Republic of Tajikistan

FY2021 Ex-Post Evaluation Report of

Japanese Grant Aid Project

"The Project for Improvement of Dushanbe International Airport (Phase 1) (Phase 2)"

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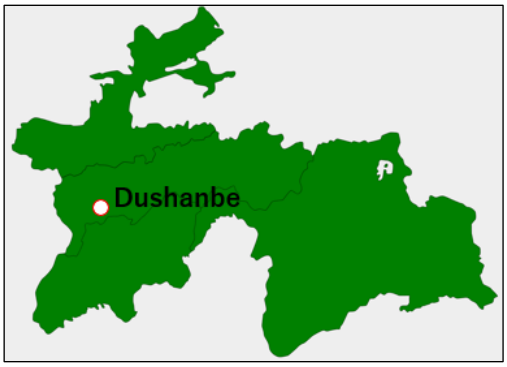
0. Summary

The Project was implemented with the aim to improve safety of aircraft operations and passenger and cargo handling capacity by upgrading air navigation safety equipment and improving cargo handling facilities at Dushanbe International Airport (DIA), thereby contributing to the facilitation of logistics flow.

Its purpose is in line with Tajikistan's development policy at the time of planning and the ex-post evaluation, which has emphasized the importance of air transportation and development of airport facilities, and development needs to improve safety and facilities at the airport, which plays an important role in air transportation. Although there was no specific collaboration or coordination with projects or assistance other than from the Japan International Cooperation Agency (JICA), it was confirmed that the Project was in line with Japan's aid policy, which has emphasized the development of transport infrastructure, and with Goal 9 of the Sustainable Development Goals (SDGs), as well as with technical cooperation projects aimed at improving the operational capacity of air navigation services. Therefore, its relevance and coherence are high. The Project costs exceeded the plan, and the Project period largely exceeded the plan due to unsuccessful tenders and delays in tax exemptions. Therefore, efficiency of the Project is moderately low. The installation of air navigation safety equipment under the Project has improved the safety and reliability of aircraft operations by enabling appropriate aircraft arrivals and departures. At the cargo terminal, it has become possible to streamline cargo handling operations and handle perishable and medical goods that require temperature control, thereby contributing an impact such as receiving emergency relief supplies in the wake of the new coronavirus infection (COVID-19). On the other hand, with the opening of land routes with Uzbekistan and air services limited due to COVID-19 and the situation in Ukraine, international cargo handling volume has decreased compared to before the Project, resulting in substantially lower volumes than planned. As mentioned above, this Project has achieved its objectives only to a certain extent. Therefore, effectiveness and impacts of the Project are moderately low. No issues have been observed in the policy/system, institutional/organizational, technical, financial, environmental, and social aspects, including the current status of operation and maintenance. Therefore, sustainability of the Project effects is very high.

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

1. Project Description



Project Location

Inside of the Cargo Terminal

1.1 Background

DIA, located in the capital of Tajikistan, was expected to play a role in inter-regional trade and as a hub for such trade, taking advantage of its location where Afghanistan was only about three hours away by road. As the number of passengers at the airport increased at an annual rate of 15-18% between 2009 and 2013, the volume of air cargo was also expected to increase sharply from 3,258 tons in 2013 due to an increase in passenger flights and large cargo flights.[1]

However, the Instrument Landing System (ILS) to guide aircraft onto the runaway was installed only for one direction at DIA. With this condition, the flights were frequently cancelled or delayed due to heavy fog, and the installation of air navigation safety equipment was an urgent issue. In addition, the cargo terminal, which had been constructed 50 years ago, had become severely dilapidated and lack of equipment made temperature control and handling of large cargo difficult. Against this backdrop, a Grant Aid project to upgrade air safety navigation equipment and improve the cargo terminal was requested from the Government of Japan to improve the safety of aircraft departure/landing and the efficiency of cargo handling.

The Project cost significantly exceeded the plan due to inflation caused by currency depreciation as well as a rise in bidding prices with fears of further inflation in the future, resulting in a funding shortfall. The objectives of the Project could not be achieved if the facility component was cancelled or scaled down, and it was difficult to forecast the increase in Project costs due to inflation and future inflation concerns caused by currency depreciation in advance. Therefore, "The Project for Improvement of Dushanbe International Airport (Phase 2)" was implemented as an additional grant aid.

1.2 Project Outline

The objective of this Project is to improve safety of aircraft operations and passenger and cargo handling capacity by upgrading air navigation safety equipment and improving cargo handling

[1] Source: Ex-ante evaluation summary

facilities at DIA, thereby contributing to the facilitation of logistics flow.[2]

Grant Limit/Actual Grant Amount	1,914 million yen (Phase 1), 356 million yen (Phase 2)/ 1,880 million yen (Phase 1), 337 million yen (Phase 2)
Exchange of Notes Date/Grant Agreement Date	September 2014, August 2018 (Extended) (Phase 1), March 2017 (Phase 2)/September 2014, August 2018 (Extended) (Phase 1), March 2017 (Phase 2)
Executing Agency	Dushanbe International Airport (DIA)
Project Completion	July 2018 (Phase 1) (Phase 2)
Target Area	Dushanbe International Airport/Dushanbe city
Main Contractors	(Civil works) Dai Nippon Construction (Equipment) AddedValue Inc.
Main Consultants	Nippon Koei Co., Ltd., Japan Airport Consultants, Inc, Daiken Sekkei, Inc. (JV)
Preparatory Survey	November 2013 - September 2014
Related Projects	[Technical Cooperation] ・Project for Improvement of Air Navigation Services (2016 – 2018) ・The Capacity Development Project for Implementation of Performance Based Navigation (2020 - 2023) [Government of France] ・Project for the construction of the new terminal of Dushanbe International Airport (2012) ・Project for the improvement of the basic facilities at Dushanbe Airport (2012) ・Project for the construction of the control tower at the Dushanbe airport (2013) [European Bank for Reconstruction and Development] ・Project for Tajikistan State Air navigation systems development (2001) [International Finance Corporation] ・Project for Improvement of airport control facility at Dushanbe Airport (2014)

[2] At the time of planning, the objective of the Project in Phase 1 was: "To improve safety of aircraft operations and cargo handling capacity by upgrading air navigation safety equipment and developing cargo handling facilities at DIA, thereby contributing to the facilitation of logistics in the country." Phase 2 had a different description of the Project objective: "To improve the safety and passenger/cargo handling capacity by upgrading air navigation safety equipment and developing cargo handling facilities at DIA, thereby contributing to economic infrastructure development." However, as the Phase 1 and Phase 2 is same in scope, the Project objective was set in the ex-post evaluation in order to show the impact in a concrete and comprehensive manner as described.

