD Directorate General Order. Regional offices with jurisdiction over roads in the project area were given the role of inspection and evaluation for road disaster prevention and planning and project formation for disaster prevention works.
- Outcome 2 (largely achieved): Capacity building was conducted for RMD regional offices and DEPs to fulfill the above roles. In the first year of the cooperation period, weather observation using equipment installed by the project was started at six locations in the project area. In the second and third years, classroom training and manual preparation about road disaster prevention countermeasures and road disaster prevention inspection were conducted. Additional training was provided through practical work, such as a pilot project for preventing ground blizzards using the above observation data and monitoring landslide hazard areas. The roads assumed at the planning time were international roads only, and avalanches and ground blizzards were targeted. Evaluating local conditions resulted in capacity strengthening for various disaster types, including small-scale disasters such as rockfalls, landslides, and river erosion, frequently occurring on local roads. However,

[13] When providing the sub-rating, Effectiveness and Impacts are to be considered together.

although all trained staff members passed the final examination, the status of the activities after the project's completion does not indicate that the skills have been fully acquired and established. (See section of “Sustainability”)

- Outcome 3 (achieved): A database and operations manual were developed, and training was conducted for RMDs, UADs, and DEPs. Trained DEP personnel followed the manual to visit 137 disaster hazard areas, collected inventory information, and entered the information into the database using tablet terminals distributed during the training. Historical disaster data (895 cases) were collected by RMD, UAD, and DEP and entered into the database. In integrating the database with the database for bridges and tunnels developed in the previous technical cooperation project, the input method for the database was changed to a more reliable method [14].
- Outcome 4 (Achieved): the RMD developed criteria for determining road disaster preparedness priorities, and based on these criteria, a short-term road disaster management plan was developed for FY 2017 and FY 2018. In addition, a manual for short- and medium-term road disaster management planning was developed.

3.2.1.2 Achievement of Project Purpose

The following indicators were established for the project goals, and since all of them were achieved at the time of completion of this project, the project goals are judged to have been generally achieved.

Table 1 Achievement of Project Purpose

Project Purpose	Indicator	Actual
The capacity of MOTC's relevant units in the project is enhanced for the management of road disaster prevention (including road disaster inspection, preparation of road disaster	1) The management cycle for road disaster prevention is implemented by MOTC's relevant units in the project.	<Achieved> The road disaster management cycle (inspection, evaluation, selection of countermeasures, and planning) was prepared by allocating the budget to the 85.5 km landslide hazard area on the Bishkek-Osh Road by the relevant department of MOTC. However, it was not implemented according to the MOTC; the road disaster management cycle cannot be said to have been implemented.
	2) Draft budget document with breakdowns for road	<Achieved>A short-term road disaster management plan was prepared by the RMD in September

[14] In the existing bridge and tunnel database, information was transmitted to the headquarters by telephone and fax instead of being entered directly on-site as in this project.

prevention management plan, and planning of budget for road disaster prevention).	disaster prevention is prepared by RMD of MOTC.	2017 and September 2018, which includes work types and construction costs for road disaster management works to be implemented within three years. Road landslide monitoring, landslide control works, and installation of emergency warning electric signs were budgeted and planned for implementation according to the plan.
	3) Data from the newly developed road disaster database management systems utilized for formulating a budget by RMD for road disaster prevention.	<Achieved>Data from the road disaster prevention database management system was used to develop the above short-term road disaster prevention management plan.

Source: Prepared by the evaluator based on materials provided by JICA, MOTC, etc.

3.2.2 Impacts

3.2.2.1 Achievement of Overall Goal

The overall goal of the project was to "improve road traffic safety against slope/snow hazard areas in the jurisdictions of the project's road maintenance offices," the continuation of RMD road disaster management initiated under the project was a prerequisite for achieving this goal. However, activities have stagnated since the completion of the Project, and the achievement of the overall goal has been limited. Table 2 shows the achievement status at the time of the ex-post evaluation of the indicators set for the high-level targets.

