

Ex-Ante Evaluation (for Japanese ODA Loan)

1. Name of the Project

Country: The People's Republic of Bangladesh

Project: Jamuna Railway Bridge Construction Project (I)

Loan Agreement: June 14, 2018

2. Background and Necessity of the Project

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

The People's Republic of Bangladesh has railway networks with a total length of 2,877 km. However, most of their facilities and equipment are outdated as they were developed during the British colonial era before 1947. Due to this deterioration of the railway infrastructure, the transportation volume and service quality of these networks have decreased and Bangladesh has been unable to fully utilize the advantages of rail transportation, such as its punctuality, ability to transport large quantities, safety and energy saving. As a result, while the share that road transportation accounts for in the transport sector as a whole in Bangladesh rapidly increased from the 1970s, that of rail transportation has gradually decreased to the point where it now only accounts for approximately 10%. In the meantime, following strong economic growth in Bangladesh and its neighboring countries, container transportation is expected to increase rapidly in the future and rail transportation, which is an efficient mode of transporting containers, is expected to play a more major role.

Under the Jamuna Railway Bridge Construction Project (hereinafter referred to as "the Project"), a new dedicated railway bridge (with double dual-gauge tracks for broad- and narrow-gauge trains) will be constructed 300 m upstream from where the existing Jamuna Multipurpose Bridge (hereinafter referred to as the "Existing Bridge") crosses the Jamuna River, which flows through central Bangladesh. Although the Existing Bridge was originally intended to be used as a road bridge, a railway line (with a single dual-gauge track for broad- and narrow-gauge trains) was constructed as a section forming part of the Trans-Asian Railway, which leads into neighboring India, in light of an increasing demand for domestic and international rail transport. However, the Existing Bridge presents several challenges: 1) the train capacity is limited as it is a single-track line; 2) speed and weight limits are imposed structurally as the track was constructed at the edge (on the upstream side of the river) of the bridge, not at its center; and 3) some cracks were found in its foundation in the past (these cracks have already been fixed). Therefore, in view of securing the sustainability of the Existing Bridge, the separation of the railway part of the bridge is urgently required. After a new dedicated railway bridge has been constructed, the Existing Bridge will be repaired to produce a four-lane road bridge at the cost of the

Bangladeshi government.

In the National Integrated Multimodal Transportation System Policy (2013), the Bangladeshi government states its commitment to strengthening its rail transportation to address the current imbalance in transportation modes caused by the dominance of road transportation. In addition, in its Railway Master Plan (2013), the government states that it will prioritize the execution of the Project, which is intended to contribute to international rail transportation as a section of the Trans-Asian Railway.

(2) Japan and JICA's Cooperation Policy and Operations in the Railway Sector

The JICA Country Analysis Paper for Bangladesh (May 2014) identifies the development of a domestic transportation and traffic network as an important issue. Moreover, Japan's Country Assistance Program for Bangladesh (February 2018) focuses on accelerating economic growth as an important goal and states that efforts will be made to develop high-quality transportation and traffic infrastructure with the aim of promoting the effective movement of people and goods and improving regional connectivity. The Project is, therefore, consistent with these policies and the analysis.

JICA's past support activities for the railway sector include the Dhaka-Chittagong Railway Development Project (loan project approved in FY2007) and the Technical Assistance for the Preparation of Rules and Regulations under the Dhaka Mass Rapid Transit Act (FY2011–2015).

The Project is one of five projects requested by Prime Minister Sheikh Hasina in the Japan-Bangladesh Comprehensive Partnership, which was announced jointly at the Japan-Bangladesh Summit Meeting held in May 2014, and it is positioned as an important project that will contribute to improved regional connectivity. In addition, as the Project will improve the railway corridor connecting surrounding and neighboring countries and enhance logistics and passenger transportation, it will also contribute to Sustainable Development Goal 9 ("Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation").

(3) Other Donors' Activity

The major donor for the railway sector in Bangladesh is the Asian Development Bank (ADB). ADB provides support for the reforming of the railway sector, including a project for the conversion of certain sections of the railway into dual-gauge tracks as well as the privatization of the Bangladesh Railway (BR) and revision of its fares under the Railway Sector Investment Program (since 2007). Moreover, in recent years, the Indian government has provided support for procurement of rolling stocks and the construction of new lines and railway bridges, while the Chinese government has provided support for projects to convert multiple sections of the railway into dual-gauge tracks and to construct new lines.