2. Outline of the Evaluation Study

2.1 External Evaluator

Hisae Takahashi, Global Group 21 Japan, Inc.

2.2 Duration of Evaluation Study

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

Duration of the Study: October, 2021 – November, 2022

Duration of the Field Study: July 4th – July 9th, 2022

2.3 Constraints during the Evaluation Study

The planned field survey could not be implemented by the evaluator due to the spread of COVID-19. For this reason, the first field survey was implemented by a local assistant under the direction of the evaluator, and the evaluator conducted a survey remotely based on the results of the field survey conducted by the local assistant, such as information collection, interviews with the stakeholders, and site inspections.

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

3.1 Relevance/Coherence (Rating: ③[4])

3.1.1 Relevance (Rating: ③)

3.1.1.1 Consistency with the Development Plan of Tajikistan

At the time of the Project planning, Tajikistan's mid-term action strategy, the *Living Standard Improvement Strategy (2013-2025)*, showed the need for strengthening the air transportation sector and had a specific target of increasing the share of air cargo to total cargo volume from 12% to 15% through airport development.[5] The sectoral plan for the transport sector at the time of the planning, The *Transport Sector Development Strategy (2011)*, which was the sectoral plan until 2025, stated that development of the transport sector would ensure the country's economic development, and one of its goals was to improve airport facilities, air traffic control systems, etc.[6]

On the development policy at the time of the ex-post evaluation, the *National Development Policy to 2030*[7] was formulated in 2016 as a long-term policy. The policy sets the long-term goal of improving people's living standards based on sustainable economic development, with the priorities of making effective use of human and natural resources, diversifying the economy, strengthening competitiveness, and expanding and strengthening the middle-income group.

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

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

[5] Source: *Living Standards Important Strategy of Tajikistan for 2013-2015 (2013)*

[6] Source: *National Target Development Strategy for Transport Sector of the Republic of Tajikistan to the year 2025 (2011)*

[7] Source: *National Development Strategy (2016)*

Regarding the sectoral level, the development strategy at the time of planning remains valid at the time of the ex-post evaluation, and this strategy is also identified as the strategy for the transport sector in the *National Development Strategy up to 2030 (2016)*.

As mentioned above, at both times of planning and ex-post evaluation, the purpose of the Project is in line with the Government's development plan for the country, which refers to the importance of air transportation and the need to develop airport facilities to enhance its use.

3.1.1.2 Consistency with the Development Needs of Tajikistan

At the time of the Project planning, DIA was expected to play a role in inter-regional trade and as a hub for such trade, and both the annual number of passengers and the cargo handling volume at the airport were expected to increase rapidly. On the other hand, the cargo terminal of the airport, which was about 50 years old, had deteriorated considerably and was equipped with only two cargo X-ray inspection units and weight scales, with no facilities or equipment capable of controlling temperature or handling large cargo. As a result, there were limitations on the volume and items of cargo that could be handled, creating a logistics bottleneck and an impediment to economic revitalization. Furthermore, the ILS to guide aircraft onto the runway was installed in only for one direction on the runway at the airport, resulting in frequent cancellations and delays due to heavy fog, so installation of air navigation safety equipment to ensure safe operations was an urgent need.

Despite the impact of COVID-19 and the situation in Ukraine, DIA continues to play an important role as the country's air services hub at the time of ex-post evaluation. For example, the annual number of passengers at the airport increased from 1.22 million at the time of planning to 1.44 million[8] in 2019, before the rapid spread of COVID-19. The cargo terminal which handles most of the country's general air cargo, is the only airport in Tajikistan with cold storage facilities capable of handling quality medicines and perishables that need to be kept under appropriate temperature control. In addition, at the airport, where dense fog frequently occurs, ensuring visibility and safe guidance of aircraft is essential for the safe arrival and departure of aircraft, and the need for air navigation safety equipment on the runway is high, even at the time of ex-post evaluation.

As described above, at the time of planning and ex-post evaluation, the development needs for the improvement of the cargo terminal and the modernization of air security equipment were high, and the Project was consistent with these needs.

3.1.1.3 Appropriateness of the Project Plan and Approach

Although the outputs of the Project are mostly as planned, it was decided to carve out some of the outputs and provide Phase 2 due to the increase in bidding prices caused by inflation. No

[8] Source: Questionnaire answers

additional scope or outputs were added in granting Phase 2. The decision was deemed an appropriate change since the rapid inflation was unpredictable, and it was judged that the Project objectives could not be achieved if the scale of output was reduced. In addition, the Project supported the development of air navigation safety equipment and the cargo terminal; thus no differences in intervention effects between beneficiaries are particularly envisaged. Therefore, the Project plan is not impartial. It should be noted that the reason why the cargo handling volume, an indicator of effectiveness, has not reached the target is due to the impact of the COVID-19 pandemic and the opening of the border gate connecting to Uzbekistan. Therefore, it can be concluded that there are no problems with the Project planning, design, logic and approach.

3.1.2 Coherence (Rating: ③)

3.1.2.1 Consistency with Japan's ODA Policy

At the time of planning of this Project, the *Country Assistance Policy for Tajikistan (2012)* identified the development of economic infrastructure as a priority area. It also indicated that the transport infrastructure would be developed to contribute to the revitalization and stabilization of the regional economy through improved logistics, for example by strengthening connectivity with Central Asia and its neighboring countries. The *JICA Country Analysis Paper for Tajikistan (2014)* also identified "the transportation at the connective point between Central Asia and South Asia" as a key issue. In light of the above, at the time of planning, this Project was consistent with the policy of Japan's assistance to Tajikistan.