Table 2 Achievement of Overall Goal

Overall Goal	Indicator	Actual
Safety of the road traffic at the selected disaster-prone areas is improved.	1) In reference to the project experiences and manuals produced by the project, the short-term road disaster prevention management plan continues to be prepared by the RMD of MOTC every year.	<Not achieved>After the completion of this project, a short-term road disaster prevention management plan based on the manual developed during the implementation period has not been prepared. There is an intention to utilize the disaster prevention data from this project in MOTC's road management planning by incorporating it into HDM-4. Still, the prospect of realization is not yet clear.
	2) Road disaster prevention measures are implemented based on the short-term	<Partially Achieved> Although road disaster prevention measures such as landslide monitoring, landslide

	road disaster prevention management plan developed by the RMD of MOTC.	control works, and installation of emergency warning electric signs were budgeted based on the short-term road disaster prevention management plan prepared during the project, they have not been implemented due to activity restrictions caused by the 2020 pandemic of the COVID-19 infection and the lack of contractors available on site to perform the work. At the time of the ex-post evaluation, a short-term road disaster prevention management plan had not been prepared by the RMD, and road disaster prevention works based on the plan had not been implemented.

Source: Prepared by the evaluator based on materials provided by JICA, MOTC, etc.

One of the reasons why activities were not continued, and the top goals were not fully achieved is that "the once clearly defined division of duties related to disaster management was not adequately maintained during the reorganization of MOTC, and activities at the local level stagnated as pointed out in "Appropriateness of the Project Plan and Approach." In addition, many of the MOTC officials who received training left their positions, while those at the regional offices who did not leave were not prepared to continue working on the new topic of road disaster management, referring only to the manual themselves. The operation of the manual in the regional offices is limited, with only a few examples of trained engineers in the regional office in Chuy (DEP 43), which is not in the project target area, using it to analyze the mechanism of flood disasters, referring to it spontaneously. In addition, the weather observations were not continued, and the tablets for data entry were no longer used (see "Sustainability"), which meant that disaster management data, the basis for road disaster management plans, were not collected continuously.

On the other hand, the field survey confirmed that some of MOTC's young engineers show a high level of ability and willingness to work on the database construction conducted in this project. For example, young engineers who received training in this project attempt to collect data on disasters yearly and propose disaster prevention measures in areas where flood disasters frequently occur. In addition, at the Production Innovation Center (PIC) of RMD, which was newly assigned to develop the database, IT engineers who received training under the project and fully understand the importance of disaster prevention have created a plan for the disaster prevention database that will take over the project and have already been working on the database

which can be operated on the MOTC website. If such young engineers are continuously trained through disaster management-related projects by Japan and other donor projects, the situation could be improved by updating and utilizing the disaster prevention database established in this project and establishing a database for road asset management supported by ADB [15]. The road disaster prevention database and the results of the analysis of hazardous areas and meteorological data were utilized in ODA loans and grants funded by JICA. Specifically, the International Main Road Improvement Project (ODA loan) plans to construct a tunnel around 400 km point from Bishkek to prevent rock falls at 409 km point and to prevent landslides at 451 km point (slope protection work, etc.). This project has clarified the necessity of these measures.

Concerning the implementation of road disaster prevention work, first of all, by analyzing the meteorological information collected in this project, the occurrence mechanism and scale of avalanches and ground blizzards were analyzed, which enabled the formation of specific structural measures and contributed to the formation of a case for the grant project (Avalanche Protection on Bishkek-Osh Road Project, and the Project for the Protection from Ground Blizzard on Bishkek-Osh Road Project). Furthermore, the results of the clarification of hazardous areas and the study of countermeasures in this project, a tunnel around 400 km from Bishkek, rockfall countermeasures at 409 km, and landslide countermeasures at 451 km (including slope protection work) will be constructed under the ODA loan project (International Main Road Improvement Project).