3. Project Description

(1) Project Objective(s)

The objective of the Project is to meet the demand for rail transportation, expand the road capacity of the Existing Bridge and improve its sustainability and safety by constructing a new dedicated railway bridge parallel to the existing Jamuna Multipurpose Bridge in the basin of the Jamuna River, thereby contributing to greater efficiency in the transportation links within Bangladesh and with its neighboring countries.

(2) Project Site / Target Area

Sirajganj District and Tangail District

(3) Project Component(s)

- 1) Construction of the Jamuna Railway Bridge (steel through truss bridge with a length of 4.8 km and double dual-gauge tracks)
- 2) Construction of approach tracks (elevated bridges) on both banks and relocation of the rail tracks (7.7 km in total for both banks)
- 3) Related facilities such as signaling systems, relocation and repair of station buildings on both banks (Bangabandhu Setu East Station and Bangabandhu Setu West Station) and incidental facilities, etc.
- 4) Consulting services (F/S review, detailed design, tender assistance, construction supervision, environmental and social consideration procedures and monitoring assistance, etc.)

(4) Estimated Project Cost (Loan Amount)

171,229 million Yen (Loan Amount: 126,794 million Yen)

(5) Schedule

June 2016 - December 2024 (103 months in total). The Project will be completed when the facilities are put in place (November 2023).

(6) Project Implementation Structure

- 1) Borrower: The Government of the People's Republic of Bangladesh
- 2) Guarantor: N/A
- 3) Executing Agency: BR
- 4) Operation and Maintenance System: BR

(7) Cooperation and Sharing of Roles with Other Donors

- 1) Japan's Activity: N/A
- 2) Other Donors' Activity: N/A

(8) Environmental and Social Consideration / Poverty Reduction / Social Development

1) Environmental and Social Consideration

- ① Category: A B C FI
- ② Reason for Categorization: The Project falls into the railways and bridges sector under the JICA Guidelines for Environmental and Social Considerations (published in April 2010).
- ③ Environmental Permit: The Environmental Impact Assessment (EIA) Report for the Project was approved in December 2017 by the Department of

Environment (DOE) under Bangladesh's Ministry of Environment and Forest.

- ④ Anti-Pollution Measures: With respect to air quality, noise and vibration during construction work, the environmental effects will be mitigated by taking measures such as sprinkling water, placing covers over load-carrying platforms on vehicles, managing equipment and vehicles properly, soundproofing construction equipment and using low-noise heavy machinery. Moreover, the effects that wastewater and waste from the workers' camp or the construction yard have on the water quality and bottom sediment will be minimized by installing a septic tank or settling reservoir, securing a place to store waste, or taking other appropriate measures. When the bridge piers are constructed, the effects of muddy water will be avoided by adopting cofferdams, using silt fences, or taking other appropriate measures. Furthermore, although the vibration and noise caused by running trains after the commencement of services is not expected to have any particular impact, appropriate measures will be taken if monitoring indicates that the railway has a significant impact.
- ⑤ Natural Environment: In the forest park located on the west bank of the Jamuna River, trees will be cut down due to the Project. However, the area will be reforested upon consultation with the DOE and other related parties. While the target area for the Project is not located in or around national parks or other vulnerable areas, the whole area of the Jamuna River is designated as an important bird sanctuary. The impact of the Project is expected to be minimized by the implementation of measures such as protecting nests and minimizing logging during construction. In addition, river dolphins, which are designated as an endangered species, live in the Jamuna River. If they are seen during the construction work, any material negative impact will be avoided by taking measures such as suspending the piling work and stopping the vessels used for construction.
- ⑥ Social Environment: Since the Project will be implemented on land owned by the executing agency or transferred by the Bangladesh Bridge Authority, no land acquisitions or resettlements will occur. Moreover, although there is a sandbar in the middle of the Jamuna River, no residential area has been found to exist on the sandbar near the target area of the Project. In addition, although access to the construction area will be restricted, any potential impact that the construction work for the Project may have on fishery and farming will be avoided by issuing early notices to residents. The implementation of the Project is not expected to have any particular effect on floods or erosion or to have any impact on livelihoods due to such disasters. Monitoring will be conducted by the BR through continuous participation by local residents.
- ⑦ Other / Monitoring: For the Project, the contractor and the BR are in charge of monitoring air quality, noise, vibration, water quality, ecosystems, etc. After the

start of operations, the BR will monitor noise, ecosystems, and the impact on livelihoods.