3.1.2.2 Internal Coherence

At the time of planning, there were no other specific projects which was scheduled to collaborated or be coordinated with; however, the technical cooperation project for Capacity Development in Air Traffic Services (2016-2018) was implemented to improve the operational capacity of air traffic controllers as support in the aviation sector. Although there was no direct collaboration or coordination during the implementation of the Project, the installation of ILS and Precision Approach Lighting System (PALS) on the runway of DIA is one of the important basic conditions for achieving the output of the "Project for Capacity Development in Air Traffic Services." The installation of this equipment is expected to have a synergistic effect in terms of air traffic control operations, as it will reduce the burden on air traffic control officers to facilitate smooth air traffic control, leading to improved safety in air traffic control, and in turn contributing to safer aircraft landings and departures.

3.1.2.3 External Coherence

No complementarity, collaboration, or coordination with projects implemented by other Japanese agencies, other developing partners such as other donors etc., or support provided by

the private sector was identified. In addition, although no consistency with international frameworks was pointed out in the documents as of the planning or by the executing agencies, the Project is in line with SDG Goal 9: *Industry, Innovation and Infrastructure (Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation)* from the perspective of developing high-quality, reliable, sustainable and resilient infrastructure to support economic development. Furthermore, DIA was used as a domestic airport until 1991, and even after it became an airport handling international flights, the facilities and equipment were operated according to domestic airport standards, as they had been before. The Project has provided facilities for a cargo terminal (cold storage facilities, animal storage and dangerous goods space), lighting, fire protection and air conditioning, containers, etc., which previously the airport was not equipped with, enabling the airport to carry out the process in line with international standardization and meet international standards regarding cargo handling, registration, etc.

As described above, the implementation of the Project is in line with Tajikistan's development policy and development needs, and there are no issues with the Project plan and approach. Although there was no specific coordination or collaboration with projects or assistance provided by other organizations, and no outcome generated by collaboration could be confirmed, the consistency of the Project with Japan's aid policy, JICA's technical cooperation project, and international frameworks was confirmed.

Therefore, its relevance and coherence are high.

3.2 Efficiency (Rating: ②)[9]

3.2.1 Project Outputs

This Project was designed to construct the facilities (cargo terminal and other ancillary facilities), procure air navigation safety equipment and equipment for the cargo terminal, and provide consultancy services, and guidance on training and manual preparation for cargo handling (soft component) at DIA. Table 1 shows the planned and actual outputs of this Project understood at the time of ex-post evaluation.

[9] In this Project, Phase 2 was implemented by carving out some of the outputs due to the increase in the bidding price caused by inflation. There were no additional scope or outputs added in conducting Phase 2, and there were no changes of the planned outputs at the time of planning. Therefore, the inputs in efficiency (Project cost and period) were compared between the original (Phase 1) plan and actual results.

Table 1 Planned and Actual Outputs

	Plan	Actual
Construction of facilities	Cargo terminal ・Freight handling area (2,401 m²) Build-up・break-down space Note1, storage for exports and imports, X-ray inspection area, and cold storage facilities ・Special cargo facilities (106 m²) Valuable goods storage, animal storage and dangerous goods space ・Office area (1,203 m²) Cargo terminal office and staff rooms	As planned Note2
Procurement of equipment	・ILS Note3 1 set ・PALS Note4 1 set ・Cargo handling equipment	As planned Note5
Consulting services	Detailed design, construction supervision and procurement supervision	As planned
Soft component	・Creating the operation manual for handling pallets for international cargo handling ・Training for operating methods of cargo handling and use of equipment - Lecture training Learning basic knowledge for handling diverse forms of cargo - Safety and security training Knowledge needed for on-site management, including safety in the workplace, accident prevention and aviation security measures - Practical training Handling of Unit Loading Devices (ULDs) procured as cargo terminal equipment, based on the content of lecture training	As planned

Source: Preparatory survey report and documents provided by JICA
Note 1: It refers to the process of loading or unloading cargo on or from a tool for loading cargo onto aircraft.
Note 2: At the cargo terminal, installation works of ancillary facilities, such as electrical facility, water supply and drainage facility, air conditioning and ventilation facility, and outdoor facilities (paving, outdoor electrical and drainage) were carried out in Phase 2 of the Project.
Note 3: Systems that enable landing by providing highly accurate navigation information even when visibility is reduced.
Note 4: Lights that indicate the centerline of the runway and the direction of approach when an aircraft approaches an airport runway for landing. As a general rule, they are installed on runways where the landing approaches are instructed by ILS.
Note 5: ILS and PALS were procured in Phase 2.

As shown in Table 1, although the outputs were as planned, some changes occurred in the specification of a part of facilities and equipment to be covered by the Tajikistan side. According to the executing agency, each change (see below) did not affect the functions of the facilities and

equipment, and there is no impact on the generating effects or the Project period due to these changes.

Change in facility specifications.

- Change in the shape of the septic tanks (due to downsizing of the existing septic tanks installed in the cargo terminal facilities, as three years have passed after design).
- Increase of circuits in the main switchboard (based on changes/requests for construction work to be borne by the Tajikistan side).

Change to make some equipment covered by the Tajikistan side

Due to price increases, there was a deviation from the cost estimate, and then some equipment for the cargo terminal equipment (towing tractors, container and pallet dollies, bulk carts and forklifts) had to be covered by the Tajikistan side to ensure the E/N amount wasn't exceeded.

In addition, as mentioned above, since equipment that had not been handled before was installed at the cargo terminal in this Project, training on the handling of cargo using this equipment and guidance on the preparation of a manual on the operation of the cargo terminal were provided. According to the staff who received the training and guidance, the content, timing and duration of the training were appropriate. However, the number of staff who remained with the executing agency at the time of the ex-post evaluation was limited, and staff from the executing agency raised the opinion that the number of staff who participated for the training was limited.