The effectiveness of the snow fence implemented in the pilot project was confirmed by interviews with maintenance staff and field visits to DEP 9, where the snow fence was installed, and it was confirmed that the fence appropriately reduced avalanche damage and contributed to reducing the duration of road closures. It has been decided to prioritize the budget allocation for the formation of a road improvement project on the avalanche-prone Osh - Sary Tash Road in the south (the international highway connecting to Tajikistan within the project area) in May 2023, which will include the installation of snow protection fences similar to those in the pilot project. These projects for disaster prevention structures were formed based on the research and training conducted by the project, such as field inspections and analysis of soil and weather conditions in hazardous areas, which played a significant role in the Project. These projects are not necessarily in line with the Short-Term Road Disaster

[15] At the suggestion of ADB, which had participated as an observer in the Joint Coordinating Committee of the project, faculty members and students of the Kyrgyz University of Transport, Construction, and Architecture (KSUTCA)participated in the training program of the project in order to maintain and develop road disaster prevention technology in Kyrgyz Republic for the future. The University continues to conduct classes using the Project's manuals, contributing to developing human resources for road disaster prevention.

Management Plan prepared in 2018 during the implementation of this project. Still, it is the impact of this project that contributes to the overall goals.

From the above, although the achievement of the overall goals at the time of the ex-post evaluation is limited compared to the plan, the overall goals can be considered to have the potential to be achieved in the future.

3.2.2.2 Other Positive and Negative Impacts

1) Impacts on the Environment

The project was judged to have minimal undesirable environmental impacts under the "JICA Guidelines for Environmental and Social Considerations" (established in April 2010) and was classified as Category C. No adverse impact on the natural environment was found for the project, including pilot snow fence construction.

Snow fence constructed in the pilot project (Source: Evaluator)

DEP staff engaged in maintenance work near the snow fence (Source: Evaluator)

2) Resettlement and Land Acquisition

Resettlement and land acquisition were not anticipated at the beginning of the project, and neither of these occurred, even in the pilot project.

3) Gender Equality

It is worth noting that women are also part of the MOTC engineering team. Out of approximately 70 trainees who participated in the training program, 10% were women. Two female engineers, who studied in Japan from MOTC and were part of JICA's "Core Human Resources Development Program for Road Asset Management" that started after this project, studied themes related to disaster prevention measures. Both women were counterparts in the training program and gained valuable experience before studying in Japan for further studies.

4) Marginalized People, Social Systems and Norms, Human Well-being and Human Rights

Approximately 20 students and faculty members of Roads, Bridges, and Tunnels of the Kyrgyz State University of Transport, Construction, and Architecture (KSUTCA)

participated in the training program. The engineer affiliated with the Kyrgyz Roads Corporation, who received training from this project, continues to give lectures at the university, using the manual prepared by the project. Long-term results were achieved in that future road engineers learn the importance of disaster prevention.

Based on the above, it can be judged that the project goals of this project were generally achieved in light of the indicators, but the achievement of the overall goals was limited because the activities were not continued after the completion of the project. Since this project has achieved its project purpose and overall goal only to a certain extent, effectiveness and impacts of the project are moderately low.

3.3 Efficiency (Rating: ③)

3.3.1 Inputs

Table 3 shows that the project had several plan changes, including diversification of targeted hazards, changes in database input method, and the input of additional experts in snow protection and construction management. It was necessary to implement certain changes in response to the specific requirements of the field. Some of these changes included the snow fence pilot project, the integration of databases created in the previous bridge and tunnel maintenance and management capacity improvement project, and an additional road asset management seminar. All of these changes were appropriate and relevant.

Table 3 Planned and actual inputs

Inputs	Plan	Actual
(1) Experts	10 Short-Term (70 MM*) 1) Team Leader/Road Maintenance Expert 2) Disaster Prevention Countermeasures Expert 3) Slope/sediment-related Disaster Prevention Expert 4) Snow Disaster Prevention Expert 5) Debris Flow Disaster Prevention/River Engineering Expert 6) Disaster Prevention Facilities Expert 7) Geological Expert 8) Database Expert 9) Cost Estimator/Construction	16 Short-Term (81.03 MM) [16] 1) Team Leader/Road Maintenance Expert 2) Deputy Team Leader/Debris Flow Disaster Prevention/River Engineering Expert 3) Snow Disaster Prevention Expert (1) 4) Snow Disaster Prevention Expert (2) 5) Snow Disaster Prevention Expert (3) 6) Slope Disaster Prevention Expert 7) Database Expert

[16] In addition to the planned specialists, six specialists were added to the team, including two for snow damage control, one for the road disaster prevention database, one for construction management, one for topographical surveying, and one for Japanese training assistance.