2) Cross-Cutting Issues: N/A

3) Gender Category: [Gender Project] GI (S) (Gender Activities Integration Project) Activity Component(s)/Reason for Categorization:

In Bangladesh's public transportation systems, a lack of sufficient convenience for women acts as an obstacle to women's use of these systems. The Project will adopt a design that takes into account convenience for women, including the installation of toilets and prayer rooms for women at Bangabandhu Setu East Station and Bangabandhu Setu West Station, both of which are to be repaired. Consequently, this is categorized as a Gender Activities Integration Project.

(9) Other Important Issues

N/A

4. Targeted Outcomes

(1) Quantitative Effects

1) Performance Indicators (Operation and Effect Indicators)

Indicator	Baseline (Actual Value in 2017)	Target (2025) (Expected value 2 years after project completion)
Passengers carried (million passengers-km/day)	5.15	11.24
Goods transported (thousand tons-km/day)	144	1,679
Frequency of trains (number of trains in service/day)	22.41	38.53
Maximum speed of trains when crossing the bridge (km/h)	16	100
Average time required to travel from Bangabandhu Setu East Station at one end of the bridge to Bangabandhu Setu West Station at the other end (minutes)	44.25 ¹	9.00 ²

(2) Qualitative Effects

Logistics within Bangladesh and with neighboring countries will be improved, the safety of rail transportation will be improved through measures such as the separation

¹ Time required for a train to travel on the Existing Bridge is measured.

² Time required for a train to travel on the dedicated railway bridge is measured.

of railway portions, and the sustainability and safety of the Existing Bridge will be improved. Traffic jams will be reduced.

(3) Internal Rate of Return

According to the following preconditions, the Project's Economic Internal Rate of Return (EIRR) will be 11.9%. The Financial Internal Rate of Return (FIRR) will be 0.4%.

[EIRR]

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

Benefit: Reduction in time costs, vehicle operation costs and maintenance costs for existing roads, increase in safety (reduction in number of traffic accidents) and effects of reducing greenhouse gases

Project Life: 30 years

[FIRR]

Cost: Project costs and operation/maintenance costs

Benefit: Fare revenues and usage fees for laying gas pipes

Project Life: 30 years

5. Preconditions / External Conditions

(1) Preconditions: N/A

(2) External Conditions: Improvements to the railway infrastructure in the surroundings of the project area, including double-tracking between Joydebpur and Ishurdi, will be implemented as planned.

6. Lessons Learned from Past Projects

The results of the ex-post evaluation (in 2011) of the Second Mekong International Bridge Construction Project in Thailand and Laos revealed that the traffic volume predicted for the project planning stage was not achieved due to insufficient improvements to surrounding infrastructure. The lesson learned from the project is that, in the case of improvements to a broad-based transportation network, it is important to prepare a project after the improvement situations and development plans of other roads and transportation networks have been sufficiently analyzed and considered. The details of the Project were reviewed taking into account related projects based on the Broad-Based Transport and Traffic Improvement Plan in the South Asia Region because the Bangladesh government and other donors are improving railways, roads and other transportation infrastructure near the planned project area at about the same time and the circumstances of such improvements may influence the effects of the Project.

In addition, the results of the ex-post evaluation (in 1985) of the Nonthaburi and Pathumthani Bridges Construction Project in Thailand indicated that for large bridges it was necessary to review the plan during the construction work due to floods and soft

ground, and extra time was required to deal with such problems. Since the target area for this Project also has soft ground, the Project's plan reflects the idea that sufficient geological survey must be conducted by consultants before a detailed design is made. In addition, extra care must be taken when finalizing the bridge design and preparing tender documents based on the results of the detailed design so that the Project will not be delayed.

7. Evaluation Results

The Project is consistent with the assistance policies and the analysis of the Government of Japan and JICA. In addition, the policies of the Bangladesh government indicate the importance of improving the railway corridor that connects the surrounding and neighboring countries and enhancing logistics and passenger transportation. The Project is expected to contribute to SDGs Goal 9 ("Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation"). Thus, the necessity for JICA to support the Project is substantial.

8. Plan for Future Evaluation

(1) Indicators to be Used

As described in (1)-(3) of Section 4.

(2) Timing

Ex-post evaluation: Two years after the project completion