In addition to the cooperation items from the Japanese side, the Tajikistan side was also expected to handle the following items in this Project:

1）Necessary steps related to Banking Arrangement and Authorization to Pay with payment of relevant commission
2）Exemption of taxes and duties on imported equipment and materials
3）Entrance to the site and construction permits
4）Securing construction sites, earth dumping sites, waste disposal sites
5）Removal of existing equipment for installation of new equipment
6）Taxes and fiscal levies for procurement of materials and services
7）Securing temporary yard for materials and equipment
8）Securing commercial power on site and provision of existing main power distribution network
9）Securing the budget and human resources for maintenance

According to the executing agency and Project consultant, all responsibilities on the Tajikistan side were carried out, though tax exemption took longer time than planned.

3.2.2 Project Inputs

3.2.2.1 Project Cost

This Project was planned to cost 1,932 million yen, consisting of 1,914 million yen on the Japanese side and roughly 18 million yen on the Tajikistan side. The actual Project cost was 2,228 million yen (2,217 million yen[10] on the Japanese side, 11 million yen on the Tajikistan side), slightly exceeding the plan (115% of the original plan).[11]

The reason why the Project cost exceeded the plan was inflation. Meanwhile, there were also concerns about further inflation in the future. The inflation caused the prices of tenders for the facilities component to rise, resulting in significantly exceeding the originally planned Project costs. In the tender in November 2015, as the bidding price was approximately 30% higher than the planned amount, it turned out that it exceeded the original E/N amount. Accordingly, the need for Phase 2 of the Project was confirmed based on discussions between the Tajikistan side and JICA[12]. At the time, inflation was affected by the rapid deterioration of the Russian economy due to low oil prices and economic sanctions, and the resulting depreciation of the currency. On the other hand, it would have been difficult to foresee these circumstances at the time of planning[13]. The fact that the major materials for the construction were not produced in Tajikistan and were imported from outside the country, and higher fuel prices, also contributed to the increase in the inflation coefficient.[14]

3.2.2.2 Project Period

The Project period[15] was planned to be 26 months, from August 2014 to September 2016, but the Project lasted 45 months, from November 2014 to July 2018, which significantly exceeded the pan (173% of the plan)[16]. The delays were caused because of the re-bidding by dividing the components as a result of an unsuccessful bid for the construction works due to increase in the bidding price which was affected by inflation. In addition, there was a delay of approximately six months in the Tajikistan Government's tax exemption procedures.[17]

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[10] 1,880 million yen out of 2,217 million yen was granted in the Phase 1 and the remaining 337 million yen in the Phase 2 of the Project.

[11] Excluding the estimated cost of procured equipment which was initially due to be covered by Japan, but later was decided to be borne by the Tajikistan side, the total Project cost at the time of planning was 1,902 million yen, which is 117% of the actual cost (2,228 million yen). Therefore, it can be said that the Project cost exceeded the plan even when the reduction in the output portion incurred is taken into account.

[12] Source: Documents provided by JICA

[13] Source: Comments from JICA Financial Cooperation Implementation Department and questionnaire answers from the Project consultant

[14] Source: Questionnaire answers from the executing agency

[15] The Project period is defined as the period from the month in which the contract with consultant is made to the month in which the facility construction and equipment procurement /soft component are completed.

[16] As described, there was no change in the outputs in this Project. Therefore, the Project cost was analyzed by comparing the planned Project period of Phase 1 with the actual results. On the other hand, Phase 2, for which the G/A was signed in May 2017, assumed a Project period of 45 months; thus it can be said that no Project delay occurred.

[17] Source: Questionnaire answers from the Project consultant

Table 2 Planned and Actual Project Period by Item

	Plan	Actual
G/A – Detailed design	8 months	September 2014
Detailed design		November 2014 – March 2015
Tendering period	—	(Phase 1) September 2015 – December 2016 (Phase 2) Negotiated contract July 2017
Construction of the cargo terminal	15 months	February 2017 – June 2018
Procurement of equipment	8 months	September 2016 – March 2017
Soft component	2 months	May – July 2018
Project period	26 months[Note1]	45 months

Source: Preparatory survey report, documents provided by JICA, and questionnaire answers.
Note 1: As some of the work processes overlapped, the entire Project period was planned to be 26 months from the month of the contract of consultant for the detailed design.

In light of the above, the Project cost slightly exceeded the plan. While facility construction and equipment procurement were carried out almost as planned, the overall Project period significantly exceeded the plan due to re-bidding. Therefore, efficiency of the Project is moderately low.

3.3 Effectiveness and Impacts[18] (Rating: ②)

3.3.1 Effectiveness

3.3.1.1 Quantitative Effects (Operation and Effect Indicators)

At the time of planning of this Project, the ratio of aircraft making an approach or landing at DIA using the ILS system and the increase in the international cargo handling volume at DIA, or the operation and effect indicators of the project, were expected to increase. The actual values for these indicators after Project completion are shown in Table 3.

Table 3 Operation and Effect Indicators of This Project

	Baseline value	Target value	Actual value			
	2014		2018 [Note1]	2019	2020 [Note2]	2021 [Note3]
		3 Years After Completion	Completion Year	1 Year After Completion	2 Years After Completion	3 Years After Completion
Ratio of aircraft making an approach or landing at DIA using the ILS system (%)	80	100	100	100	100	100
International cargo handling volume at DIA (ton)	3,258	8,700	2,268	2,543	368	966

Source: Documents provided by JICA and the executing agency, *DIA Annual Report each year edition.*
Note 1: International cargo handling volume as of July 2018
Note 2: As DIA was closed in April 2020 due to COVID-19, the data for 2020 shows the international cargo handling volume from January to March.
Note 3: DIA resumed operations in July 2021 and aircraft restarted operations.

