Ex-Ante Evaluation Paper (for Japanese ODA Loan)

South Asia Division 1, South Asia Department, JICA

1. Name of the Project

Country: India

Project: Dedicated Freight Corridor Project (Phase1) (IV)

Loan Agreement: March 27, 2020

2. Background and Necessity of the Project

(1) Current State and Issues of the Railway Sector in India

While freight transportation volume has increased at an annual rate of over 10% in India, its freight volume transported by railway grew by slightly less than 2% per year from 2013 to 2017 partly because the freight transportation capability of its railways was limited. The railway transportation share in freight transportation has also been declining. The development and enhancement of railways, which allow mass transportation and are more environmentally friendly than road transportation, is a critical issue for sustainable economic growth in India. Above all, the freight transportation volume on the route known as the "Golden Quadrilateral," which connects Delhi, the capital and one of the most important production and consumption areas in India, Mumbai and Kolkata, the main ports of the west and east of the continent, and Chennai in southeastern India, accounts for about 65% of that of the whole country. Because it is expected that the volume of container freight, and of agricultural products and mineral or industrial resources, transported on the route will continue increasing, it is required for locomotives to improve their transportation capability by increasing their power density, speeding up, and cooperating with other means of transportation.

In the 12th Five Year Plan (April 2012-March 2017) as well as the 11th Five Year Plan, the Government of India gives high priority to measures for the early development of dedicated freight railway corridors, especially between Delhi and Mumbai (Western Corridor) and between Ludhiana, Delhi and Kolkata (Eastern Corridor), and for the expansion of passenger and freight vehicles, aiming to expand railways, introduce high-speed freight vehicles and improve access to port facilities for the purpose of mass transportation on arterial railways. The latest Three Year Action Agenda (FY 2017-2019) also emphasizes the importance of the development of transportation infrastructure, including railways, for economic reform in India.

The West Corridor route, which is to be developed through the Dedicated Freight Corridor Project (Phase1) (hereinafter referred to as “the Project”) based on the above-mentioned plan, passes from the state of Maharashtra (state capital: Mumbai) on the west coast to the state of West Bengal (state capital: Kolkata) on the east coast through 10 states (whose total population is about 740 million). In particular, the western coastal region centering around Mumbai (the states of Maharashtra and Gujarat) have multiple deepwater ports and thrive on commerce and industry, while the national capital region centered around Delhi has a developed industry, commerce and agriculture as the biggest consumption area in India, where the population is significantly concentrated. It is therefore expected that the volume of container transportation on the West Corridor between international ports on the western coast and inland areas of demand will increase rapidly. On the other hand, the current line capacity is only about 50% of the line capacity required to address transportation demand for 2032 and is reaching its limit. The Project aims to enhance freight transportation capability and improve the tight line capacity by developing new dedicated freight routes and is ranked as an important project in the above-mentioned development policies of the railway sector of the Government of India.

(2) Japan and JICA’s Railway Sector Policy and the Positioning of the Project

Country Assistance Policy for India (March 2016) indicates “the reinforcement of connectivity” as a priority area, and states that we should support the development of transportation infrastructure to create transportation hubs and networks in railway and other areas, aiming at the reinforcement of connectivity within major industrial cities and economic blocs, and between regions, in India. The JICA Country Analysis Paper for India (March 2018) also states that in the situation where a large part of the Indian population is expected to move to the middle class by 2030, it is necessary to “foster productive industries” in order to address growing consumer demand and therefore required to reinforce connectivity, such as the development of economic corridors that improve the flow of people and goods. It concludes that the continuance and expansion of support for infrastructure development and other areas will be required in order to meet massive development needs and further stimulate private economic activities. The Project is consistent with these policies and analyses.

As of the end of December 2019, Japan has approved 66 ODA loan projects worth a total of 2,584.5 billion yen for the transportation and traffic sector of India, among which 41 ODA loan projects worth a total of 2,041.3 billion yen are for the

railway sector. In this regard, Japan provided the Project with a total of 196.5 billion yen for three terms after the L/A signing for the first term in October 2009 and has approved the provision of a total of JPY 137.7 billion for two terms to the Dedicated Freight Corridor Project (Phase 2) (hereinafter referred to as “Project Phase 2”) targeting the sections between Dadri and Rewari and between Vadodara and Mumbai.

In addition, as for technical cooperation regarding the Project, Japan implemented the Study on Plan for Strengthening Freight Transportation Capability of Railways (2006-2007), the Demonstration Project regarding Freight Transportation Safety of Arterial Railways (2008) and the Support Project for Operation and Maintenance of Dedicated Freight Corridor (Phase 1) (2015-February 2018) and implements the Project for Strengthening Safety Capacity of Indian Railways [technical assistance related to ODA loan] (for two years from December 2018).