	Planner 10) Coordinator/Road Disaster Inspection Assistant	8) Database Expert (2) 9) Disaster Prevention Countermeasures Expert 10) Geological Expert 11) Disaster Prevention Facilities Expert/Cost Estimator/ Construction Planner 12) Construction Supervisor 13) Topographic Survey Expert 14) Landslide Observation Expert 15) Coordinator/Road Disaster Inspection Assistant 16) Japan Training Assistant
(2) Trainees received	To be determined based on the progress of the project.	12 persons
(3) Equipment	・ Inspection and observation equipment (anemometers, etc.) ・ Database system for road disaster prevention (including PCs, etc.)	・ Weather observation equipment (6 locations) ・ 16 tablets and a PC for building a road disaster prevention database system
(4) Others		・ Pilot Project for Snowdrift ・ Road Asset Management Seminar
Japanese Side Total Project Cost	312 million yen	336 million yen
Kyrgyz Republic Side Total Project Cost	1. Counterpart assignment ・ Project Director (Director, Investment Project Implementation Office, MOTC) ・ Project Manager (Deputy Director of RMD, MOTC) ・ Counterpart (several staff from MOTC-related departments) 2. Preparatory works for installation of equipment to be provided 3. Office space (including furniture and communication environment) 4. Operating and recurring expenses necessary for project implementation	Same as the Plan

* MM stands for person-month.

Source: Prepared by the evaluator based on materials provided by JICA, MOTC, etc.

3.3.1.1 Elements of Inputs

The input components of the project are shown in Table 3. There were no particular problems with the quality or timing of the inputs. Partial installation of snow fences and simulation analysis were added as pilot projects based on the results of weather observations. The number of expert trips was increased to implement them, and a seminar on road asset management was added. These are considered to have been appropriate additional inputs to strengthen outputs, with the pilot project on snow damage control effectively strengthening practical capacity and substantially reducing damage related to snow damage control. The road asset management seminar effectively promotes an understanding of the disaster prevention database within MOTC. The seminar was an appropriate additional input to strengthen the outputs [17].

3.3.1.2 Project Cost

Due to the additional inputs mentioned above, the project cost was 336 million yen, slightly exceeding the plan (108% of the plan), compared to the planned 312 million yen. The reason why the actual results exceeded the plan was due to the additional investment mentioned above. The input from the Kyrgyz side was as planned, but data on the project cost was unavailable; therefore, the amount of input has not been confirmed.

3.3.1.3 Project Period

The project period was 38 months, from April 2016 to May 2019, within the plan (within 100%).

The project cost was slightly higher than planned but within the project period plan. The added inputs are highly efficient due to the above. Therefore, efficiency of the project is high.

3.4 Sustainability (Rating: ②)

[17] Thanks to the meteorological observation equipment, MOTC could accumulate data, resulting in identifying the snow damage situation in 2016 more precisely. As a pilot project, snow fences were partially installed and analyzed, and more experts were sent to the project area, enabling them to transfer practical technology on snow damage type, scale, and countermeasure construction while also confirming the actual snow damage situation on-site. In addition, the Road Asset Management Seminar was very significant in promoting understanding of MOTC's database operations, integrating the preceding bridge and tunnel database, and ensuring the sustainability of the disaster prevention database operations.

3.4.1 Policy and System

The Project aimed to promote preventive road disaster management (mitigation of damage through disaster prevention works) through MOTC. Still, the Kyrgyz Government Decree No. 435 (2011) on "Establishment of Disaster Control Headquarters for Prevention and Mitigation of Avalanches, Landslides, and Other Slope Disasters on Public Roads" stated that MOTC's role was only restoration after a disaster occurrence. The 2018 amendment to the same decree does not explicitly identify road disaster management as a scope of MOTC.