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

The ratio of aircraft making an approach or landing at DIA using the ILS reached 100%, achieving the target value. On the other hand, the actual international cargo handling volume was significantly below the baseline value. According to the executing agency, the result in 2018 was below the baseline value as the Project was completed in July 2018 and the cargo handling volume in the same year was limited to that from August onwards, which is why the cargo handling volume was lower than the baseline value. In 2019, the border gates between Tajikistan and Uzbekistan, which had been closed since 1998, were opened[19]. Increasing the transportation of cargo by road. This impact is considered to have continued not only in 2019, but also in subsequent years. With regard to 2020 onward, the closure of the airport due to COVID-19 was the cause. It is noted that the airport was closed in April 2020 due to the impact of COVID-19, and both passenger and cargo operations were suspended until July 2021.[20]

Meanwhile, the international cargo handling volume in 2022 has already exceeded the previous year's figure by 1,061 tonnes[21] as of June, and the executing agency explained that exports of fruit, which account for most of its exports, are expected, from the past experiences to increase from July onwards, which is the harvest season. At the time of the ex-post evaluation, cargo flights were mainly limited to operations from Russia and Turkey, with no resumption of cargo flights from China or Kazakhstan, which were the main cargo destinations until operations were suspended due to the COVID-19 pandemic. China's share of cargo handling volumes at DIA was particularly high, at around 30-40%[22] every year, and the resumption of cargo flights from China is expected to increase cargo handling volumes.[23]

3.3.1.2 Qualitative Effects (Other Effects)

For the qualitative effects of this Project, it was assumed that modernizing the air navigation safety equipment would improve the air traffic safety and reliability. According to the executing agency, the following effects were observed.

(1) Improved air traffic safety and reliability

Appropriate aircraft approach and landing/departure

Before the implementation of the Project, DIA had an ILS in only for one direction on the runway, which reduced visibility on the runway during dense fog, heavy rain or snowfall, as a

[19] Tajikistan has had a complicated relationship with Uzbekistan, with both sides claiming to have the other's ethnic group in their country and both sides explaining to be harboring rebels from the other country. However, there has been a trend of improvement in this relationship, backed by efforts to strengthen relations with Central Asian countries by the Mirziyoyev Government, which was established in Uzbekistan in December 2016. Accordingly, the border gates have been opened between Uzbekistan and Tajikistan since 2018.

[20] Even after DIA reopened for operation, only four of the 14 airlines that previously operated there have resumed operations.

[21] Source: Documents provided by the executing agency

[22] Source: Interview with the executing agency

[23] According to interviews with the executing agency conducted in July 2022, the resumption of flights from China is planned for August of the same year.

result posing a risk to departures and landings. The installation of ILS and PALS on the runway in the Project has ensured safety during departures and landings, as all aircraft are utilizing air navigation safety equipment and can take off and land without risk, even when visibility is poor. Since the implementation of the Project, there have been no emergencies during departure and landing at the airport.[24] In addition, as described in 3.1.2.2 Internal Coherence, the installation of ILS and PALS on the runway is directly linked to the safer landing of aircraft, which is also considered to improve air traffic control safety.

Reduction in cancellations and delays of flights to and from DIA

At the time of planning, the situation at DIA, where frequent dense fog with the absence of an ILS caused flight cancellations and delays, was taken as an issue. According to the executing agency, since the installation of the safety equipment in 2018, frequent flight cancellations and delays due to dense fog and other adverse weather conditions have improved, and the effects of ensuring improved operation and punctuality of flights have been realized.

ILS Antennas

PALS Light Seen from the Cockpit

(2) Improvement in the efficiency and quality of cargo handling operations

Improvement in the efficiency and quality of cargo handling operations was reported as an effect of the improvement of the cargo terminal as a result of the Project. According to staff working at the cargo terminal, cargo handling was carried out manually, in the old cargo terminal. In addition, there were no suitable warehouses to store cargo in the terminal at that time, which led to issues such as cargo losses and cargo being stored in an unsuitable environment. The cargo terminal developed through the Project has valuable goods storage, dangerous goods storage and cold storage facilities. Thus, after the installation of facilities and equipment, the cargo handling works have been mechanized with the use of equipment, which has improved the efficiency of operations considerably. In addition, it is currently possible to organize and store each cargo with defined storage conditions depending on each product and type. As a result, the work of receiving and sending cargo has become easier and the time required for cargo handling has been reduced.

[24] Source: Questionnaire answers and interviews with the staff of the executing agency

Transportation companies using the cargo terminal at DIA also reported effects such as an improvement in cargo quality control and enhanced operational efficiency by mechanized cargo handling works with the installation of new equipment. Furthermore, before the cold storage facilities were set up, it was difficult to store goods that require temperature control, such as fruit, Tajikistan's main export cargo, for more than four hours. At the time of the ex-post evaluation, however, it is possible to handle these goods under appropriate temperature control, contributing to maintaining the quality of the goods.

Inside of the Cargo Terminal

Equipment for Cargo Handling

3.3.2 Impacts

3.3.2.1 Intended Impacts

The Project was assumed to contribute to the facilitation of logistics in the country by improving the safety of aircraft operations and passenger and cargo handling capacity. The value of Tajikistan's imports and exports has increased by approximately 1.5 times since the time of planning, as shown in the table below. On the other hand, the direct contribution could not be ascertained due to the lack of clarity on the proportion of transport means with foreign countries in Tajikistan.

Table 4 Value of Tajikistan's Imports and Exports

(Unit: Million US$)

	2015	2016	2017	2018	2019	2020	2021
Export	891	899	1,198	1,074	1,174	1,407	2,150
Import	3,436	3,031	2,775	3,150	3,349	3,151	4,210
Total	4,326	3,930	3,973	4,223	4,524	4,558	6,359

Source: Data Bank, World Bank

According to the executing agency, the number of scheduled flights by large aircraft has been significantly reduced since 2020. Meanwhile, logistics services by air have continued within a limited scope except during periods when aircraft operations were temporarily suspended.

Therefore, it is considered that the Project has indirectly contributed to the facilitation of logistics through the effects of safe aircraft departure and landing even in adverse weather conditions, and improved efficiency of cargo handling operations and cargo quality maintenance due to the modernization and improvement of equipment and facilities at the cargo terminal.

