Japanese ODA Loan

Ex-Ante Evaluation (for Japanese ODA Loan)

South Asia Division, South Asia Department 4

Japan International Cooperation Agency

1. Name of the Project

Country：The People's Republic of Bangladesh

Project：Dhaka Mass Rapid Transit Development Project (V)

Loan Agreement：March 29, 2022

2. Background and Necessity of the Project

(1) Current State and Issues of the Urban Development Sector and the Priority of the Project in Bangladesh

The population of Dhaka increased from 6.62 million to 19.8 million (estimated value) between 1990 and 2018 (United Nations Population Division, 2018). This population increase and economic growth have caused a rapid increase in transportation demand, which in turn has led to chronic traffic congestion and air pollution. As a result, the average vehicle travel speed in Dhaka was 6.4 km/h, which is less than half that of central Tokyo (14.7 km/h) (Ministry of Land, Infrastructure, Transport and Tourism, 2015). Economic loss due to traffic congestion are estimated to be billions of dollars per year (World Bank 2018). In terms of air pollution, the annual average PM10 concentration is 146 μg/m3, which is much higher than the environmental standard set by the World Health Organization (hereinafter referred to as "WHO") (20μg/m3 - 70μg/m3). WHO points out that emissions from vehicles are responsible for roughly 40% of air pollution in Dhaka, and is concerned that emissions from such traffic congestion could harm the health of residents in the Dhaka metropolitan area. These factors have worsened the country's economic activities and urban environment, creating a major bottleneck for economic and social development.

The Eighth Five Year Plan (FY2021-FY2025) sets a major goal of comprehensive economic growth, which benefits all people including the poor. In addition, it aims at reducing the traffic congestion and improving the environment, improving transport and traffic infrastructure so as to meet existing and potential demands, and developing an integrated and balanced system in which all modes can perform efficiently and each mode can fulfil its appropriate role in the system, in the "Transportation and Communication" sector.

In regard to these goals, the Government of Bangladesh has established the Revised Strategic Transport Plan (hereinafter referred to as "RSTP") with the assistance of JICA in August 2016, which aims to develop five mass rapid transit (hereinafter referred to as "MRT") routes and two bus rapid transit (hereinafter referred to as "BRT") routes.

The Dhaka Mass Rapid Transit Development Project (hereinafter referred to as "the Project") will alleviate traffic congestion in Dhaka city by constructing the MRT Line 6

connecting the northern and central parts of the capital city of Dhaka. MRT Line 6 will also be connected with MRT Line 1 and Line 5 Northern Route, which are also financed by Japanese ODA loan. The Project is positioned as the highest prioritized route in RSTP.

(2) Japan and JICA's Policy and Operations in the Urban Development Sector

Country Development Cooperation Policy for the People's Republic of Bangladesh (February 2018) has set forth the priority area of "accelerating economic growth for the benefit of all citizens toward a middle-income country," trying to contribute to the improvement of regional connectivity by promoting the efficient move of people and goods through the development of high quality transportation and traffic infrastructure in accordance with international standards, while paying attention to the diversification of transportation systems. In addition, the JICA Country Analysis Paper for Bangladesh (March 2019) identifies urban development including urban transport as a prioritized issue. The Project is consistent with this analysis and policy. Additionally, since it will help alleviate traffic congestion in the Dhaka metropolitan area, and reduce the negative environmental impact of air pollution, the Project will also contribute to the achievement of SDGs Goal 9 (Industry, Innovation and Infrastructure), 11 (Sustainable Cities and Communities), and 13 (Climate Action).

In addition to the JICA's recent major assistance activities in the urban development sector specified in 3. (7) 1), JICA implemented the technical cooperation, "Project on the Revision and Updating of the Strategic Transport Plan for Dhaka (FY 2014-2016), to establish RSTP.

(3) Other Donors' Activity

The World Bank (hereinafter referred to as "WB") assisted the preparation of the Strategic Transport Plan. WB also implemented the Clean Air and Sustainable Environment Project, which supports detailed design of the BRT Route 3 south section (between Airport Station and Jhilmil), from 2009 to 2016. The Asian Development Bank (hereinafter referred to as "ADB") has been implementing the Greater Dhaka Sustainable Urban Transport Corridor Project to develop the BRT Route 3 north section (between Gazipur and Airport Station) since 2010. ADB also provides assistance for the MRT Line 5 Southern Route (between Gabtoli and Aftabnagar stations).

3. Project Description

(1) Project Objective

The objectives of the Project are to alleviate traffic congestion and mitigate air pollution in Dhaka City by constructing the MRT Line 6, thereby contributing to economic development and improvement of urban environment.

(2) Project Site/Target Area

Dhaka North City, Dhaka South City (population in Dhaka district: 12 million

(Bangladesh national census 2011))

(3) Project Components

1) Construction of a depot (land development, construction of depot buildings, railway sidings, etc.)

2) Construction of railway structures (total length of 21 km including the extension from Motijheel to Kamalapur; construction of elevated railways, stations, tracks, etc.)