(3) Other Donors’ Activities

The World Bank has provided about USD 4,361 million assistance for the development of the section between Ludhiana and Mughalsarai (1,193 km) of the Eastern Dedicated Freight Corridor. The Asian Development Bank has provided the railway sector with software support, such as organizational reformation of the Indian Railways (hereinafter referred to as the “IR”), and others. In addition, it provided assistance to the Mumbai Metro (Lines 2A, 2B and 7; approved amount: USD 926 million), the Jaipur Metro (approved amount: USD 176 million) and the Bangalore Metro (approved amount: USD 250 million).

(4) Meaning of Implementing the Project

The Project aims to realize effective freight transportation by enhancing the freight transportation capability through the construction of new dedicated freight routes, the adoption of automated signal and communication systems, and the introduction of high-power and high-speed electric locomotives, being consistent with the issues and development policies of India, and the support policies of Japan and JICA. The Project is also expected to contribute to the SDGs Goal 9 (Build resilient infrastructure). Thus, the necessity and reasonability of JICA’s continuous support for the Project is substantial.

3. Project Description

(1) Project Objective

The objective of the Project is to cope with the increase of freight transport demand in India by constructing new dedicated freight railway system, thereby promoting comprehensive regional economic development along the freight corridor, through improvement and modernization of inter-modal logistic system handling considerable freight traffic and poised for massive growth.

(2) Project Site / Target Area

Delhi Territory and the states of Uttar Pradesh, Haryana, Rajasthan, Gujarat and Maharashtra

(3) Project Components

1) Civil engineering and building construction: Railbed development, construction of structures such as bridges, freight stations and junction stations, and other components (international competitive bidding (tied))
2) Track construction: Rail laying and other components (international competitive bidding (tied))
3) Electrical and mechanical construction: Development of overhead lines, substations and other components (international competitive bidding (tied))
4) Signal and communication construction: Development of signal and communication systems, and construction of automatic barrier systems (international competitive bidding (tied))
5) Vehicle procurement (i): Electric locomotives (produced and delivered by the Ministry of Railways of India on a self-financing basis)
6) Vehicle procurement (ii): Railway maintenance and inspection vehicles, and other components (international competitive bidding (tied))
7) Consulting services: Construction supervision, quality and safety control, test-run assistance, support for planning and implementation relating to operation and maintenance (including the provision of training programs and the review of manuals), implementation management of environmental management plans and monitoring plans for resettlement, social development (such as activities for public relations and for enlightening residents, and activities for preventing HIV), and other components (short-list method)

(4) Estimated Project Cost

522,654 million yen (of which, the ODA Loan amount is 130,000 million yen)

(5) Schedule

October 2009 - May 2027 (212 months in total). The Project will be completed upon the commencement of services of all facilities (May 2027).

(6) Project Implementation Structure

1) Borrower: President of India
2) Guarantor: None
3) Executing Agency: Dedicated Freight Corridor Corporation of India Ltd. (hereinafter referred to as the “DFCCIL”) and Ministry of Railways of India (only procurement of electric locomotives)
4) Operation and Maintenance System: After the completion of construction, the DFCCIL will assume the operation and maintenance of the main line, train operation control facilities (tracks, and signal and communication systems) and other duties; and the IR, a subsidiary of the Ministry of Railways of India, will assume freight transportation operation, including the maintenance of electric locomotives.

(7) Collaboration with Other Schemes and Donors

1) Japan’s Assistance Activity

As mentioned in section 2. (2), the Project aims to develop the section between Delhi and Mumbai, which will cover a distance of about 1,465 km, of the Western Dedicated Freight Corridor, together with the Project Phase 2 targeting the sections between Dadri in the state of Uttar Pradesh and Rewari in the state of Haryana, and between Vadodara in the state of Gujarat and Mumbai in the state of Maharashtra.

In addition, through the Support Project for Operation and Maintenance of Dedicated Freight Corridor technical cooperation, an enhancement plan has already been formulated for the operation and maintenance system of the freight railway project carried out by the Ministry of Railways and the Dedicated Freight Corridor Corporation of India Ltd. (hereinafter referred to as the “DFCCIL”).

2) Other Donors’ Assistance Activity

As well as assistance for the development of the section between Ludhiana and Mughalsarai of the Eastern Dedicated Freight Corridor mentioned in section 2. (3), the World Bank has provided assistance relating to the development of business plans, marketing plans,

track-access charge calculation formulas and other matters of the DFCCIL, including those for the Western Corridor.

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

1) Environmental and Social Considerations

① Category: A

② Reason for Categorization

The Project falls into the Railway sector and is likely to have a significant adverse impact due to its characteristics under the JBIC Guidelines for Confirmation of Environmental and Social Considerations (published in April 2002, hereinafter referred to as the "JBIC Guidelines".

③ Environmental Permit

The environmental impact assessment (EIA) report on the Project was prepared in August 2009 and was approved by the Ministry of Railways on August 13, 2009, though its preparation is not required under the domestic laws of India.