3.3.2.2 Other Positive and Negative Impacts

(1) Impacts on the Natural Environment

The Project did not fall into the large airport sector listed in the *JICA Guidelines for Confirmation of Environmental and Social Considerations (April 2010)*, and was classified as Category B, with less significant undesirable effects on the environment. An environmental permit was obtained in March 2017, and an Environmental Impact Assessment report is not required under Tajikistan's national legislation. At the time of planning, it was planned that surplus soil disposal would be carried out at the airport site as a pollution control measure to meet the country's environmental standards, and that surplus soil disposal would be monitored during construction. According to the Project consultant, during construction, the surplus soil was transported to the airport site (low ground) designated by the executing agency, and leveling work (spreading) was carried out. Although it was not allowed to visit the site due to airport access restrictions, it has been confirmed by the executing agency and the Project consultant that this was essentially a move of soil that was completed within the airport, and that the measures for contamination were implemented and had no environmental impact or negative impact on the outside of the airport.

(2) Resettlement and Land Acquisition

The Project involved the construction of a cargo airport terminal on an existing site, and no land acquisition or resettlement was planned. It was confirmed by the executing agency through the questionnaire answers that neither resettlement nor land acquisition had occurred.

(3) Gender Equality, Marginalized People, Social Systems and Norms, Human Well-being, and Human Rights

No specific and direct initiatives from the perspectives of gender equality, marginalized people, social systems and norms, human well-being, and human rights were articulated at the time of planning, and no relevant impact occurred during and after the implementation and completion of the Project.[25] In addition, due to the nature of the Project, there is no difference between beneficiaries in the Project effects.

[25] Questionnaire answers

(4) Other Positive/Negative Impacts

Use of cargo terminal facilities for emergency assistance

While the cargo handling volume has been significantly reduced due to the impact of Covid-19, the international cargo terminal has been receiving medical supplies, including vaccines, delivered as emergency assistance. The installation of cold storage facilities through the Project made it possible to manage vaccines and medicines transported by air at appropriate temperatures, and approximately 50 tonnes of medical supplies delivered as emergency relief supplies from foreign countries were transported to various parts of Tajikistan through the cargo terminal.

【Contribution of cold storage to the control measures for Covid-19】

The international cargo terminal at DIA has been receiving vaccines and medical supplies sent from foreign countries as emergency assistance. The lack of cold storage at the old terminal limited the handling of medical supplies to tablets and other items that can be managed at room temperature, but the cold storage facilities installed in the Project have enabled vaccines and medicines transported by air to be managed at the appropriate temperature. Due to the limited capacity of the refrigeration facilities of the Ministry of Health in Tajikistan, the DIA accepted approximately 50 tonnes of vaccines and medicines transported as emergency relief supplies, and most of the vaccines were transported directly from the airport's cold storage facilities to medical facilities around the country. According to the Ministry of Health, it would have been difficult to accept the same amount of vaccine without the cold storage facilities at DIA, and the facilities established at the airport have contributed to the country's fight against Covid-19.

Cold Storage Facilities

Inside of the Cold Storage

After the implementation of the Project, the airport has been able to use high-accuracy ILS for all departures and landings, which has improved the safety and reliability of aircraft operations. Although the opening of the border gate to Uzbekistan, Covid-19 and the Ukraine situation have restricted a number of air services, and the actual cargo handling volume has been below the baseline value, the cargo terminal has streamlined cargo handling operations and helped maintain the quality of cargo, including perishable goods. Furthermore, the impact of the use of cargo terminal facilities to transport emergency assistance (medical supplies) and to handle medical

supplies requiring temperature control, such as vaccines, was also confirmed, contributing to the country's Covid-19 control measures. In light of the above, this Project has achieved its objectives only to a certain extent. Therefore, effectiveness and impacts of the Project are moderately low.

3.4 Sustainability (Rating: ④)

3.4.1 Policy and System

As policies, rules and regulations on safety in aircraft operations in Tajikistan, the *General Aviation Rules of the Republic of Tajikistan: air traffic management* (2014) for aircraft has been developed. The rules provide guidelines for aircraft, special vehicles and means of mechanization at aerodromes in Tajikistan, and the facilities and equipment developed under the Project are also utilized in accordance with the rules. In addition, according to the executing agency, the operation manual for the cargo terminal which was created with the support of the Project is very useful for the operation of facilities and equipment in line with global standards and has been used effectively since it was prepared and will continue to be used as an operational guideline for airport facilities and equipment in the country.

3.4.2 Institutional/Organizational Aspect

The cargo terminal is operated and maintained by the Cargo Terminal Department of the DIA, while the security equipment is operated and maintained by the Equipment Department (see Figure 1: Organization Chart of the Executing Agency). Each department works closely together and there have been no problems with the reporting system. Out of a total of 1,582 staff members of the executing agency, 642 staff members including engineers, technicians and drivers, are engaged in the operation and maintenance (O&M) of the airport facilities and equipment, and the executing agency explained that the required number of staff is in place[26]. Although a large number of staff temporarily left the DIA due to the suspension and restriction of air services as a result of the spread of Covid-19, the recruitments of new staff have proceeded and there are no concerns regarding staff numbers. In addition, there is close cooperation between departments and no problems have arisen with the reporting and maintenance systems.