The project reaffirmed to the MOTC executives that road disaster prevention through structures can contribute to the overall efficiency of road investment. Still, due to a series of departures of MOTC executives and insufficient budget during 2015-2020, implementation was only considered in donor projects. Revision and development of policies and systems that could support the construction of structures for road disaster prevention have stalled. Despite these policy and institutional challenges, MOTC is continuously working on disaster prevention work, including other JICA projects, as mentioned in the Impact section, on road sections with high disaster risk, to efficiently fulfill its responsibility to realize uninterrupted traffic on trunk roads within a limited budget.

On the other hand, the project formulation mission of this project did not sufficiently confirm at the time of planning that MOTC did not have the personnel to conduct the meteorological observations necessary for planning disaster prevention structures. It was challenging to continue meteorological observations after the project's completion because appropriate means of coordination with the MES, primarily responsible for meteorological observation operations, and sharing equipment and data were not agreed upon before the project began. This made it challenging to continue weather observation after the project's completion. In this regard, MOTC is working to continue weather observation equipment on the premises to be transferred to the MES.


Weather observation equipment stored at the DEP 23 office (source: Evaluator)

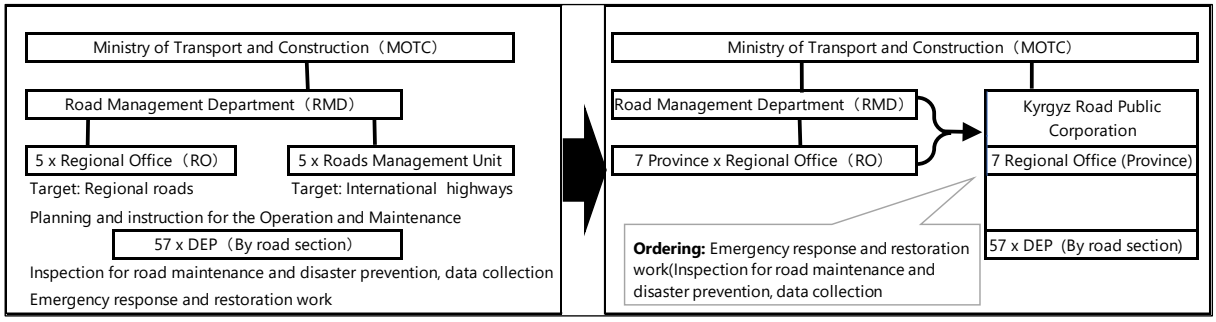
From the above, there are some problems in policy and institutional aspects, and the prospects for improvement and resolution are unclear.

3.4.2 Institutional/Organizational Aspect

After the Project's completion, MOTC implemented its reorganization in 2022. The information on the personnel changes is not sufficiently shared. All DEPs that were

supposed to conduct inspections and assessments for road disaster prevention, planning, and project formation for disaster prevention works under the project became part of the Kyrgyz Roads Corporation (see Figure 2). In addition, the collection of disaster data and research on roads was to be handled by the Production and Innovation Center, established in 2017 upon the request of the RMD; the DEP was to take the form of a commission from the RMD to carry out disaster prevention-related work, and without a mandate and budget allocation for this purpose, they would not carry out disaster prevention work. On the other hand, there is only one RMD regional office in each province, which, in addition to maintaining the hundreds of kilometers of roads under its jurisdiction, is limited in its capacity to perform the disaster management work that the DEP has performed. MOTC is currently in a transitional period shortly after the reorganization. As such, the scope of responsibilities of the local organizations clarified in the project needs to be clearly redefined under the new organizational structure. Given the importance of preventive road disaster management, the MOTC will reexamine the division of tasks for road disaster management within the Ministry and cooperate with the MES.

As described above, there are some problems in the organization and structure, but there are still possibilities for improvement and solutions.



Source: Prepared by evaluator based on materials provided by MOTC and interviews.

Figure 2 Contrast diagram before and after the organizational change

3.4.3 Technical Aspect

The project strengthened the capacity of the RMD to collect and analyze disaster-related data in the field, operating a database to accumulate disaster-related data and developing investment plans for road disaster management. After the project, only about 30 of the approximately 70 individuals who received technology transfer remained, as the rest retired or changed jobs at the time of the ex-post evaluation. According to interviews with RMD headquarters and regional offices, DEP of the Kyrgyz Roads Corporation, and others, there are still personnel with lecturer-level technical capacity on the project's themes. On the other hand, only a few people are

considered to be able to continue disaster management-related work in their jurisdiction. Four counterparts were trained to be lecturers, but only two or three remained at the time of the ex-post evaluation, and thus, the training program was discontinued.