④ Anti-Pollution Measures

During construction, contractors take mitigation measures, such as dust control, proper storage of construction materials and use of low-noise materials, in accordance with environmental management plans. As for anti-noise measures after the commencement of services, mitigation measures, such as installing sound-proof walls in densely populated areas as needed, were considered. The mitigation measures considered in detailed designs will be reflected in detailed environmental management plans, and contractors will take measures according to the plans.

⑤ Natural Environment

Because most of the target areas are agricultural or unused land, and all wildlife sanctuaries are planned to be circumvented, it is estimated that an adverse impact on the natural environment will be kept to a minimum.

⑥ Social Environment

The Project requires the land acquisition of approximately 3,716 ha and the resettlement of 1,514 households. The DFCCIL has held discussions relating to the land acquisition and resettlement, and

compensation at replacement cost and necessary livelihood recovery support have been implemented in accordance with a resettlement action plan approved by the Ministry of Railways and an entitlement matrix prepared in May 2015 according to the New Land Acquisition Act. Procedures for the land acquisition and resettlement are scheduled to be completed by June 2020.

⑦ Other / Monitoring

In the Project, the executing agencies will implement monitoring of noise, vibration, soil, air quality, water quality, borrowing-pits, vegetation, land acquisition, resettlement and other through contractors during construction and will also implement areas monitoring of noise, vibration, soil and water quality after the commencement of services.

2) Cross-Sectoral Issues

The Project promotes a modal shift in freight transportation from road to rail and contributes to GHG emission reductions. The climate change mitigation effect of the Project (rough estimate of GHG emission reductions amount) is about 14.6 million tons per year, CO_2 equivalent. On the other hand, the HIV infection risk will be high in the Project because it is a large construction project for which many workers gather at construction sites in a country where HIV infection is a concern, and it is estimated that workers engaged in the Project include many itinerant laborers who live alone. For that reason, the DFCCIL, an executing agency, has developed a safety, health and environment manual, including HIV prevention measures, and taken necessary measures in the Project. In addition, it requires contractors to cooperate in the above-mentioned HIV prevention activities by stipulating such cooperation in bidding documents and contracts.

3) Gender Category: ■GI (S) (Gender activity integration project)

<Classification Rationale>

The Project is deemed an integrated gender activity project because gender-equal initiatives, such as the promotion of employment of women in construction work and in operating agencies, have been agreed with the executing agencies.

(9) Other Important Issues

The Project is a STEP loan project, and Japan's technology is applied to components, such as tracks, signals and communication.

4. Target Outcomes

(1) Quantitative Effects

1) Outcomes (Operation and Effect Indicators /1)

Indicator	Baseline (2007) /2	Target (2029) [2 Years after Completion]
Operation rate (%)	―	93
Vehicle running distance (in both directions) (1,000 km per day)	37.9	250.8
Number of transport trains (in both directions) (per day)	33	222
Transportation volume (1 million tons/km per day) /3	55.6	336.9
Maximum speed (km per hour)	75	100
Shortened transportation time (hour) /4	―	18.25

/1: Figures based on only the section subject to the Project (between Rewari and Vadodara).

/2: As to each indicator, the current figures based on conventional lines of the IR are set as the baseline.

/3: Railway transportation volume, excluding road transportation volume and others.

/4: The difference between the required time based on the current average speed and that based on the average speed in the target year.

(2) Qualitative Effects

Addressing freight transportation demand, streamlining logistics networks and promoting extensive economic development

(3) Internal Rate of Return

According to the following preconditions, the Economic Internal Rate of Return (EIRR) of the whole Western Dedicated Freight Corridor Project (including Phase 2) will be 18.47%. The Financial Internal Rate of Return (FIRR) will be 4.01%.

[EIRR]

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

Benefit: Reduction effect of freight transportation costs required to address

increasing demand

Project Life: 30 years

[FIRR]

Cost: Project costs and operation/maintenance costs

Benefits: Freight receipts

Project Life: 30 years

5. External Factors and Risk Control

(1) Preconditions

- Electric locomotives produced by the Ministry of Railways of India on a self-financing basis are delivered properly according to the schedule.
- Personnel necessary for the operation and maintenance of the Project are employed and trained by the DFCCIL, and the DFCCIL, IR and other parties related to the Project appropriately cooperate with one another.

(2) External Factors: None in particular.

6. Lessons Learned from Past Projects and Application to the Project

From the results of ex-post evaluation on the Metro Manila Strategic Mass Rail Transit Dev. Project (I), (II) and (III) in the Republic of the Philippines, it is pointed out that, when an ODA loan project is implemented, operated and maintained by public corporation(s), it is necessary to pay special attention to their financial sustainability and to provide general support, including the improvement of finance and business efficiency of the executing agencies concerned.

In response to this, we have followed the enhancement of operation and maintenance systems, including the development of financial strategies, carried out by consultants employed by the DFCCIL, implemented the technical cooperation mentioned in section 2. (2), and developed ideas for improving organization control, and operation and maintenance plans, in the Project.

7. Plan for Future Evaluation

(1) Indicators to be Used

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

(2) Timing of the Next Evaluation

Two years after the project completion

End