[26] Source: Questionnaire answers, interviews with the executing agency

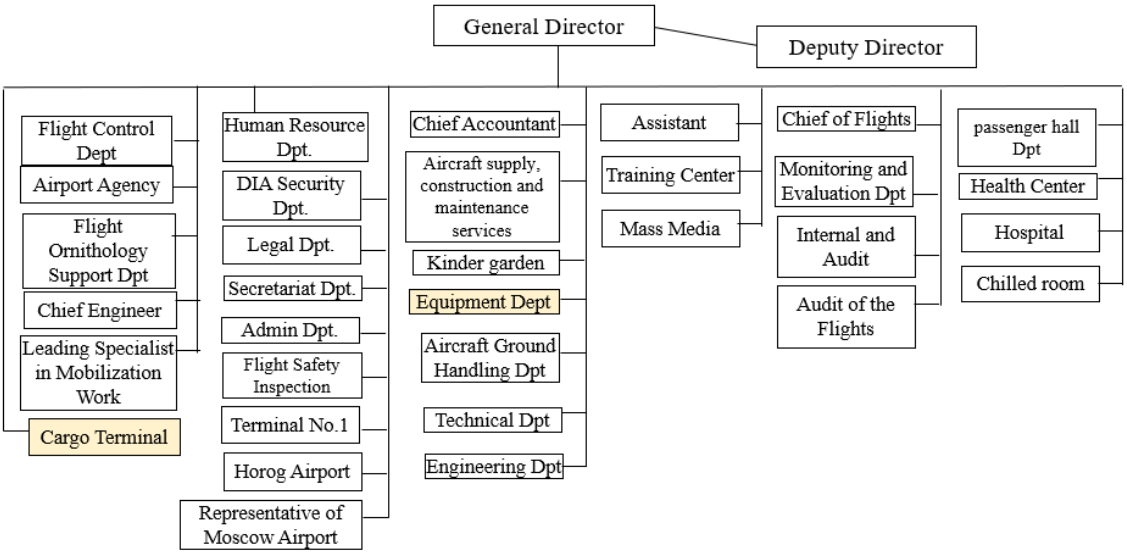

Figure 1 Organization Chart of the Executing Agency

Source: Document provided by the executing agency

3.4.3 Technical Aspect

In the executing agency, technical staff in charge of O&M have engineering vocational school or university degrees. In addition, the executing agency has the technical capacity required for O&M of the ILS and PALS, as they have owned and operated them before the implementation of the Project.[27] In the improved cargo terminal, the facilities and equipment not used in the past have been procured, and training necessary for operations using these facilities and equipment was provided during the implementation of the Project. According to staff who participated in the training, they had opportunities to learn how to operate and maintain facilities and equipment through both lecture and practical training as well as the knowledge of safety equipment in the production plant and safety management on-site through the training, and no technical problems had been encountered in operating and maintaining facilities and equipment by the time of the ex-post evaluation. On the other hand, after the Project was completed, many of the staff who participated in the training left their posts due to the limited air services caused by the spread of Covid-19. At the time of the ex-post evaluation, the staff who participated in the training are working on technology transfer to the newly deployed staff, but that tends to cause a heavy burden on those staff because of a limited number of staff who joined the training.[28] After the Project was completed, with the support of the Asian Development Bank, training was provided to improve the operational capacity of security equipment (once every five years) and transport dangerous cargo (2020). As for cargo terminal staff, training by the external organization is, for example, provided to strengthen their capacity to handle cargo within the budget of the executing

[27] Questionnaire answers
[28] Source: Interviews with the executing agency

agency, contributing to the maintenance of its technical capacities.

Manuals for facilities and equipment are provided in English and Russian and are used as required. Consumables and spare parts are stocked in its warehouse and can also be ordered and obtained. Some items need to be imported from abroad, but there were no cases of problems in obtaining them by the time of the ex-post evaluation.[29] Since both facilities and equipment are confirmed to be in good condition during the site visit, there are no technical concerns.

3.4.4 Financial Aspect

Information on the income and expenditure of the DIA could not be obtained from them since the information is confidential, but its financial position is considered stable as all shares are held by the Government.

For the facilities and equipment developed in the Project, the O&M costs estimated at the time of planning and the actual costs are shown in the table below.[30] The O&M cost of air safety equipment is significantly lower than estimated at the time of planning. This is due to the closure of DIA from April 2020 to July 2021 because of COVID-19. According to the executing agency, there is no shortage of O&M budget. It has been confirmed through site visits that maintenance of air navigation safety equipment and cargo terminal is carried out in accordance with the plan and that the actual maintenance situation is good. Therefore, it can be said that there are no particular problems, as the budget shortfalls have not caused any issues with the O&M activities.

Table 5 The O&M Cost of Air Navigation Safety Equipment (ILS, PALS)

(Unit: Million US$)

		Estimated amount	2020	2021	2022[Note 1]
ILS, PALS	Personnel expenses, Maintenance and repair cost	209,300	46,145	50,780	75,862
	Spare/consumable parts cost	8,000	778	3,504	2,236
	Flight inspection cost	160,000	31,000	31,000	31,000
	Total	377,300	77,923	85,284	109,098
Cargo terminal and related equipment	Personnel expenses, Maintenance and repair cost	301,000	N.A.	N.A.	N.A.
	Spare/consumable parts cost	10,000	N.A.	N.A.	N.A.
	Fuel cost	90,000	N.A.	N.A.	N.A.
	Total	401,000	N.A.	N.A.	N.A.

Source: Questionnaire answers

Note 1: The O&M cost for 2022 is based on estimates.

3.4.5 Environmental and Social Aspect

No negative environmental and social impacts were assumed at the time of planning, and it has

[29] Source: Questionnaire answers

[30] The executing agency explained that the O&M of the cargo terminal and related equipment are treated as part of the overall facilities at the airport, and it is not possible to indicate the costs for only the relevant facility part.

been confirmed by the executing agency that there are no possible negative environmental and social impacts in the future at the time of the ex-post evaluation.

3.4.6 Preventative Measures to Risks

No specific risks were assumed at the time of planning. According to the executing agency, there are also no specific risks envisaged for the future. On the other hand, depending on the future situation of COVID-19 and situation in Ukraine, there are expected to be risks that both passenger and cargo flights will continue to be suspended or reduced and that the operation of facilities and equipment will be limited. Although this is out of the control of the executing agency, it can be said that appropriate action will be required to ensure there is no deterioration of facilities and equipment while they are not fully in operation or used.

3.4.7 Status of Operation and Maintenance

In the site survey, both facilities and equipment were found to be maintained in good condition and well cleaned as shown in the table below. Facilities and equipment at the cargo terminal continue to have low utilization in line with the decline in cargo handling volume, and it is difficult to ascertain what the future outlook is for these facilities and equipment, including the impact of the situation in Ukraine. The operation status of the equipment at the cargo terminal is good excepting the scales and the utilization rate of air navigation safety equipment is also high.