The manuals prepared by the project are perceived as significantly advanced by MOTC engineers who are learning about disaster prevention for the first time, and they have yet to utilize these manuals much. It was almost impossible to confirm that the engineers who participated in the training under the project at the regional offices utilized the manuals. On the other hand, there were examples of Kyrgyz Roads Corporation staff using these documents to conduct lectures and contribute to the education of engineers.

As factors contributing to the low level of utilization, it can be pointed out that the training participants included MOTC staff with low IT literacy, as mentioned in "Appropriateness of Project Plan, Approach, etc.," and that the training period was short (two years in effect), which was not enough time for the MOTC staff to learn the new topic of road disaster prevention.

On the other hand, MOTC also has young and capable engineers (see Impact). MOTC recognizes the need to strengthen its capacity in disaster prevention to respond to the increasing trend of road disasters and hopes to rebuild its capacity with the support of donors by providing training using the technology transferred under this project. For example, the project has received support from ADB for data collection and database construction. JICA's long-term training program, "Road Asset Management Core Human Resource Development Program," develops human resources who can contribute to road disaster management. It should be noted that after the completion of the Project in 2019, several training sessions were held to disseminate information on road disaster prevention before the spread of the new coronavirus infection, but the dissemination of the technology to the entire MOTC has since ceased.

Based on the above, there are some problems with the technology required to sustain the effects manifested by the project, but there are still possibilities for improvement and resolution.

3.4.4 Financial Aspect

Although budgets for road disaster management have been secured in the past mainly through the inclusion of disaster management works in donor-supported projects, there are beginning to be examples of governments implementing disaster management works from their budgets (see Impact).

According to MOTC, the road maintenance and repair budget has been almost halved since 2020 due to the priority given to responding to the COVID-19 pandemic. However, after 2022, the state budget situation began to improve, and the amount of the emergency budget allocated for disaster response and disaster prevention studies in the road sector recovered to about 70% of the 2019 level. With establishing the Road Fund in Kyrgyz Republic in 2021, which provides a stable source of public investment in roads, the budget for road disaster management is expected to continue to increase based on the interview with the MOTC and ADB.

Based on the above, there are some financial problems, but the prospects for improvement and resolution are high.

3.4.5 Environmental and Social Aspect

A snow fence (4 m high and 50 m wide) was installed as a pilot project at the 128.5 km point on the Bishkek-Osh Road, an avalanche-prone area. The area where the fence was installed is near a mountain road, and there are no houses in the neighborhood. Thus, resettlement and land acquisition did not occur. No impacts of concern to the environment or society have been identified.

3.4.6 Preventative Measures to Risks

One of the sustainability issues in this project was that many of the counterparts left around the time of MOTC's reorganization. According to MOTC, the turnover was significant until around 2022, when the reorganization took place, but by 2023, when the ex-post evaluation was conducted, the turnover had settled down. In addition, based on the experience of the rapid increase in the number of younger staff due to the reorganization, MOTC is now assigning young engineers to key positions and having them participate in external training programs, including JICA training programs, to strengthen their abilities and give them more responsibility to maintain their skills.

Based on the above, there are no problems in terms of risk response.

3.4.7 Status of Operation and Maintenance

The equipment provided by the project and its operational status at the time of the ex-post evaluation are shown below.

Table 4: Current status of equipment

Equipment provided	Status at the time of the ex-post evaluation
Equipment for database ・ 16 tablets for distribution to regional offices,	Eight tablets were lost. Road disaster prevention data

· A laptop computer at RMD headquarters, File Maker Server 1 software	accumulated in File Maker has not been updated since 2019.
A set of meteorological observation equipment (for six locations) · Two laptop computers for observation · Anemometer, snow gauge, solar panel system, storage, KADEC communication software, data logger	These were stored in the warehouses of the DEP9 and DEP23 offices and have not been operated since after the completion of this project in 2019.