3) Installation of electric and signal systems

4) Procurement of rolling stock (144 cars: 6 cars × 24 sets)

5) Enterprise Resource Planning System

6) General consulting services (feasibility study review, detailed design, tender assistance, construction supervision, training for operation and maintenance, etc.)

7) Consulting services for involuntary resettlement support

8) Consulting services for institutional development support

(4) Estimated Project Cost

435,204 million Yen（Japanese ODA Loan: 18,285 million Yen）

(5) Schedule

February 2013 ～ August 2027 (175 months in total). The project will be completed upon the opening of all sections (December 2025).

(6) Project Implementation Structure

1) Borrower: The Government of the People's Republic of Bangladesh

2) Guarantor: N/A

3) Executing Agency: Dhaka Mass Transit Company Limited (hereinafter referred to as “DMTCL”)

4) Operation and Maintenance System: DMTCL

(7) Collaboration and Sharing of Roles with Other Donors

1) Japan’s Activity: MRT Line 1 and 5 Northern Route, to be constructed with JICA’s loan assistance under “Dhaka Mass Rapid Transit Development Project (Line 1)” and “Dhaka Mass Rapid Transit Development Project (Line 5 Northern Route)” respectively, will be connected with MRT Line-6 being constructed under the Project. In addition, based on the outcomes of the technical cooperation, “Project for Establishment of Clearing House for Integrating Transport Ticketing System in Dhaka City Area (Phase 1),” the technical cooperation, “Project for Establishment of Clearing House for Integrating Transport Ticketing System in Dhaka City Area (Phase 2)” aims to establish a framework for making smart cards more widespread as well as to fully introduce and institutionalize the smart card payment system. Furthermore, the technical cooperation, “Technical Assistance for Mass Rapid Transit Safety Management System of Line 6”, supports for capacity development to establish and implement DMTCL’s operational safety management system. Additionally,

the technical cooperation, “Project for Development of Policy and Guidelines for Transit Oriented Development along Mass Transit Corridors”, supports for planning of strategic urban development around MRT stations for officials of Rajdhani Unnayan Kartipakkha (RAJUK: public agency responsible for urban planning in Dhaka).

2) Other Donors’ Activity: N/A

(8) Environmental and Social Consideration/Cross-Sectoral Issues/Gender Category

1) Environmental and Social Consideration

① Category: A

② Reason for Categorization: The project falls into the railway sector, and is likely to have significant adverse impact due to its characteristic under the JICA guidelines for environmental and social considerations (April 2010).

③ Environmental Permit: The Environmental Impact Assessment (hereinafter referred to as “EIA”) report for the Project between Uttra North and Motijheel was prepared by the Dhaka Transport Coordination Authority and approved by the Department of Environment in July 2011. In addition, EIA report for the Project between Motijheel and Kamalapur was prepared by DMTCL and approved by the Department of Environment in July 2021. In Bangladesh, the Environmental Clearance Certificate must be renewed annually, and the certificate for the Project was renewed in July 2021.

④ Anti-Pollution Measures: Water is sprinkled periodically to suppress the dust which is expected to be generated during the construction work. Sound absorbers and soundproof walls is installed to reduce noise and vibration during construction work. Surplus soil and waste generated by the construction are collected, sorted and disposed appropriately based on the Bangladesh national act and guideline by the contractors. Additionally, wastewater, which is discharged from the station and the depot when the facilities are in service, will be appropriately treated at wastewater treatment facilities.

⑤ Natural Environment: The target area for the Project is not in a vulnerable area such as a national park, nor in the surrounding area of such; therefore, any adverse impact on the natural environment is expected to be minimal.

⑥ Social Environment: 57.3 ha of land has been acquired and the number of affected persons is 1,499 around stations between Uttra North to Motijheel and depot area (No involuntary resettlement is occurred in the area), and no particular problem is occurred in compensation payment. In the extension area from Motijheel to Kamalapur, additional land acquisition will be 2.4ha and additional project affected households will be 734 (including 204 households to be involuntary resettled). Based on the resettlement action plan prepared in line with the relevant act in Bangladesh and JICA guidelines, compensation payments to the affected persons have been implemented. In consultation with

local residents, information on the Project including a project description, planned routes, measures to mitigate the potential impact on the natural and social environment, an overview of the RAP proposal, and compensation details was explained by DMTCL, and no particular objections were raised.

⑦ Other/Monitoring: During the construction period, the contractors supervised by DMTCL have monitored the changing conditions of air quality, noise/vibration, water quality, and progress of land acquisition and resettlement, etc. Environmental monitoring will be conducted by DMTCL once the facilities are placed in service. Additionally, an external monitoring agency hired by the general consultant has monitored issues relating social considerations.