Table 6 Status of Maintenance of the Facility and Equipment

Cargo terminal	Current condition
Freight handling area	
Build-up･break-down space	Good
Storage for exports and imports	Good
X-ray inspection area	Good
Cold storage facilities	Good (The one of two storages is was not in use as of the site survey.)
Special cargo facilities	
Dangerous goods space	Good
Valuable goods storage	Good
Animal storage	Good
Office area	
Cargo terminal office	Good
Staff rooms	Good
Equipment	Current condition
ILS	Good
PALS	Good
Cargo handling equipment	Good except pit and platform scales, aerial work platform

Source: Questionnaire answers and observations during the site survey

At the time of the ex-post evaluation, one of the two cold storage facilities is limited use and empty at times due to a decrease in the cargo handling volume. In addition, large and small scales[31] installed at the cargo terminal have not functioned since their installation. Although the executing agency has contacted the suppliers, the causes have not been specified and it has remained unresolved.[32] Therefore, the existing scale has been used, and the executing agency is planning to obtain quotations for the purchase of a new scale. In addition, the battery of the elevated work platform is out of order though the platform itself is utilized without any problems. According to the executing agency, although Chinese batteries are available on the market in the country, genuine batteries are not available locally, so they are considering purchasing them from abroad to use their equipment longer.

At the time of the defect inspection, it was noted that the septic tank pump was making noises due to the lack of regular lubrication, but appropriate measures have since been taken, and there's no noise in it and no problems have arisen.[33] In terms of the maintenance and management plans for facilities and equipment, a log book has been prepared in each department and preventive measures for maintenance and management are implemented on a daily basis. Minor repairs are handled and resolved by the engineers, while a system is in place whereby major breakdowns, such as problems with lift batteries or problems that occur in the cold storage facilities, are dealt with in each department and the information and necessary budgets are compiled and referred to the procurement department.

The executing agency responsible for O&M of the cargo terminal and air navigation safety equipment has the necessary number of staff with good coordination between departments. Therefore, there are no problems in the institutional aspect. They also have the technical capacity required for the O&M activities. Although financial information is not fully opened and the basis for the figures cannot be verified, a budget to conduct the O&M activities is secured. Furthermore, both facilities and equipment are well maintained and air navigation safety equipment is fully operational, although operations at the cargo terminal remain low due to the impact of COVID-19. As mentioned above, no issues have been observed in the policy/system, institutional/organizational, technical, and financial aspects, including the current status of operation and maintenance. Future the environmental and social issues and risks have been well mitigated. Therefore, sustainability of the Project effects is very high.

[31] The large scale to measure the bulk baggage for export and the small scale for weighting the small baggage for import were procured.

[32] While the executing agency states that the scales have not functioned since installation, the Project consultant confirmed the records of conducting a defect inspection on site in February 2017 and receiving a signature to acknowledge that the inspection was passed.

[33] Source: Questionnaire answers

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

The Project was implemented with the aim to improve safety of aircraft operations and passenger and cargo handling capacity by upgrading air navigation safety equipment and improving cargo handling facilities at DIA, thereby contributing to the facilitation of logistics flow.

Its purpose is in line with Tajikistan's development policy at the time of planning and the ex-post evaluation, which has emphasized the importance of air transportation and development of airport facilities, and development needs to improve safety and facilities at the airport, which plays an important role in air transportation. Although there was no specific collaboration or coordination with projects or assistance other than from the JICA, it was confirmed that the Project was in line with Japan's aid policy, which has emphasized the development of transport infrastructure, and with Goal 9 of the SDGs, as well as with technical cooperation projects aimed at improving the operational capacity of air navigation services. Therefore, its relevance and coherence are high. The Project costs exceeded the plan, and the Project period largely exceeded the plan due to unsuccessful tenders and delays in tax exemptions. Therefore, efficiency of the Project is moderately low. The installation of air navigation safety equipment under the Project has improved the safety and reliability of aircraft operations by enabling appropriate aircraft arrivals and departures. At the cargo terminal, it has become possible to streamline cargo handling operations and handle perishable and medical goods that require temperature control, thereby contributing an impact such as receiving emergency relief supplies in the wake of the COVID-19. On the other hand, with the opening of land routes with Uzbekistan and air services limited due to COVID-19 and the situation in Ukraine, international cargo handling volume has decreased compared to before the Project, resulting in substantially lower volumes than planned. As mentioned above, this Project has achieved its objectives only to a certain extent. Therefore, effectiveness and impacts of the Project are moderately low. No issues have been observed in the policy/system, institutional/organizational, technical, financial, environmental, and social aspects, including the current status of operation and maintenance. Therefore, sustainability of the Project effects is very high.

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

4.2 Recommendations

4.2.1 Recommendations to the Executing Agency

Due to the COVID-19 and situation in Ukraine, the operation of flights may continue to be reduced at DIDA for a period of time. In the meantime, utilization of the installed cold storage facilities and equipment is also expected to be low. The executing agency should keep facilities and equipment running on a regular basis, even during periods when there is no need to do so, to

ensure that the facilities and equipment are not deteriorated by not running them for long periods.

4.2.2 Recommendations to JICA

None

4.3 Lessons Learned

Developing a system for transferring the outcome of training within the organization.

Training was provided on O&M of the newly developed cargo terminal facilities and equipment through the Project. Thanks to the training, it was confirmed that the O&M of the facilities and equipment is being carried out without problems. On the other hand, the majority of staff who participated in the training have already left the executing agency, leaving a limited number of staff to take on the role of transferring skills in the form of on-the-job training to the newly deployed staff, placing a burden on them. As many projects have reported cases where staff who have participated in training leave their jobs, it is desirable to establish rules at the planning stage for the transfer of experience, knowledge and technical capacity gained in training to successors and other existing staff members appropriately when training participants are transferred or leave their jobs, and to establish a system in the executing agency to ensure a sufficient number of staff with technical capacity.

Use of defect inspection when equipment defects are identified at an early stage

Large and small scales procured under the Project have not functioned or been utilized since their installation. As defect liability inspections are usually carried out one year after Project completion, in cases such as this, where the equipment has not functioned or operated since installation and the contractor has not found a solution, it is an option to refer the case to an expert during the defect inspection survey to find a solution.

5. Non-Score Criteria

5.1 Performance

5.1.1 Objective Perspective

None

5.2 Additionality

None