Source: Prepared by evaluator based on materials provided by JICA, MOTC, etc.

The project provided tablets and PCs for managing the road disaster prevention database and equipment for conducting weather observations at six locations, but these were not operational. Of the 16 tablets provided to the regional offices, only eight were confirmed to exist during the period of the ex-post evaluation [18]. After the project's completion in 2019, the RMD ordered that all remaining tablets be returned to headquarters because the tablets distributed to the regional offices were not functioning correctly to send data to headquarters and were difficult to repair even after review by MOTC's internal IT specialists [19]. As a result, many regional offices were cut off from information collection via tablets. They were unable to monitor hazardous areas or accumulate information that could be used as a basis for post-disaster analysis. The Production Innovation Center plans to use smartphones instead of tablets for future data collection and input.

The meteorological observation equipment was stored in the warehouse of the regional office at the end of the Project and ceased operation. During the implementation period of the Project, the actual collection of meteorological observation data was carried out by the MES, as the MOTC staff could not continue the meteorological observations. In response to the findings of this ex-post evaluation, MOTC is considering resuming the operation by transferring it to the MES.

Therefore, there are issues with the operation and maintenance status of the equipment provided under this project.

From the above, some minor issues have been observed in the project's systems, institutions, organization and structure, technology, financial situation, and operation and maintenance of the provided equipment that may affect the sustainability of the project's effects. They are not expected to be improved and resolved. Therefore,

[18] The remaining eight tablets were lost. The reason behind this loss was that the tablet had specifications that allowed it to be used for purposes other than database management.
[19] The young regional office engineers, who were eager to collect the data, protested against this recall order of tablets. A few engineers did not comply with the recall, claiming that their tablet devices were necessary for their work, and they continue to collect local disaster information and use it for analysis for maintenance and management purposes.

sustainability of the project effects is moderately low.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

The technical cooperation project was implemented with the project objective of improving the capacity of relevant departments in the MOTC that have jurisdiction over areas where avalanches and other slope hazards frequently occur on trunk roads in the region, to manage road disaster prevention. The project was implemented with the overall goal of improving road traffic safety in areas affected by slope/snow hazards. The project is in line with the country's relevant policies and development needs, which emphasize road disaster prevention since the Kyrgyz Republic has severe natural conditions that cause various types of disasters, and road transportation is the primary means of transportation at the time of the project formulation and the ex-post-evaluation. The project is consistent with Japan's development assistance policy and appears to be linked to related projects of JICA and other donors. Therefore, the relevance and coherence of this project is high. The project objectives were primarily achieved by clarifying the roles of relevant MOTC departments concerning road disaster management, improving their capacity to collect and analyze disaster-related data in the field and to build a database, and strengthening their capacity to plan investments in disaster preventive structures based on the data. Road disaster prevention using the results of this project is being realized under the ongoing grant aid projects and the planned ODA loan project. It is expected to bring about improved safety. However, the activities initiated under the project are not fully sustained after its completion, and achieving the overall goals still needs to be improved. Therefore, the effectiveness and impact of the project is moderately low. Although the project cost of this project was slightly higher than planned, the added inputs and activities were effective and appropriate to strengthen the outputs. The project duration was as planned. Based on the above, the efficiency of this project is high. Due to the MOTC's reorganization after the project's completion, the division of roles among MOTC's related departments regarding road disaster prevention became unclear. There are issues regarding the maintenance and dissemination of technology and the operation and maintenance of the equipment provided under the project. Therefore, the sustainability of the effects of the project is moderately low. In light of the above, this project is evaluated to be partially satisfactory.

4.2 Recommendations

4.2.1 Recommendations to the Implementing Agency

In view of the importance of road disaster prevention in the Kyrgyz Republic, MOTC needs to address the following issues to continue road disaster prevention using the results of this project.

- Review the allocation of responsibilities for road disaster prevention following the reorganization and establish it promptly through a new decree. Specifically, define the working framework for inspecting and collecting disaster information by DEP personnel.
- Training courses for RMD, Kyrgyz Roads Corporation, and DEP staff will be conducted with project counterparts as lecturers, and disaster management operations will be resumed using the manuals prepared by the Project.
- A plan for this project's meteorological observation equipment will be developed promptly. If operating the equipment within MOTC is challenging, the equipment will be transferred to MES to re-establish a system for resuming meteorological observations for road disaster management.
- The information gathered from the above data collection will be stored in a database for road disaster prevention. This information will be analyzed for future integration with the road asset management database and to enhance the examination of further countermeasure works for disaster prevention.