2) Cross-Cutting Issues: The Project is intended to reduce air pollution and mitigate climate change through the promotion of public transportation, thereby contributing to reduce Green House Gas (hereinafter referred to as “GHG”) emissions. The Project’s mitigation effect on climate change (estimated GHG emissions) is expected to be approximately 0.18 million tons of CO_2/year (estimate for 2025). Based on the Bangladesh National Building Code and Barrier-free Maintenance Guideline about facilities and vehicles of public transportation in Japan, barrier-free facilities such as guiding blocks for persons with disabilities and slopes for wheelchairs are provided. Measures against COVID-19 infection are implemented such as taking PCR test before entering the construction site, preparing isolation buildings, assigning doctors, and reserving hospital beds for contractors and consultants. Considering the impact of COVID-19, the cost, construction period, etc. have been revised with reference to Bangladesh national laws and guidance.

3) Gender Category: [Gender Project] GI (S) (Gender Activities Integration Project)
Activity components/reason for classification: Gender action plans including the operation of women-only cars at peak times, the installation of surveillance cameras in stations and cars, as well as the promotion of hiring women for construction sites and at managing entities will be implemented to promote gender understanding and woman safety. Consequently, this is categorized as a Gender Integrated Project.

(9) Other Important Issues

The Project incorporates advanced Japanese technologies such as countermeasures for soft soil, rolling stocks, signaling systems, and automatic fare collection systems.

4. Targeted Outcomes

(1) Quantitative Effects

Performance Indicators (Operation and Effect Indicator)

Indicator		Baseline (Actual Value in 2009)	Target (2027) 【Expected value 2 years after project completion】
1) Passenger Kilometer (1,000 people/km/day)	From Uttra North to Agargaon	—	1,874
	From Agargaon to Motijheel	—	1,524
	From Motijheel to Kamalapur	—	78
2) Train Kilometer (km/day)		—	6,955
3) Average Travel Time (min)		110*	38
4) Operating rate of train (%)		—	80

Note: The travel times indicated above are for the section between Uttara North Station and Motijheel Station by bus.

As a reference value, air pollutant density (density of NO_2 and total suspended particulates [$PM_{2.5}$/PM_{10}] along the railway line) will be monitored.

(2) Qualitative Effects

Facilitation of transportation and physical distribution in the Dhaka Metropolitan Area, development of Bangladesh's economy through the reduction of economic losses by reducing traffic congestion, mitigation of climate change through the reduction of GHG emissions by promoting a modal shift to public transportation and alleviation of air pollution.

(3) Internal Rate of Return

According to the following preconditions, the Project's Economic Internal Rate of Return (hereinafter referred to as "EIRR") will be 16.8%. The Financial Internal Rate of Return (hereinafter referred to as "FIRR") will be 1.8%.

【EIRR】

Cost: Project costs and operation/maintenance costs (excluding tax)

Benefit: Reduction in vehicle operation costs, travel time, GHG emissions etc.

Project Life: 43 years

【FIRR】

Cost: Project costs and operation/maintenance costs

Benefit: Fare revenues and non-rail revenue

Project Life: 43 years

5. External Factors and Risk Control

(1) Preconditions: N/A

(2) External Factors: N/A

6. Lessons Learned from Past Projects

The results of the ex-post evaluation of the Philippines' Metro Manila Strategic Mass Rail Transit Development Project (evaluated in 2008) revealed that it is difficult to operate an urban transport business using fare revenues only. Providing equity contribution and subsidies by the government are needed because of large initial investment. In addition, a detailed financial plan and an action plan for government support should be developed in the project planning phase in order to ensure the financial health of the executing agency.

In addition, the results of the ex-post evaluation of India's past urban railway projects, including the Delhi Mass Rapid Transport System Project (I)-(VI) (evaluated in 2010), indicated that it is necessary to ensure fulfilling the preconditions for profitability, otherwise it is necessary to push for the satisfaction of these preconditions.

As the Project requires a large initial investment and, therefore, its financial soundness needs to be secured, fare will be set appropriately based on the lessons described above, and the Government of Bangladesh provides financial assistance to reduce DMTCL's financial burden. Additionally, DMTCL's financial plans have already been developed as part of the consulting services for institutional development.

Furthermore, in order to secure non-rail revenues in addition to fare revenues, the general consultant will support to develop and implement the business plans for earning revenues from retail tenants in stations, advertising and public transportation-oriented development (type of urban development which promotes the development of public transport hubs surrounded by a high-density and compact urban area without depending on automobiles), etc.

7. Evaluation Results

The Project is consistent with the development issues and development policies of Bangladesh, as well as the assistance policies and analyses of the Government of Japan and JICA. Through the development of MRT, the Project will help to alleviate traffic congestion in Dhaka City and help to reduce the air pollution, thereby contributing to the achievement of SDGs Goal 9 (Industry, Innovation and Infrastructure), 11 (Sustainable Cities and Communities), and 13 (Climate Action). Therefore, the necessity for JICA to support the Project is substantial.

8. Plan for Future Evaluation

(1) Indicators to be Used

As indicated in sections 4. (1) to (3).

(2) Future Evaluation Schedule

Ex-post evaluation: Two years after the project completion

END