4.2.2 Recommendations to JICA

While JICA should monitor the implementation of the above recommendations to MOTC, additional cooperation is needed to facilitate their implementation. In particular, JICA needs to actively coordinate with the MES regarding using weather observation equipment and work with ADB to integrate the road disaster management database [20].

4.3 Lessons Learned

<u>Technology Transfer in line with the Technology Absorption Capacity of the Implementing Agency</u>

The practical training on collecting and analyzing information at disaster sites using tablets, conducted as on-the-job training on the theme of disaster prevention, which was new to MOTC in this project, was highly appreciated by the younger generation at each regional office. However, data collection using tablets has not been continued since the completion of the project. The reasons for this are the high turnover rate of MOTC staff, the inclusion of staff with low IT literacy in the database training, which made it difficult for them to operate the database, and the fact that there is no opportunity for

[20] As mentioned in the "Relevance" section, other donors are interested in this project as it contributes to disaster prevention, an adaptation measure against climate change.

the training participants to exchange information and deepen their understanding of the technology and its practical application through hands-on experiences.

Therefore, when conducting technology transfer on a new theme to the implementing agency, it is necessary to grasp the human resource structure of the implementing agency in more detail at the time of planning, including the knowledge and abilities of staff (IT knowledge, experience in related work, etc.) and their length of service and turnover rate, and to consider a more realistic training plan that is appropriate for the technology absorption capacity of the implementing agency. In addition, IT literacy and age should be considered in the selection criteria for training targets when IT is used. Furthermore, consideration should be given to ensuring a sufficient project period for acquiring and retaining technology, submission of practical data after training, exchange of information on practical experience, and follow-up training.

Need for organizational and institutional support

The role of MOTC in disaster is limited to post-disaster restoration based on the government ordinance, and road disaster prevention has not yet been clearly identified as its scope of work. This may affect the project's sustainability in terms of policy, organizational structure, and finance. In addition, the fact that meteorological observations were not included in the MOTC's scope of work was a decisive factor in the inability to continue meteorological observations after the completion of this project.

However, this project's scope did not include formulating cross-ministry organizations, institutions, and coordination systems. It was not fully considered how the lack of specification regarding preventive disaster management in MOTC's responsibilities and MES's primal responsibility for weather observation would affect the project. When this project was planned, the MES and the Prime Minister's Office, as well as MOTC, should have been encouraged to revise and improve their policies and systems for road disaster prevention and detailed coordination with ADB, which was considering supporting the database construction, should have been made immediately after the project started regarding the approach and specifications for the database construction.

Therefore, when providing technical cooperation on issues that involve multiple government agencies, it should be considered to include the creation of organizational structures and systems necessary to achieve the project's desired outcomes after careful examination of the relevant laws and systems, implementing agencies, and the scope of work and collaboration of other government agencies and after planning an appropriate project structure.

Monitoring the Operation of Equipment Provided through Technical Cooperation

JICA first became aware of the fact during this ex-post evaluation that the operation of weather observation equipment had been suspended after the completion of the project and that some of the tablets provided had been lost and were not being fully utilized. As stated in the technical cooperation agreement, the equipment is the property of the counterpart government. It is to be disposed of or renewed after being correctly used and maintained under the responsibility of the counterpart government. However, JICA should have directly monitored the utilization status of the equipment, which is indispensable for the project to be effective. If this monitoring had revealed the status of the equipment, JICA could have provided appropriate advice to MOTC earlier and promoted the effectiveness of the project through the use of the equipment.

Therefore, JICA should review its current operation so that the JICA office can monitor the operation of essential equipment that may be critical to the sustainability of the technical cooperation.

5. Non-Score Criteria

5.1 Performance

5.1.1 Objective Perspective

None in particular.

5.2 Additionality

None in particular.

(End)