

Ex-Ante Evaluation (for Japanese ODA Loan)

1. Name of the Project

Country: Federal Democratic Republic of Nepal
Project: Nagdhunga Tunnel Construction Project
Loan Agreement: December 22, 2016
Loan Amount: 16,636 million yen
Borrower: The Government of Nepal

2. Background and Necessity of the Project

(1) Current State and Issues of Transport Sector in Nepal

Nepal is facing difficulty in transportation sector with 90% of its territory mountainous while its mode of transportation (both freight and passenger) being road dependent. Partly due to its stable GDP growth of around 4% per annum during the past ten years, vehicle registrations in Nepal have doubled in the last five years. Both freight and passenger transport is increasing where in FY2012 trade volume (mainly by land route) of exports showed an increase of 1.7 times and that of imports showed an increase greater than 3.2 times compared to FY2004. However, the road network is still underdeveloped and the road density (0.17km/km²) remains at the lowest level in South Asia (Sri Lanka: 1.74 km/km², Bangladesh: 1.66 km/km², India: 1.59 km/km², Pakistan: 0.33 km/km², Maldives: 0.29 km/km², Bhutan: 0.28 km/km², Afghanistan: 0.04 km/km² [source: World Road Statistics by the International Road Federation]).

In particular, arterial road of Mid-Hill Highway (approx. 1,750km) running east and west from the capital city of Kathmandu which connects to the road going south through Tarai granary area to Birganj - the most important base for overland trade with India - is the key transportation route. It is the artery of the Nepali economy and about 60% of the trade by land passes through the stated route.

However, the development and maintenance of these roads have fallen behind the pace of increase in the amount of freight and passengers. Among them, the Nagdhunga Pass (altitude from 800m to 1,500m) is the major bottleneck of the said route with steep incline of over 10% and tight turns; causing frequently traffic jams and accidents.

(2) Development Policies for Transport Sector in Nepal, and the Priority of the Project

Based on such situation, the government of Nepal sets forth in its Approach Paper to the Thirteenth Plan (FY 2013/14 – 2015/16) the “[expansion of] a good-quality, reliable, affordable, and safe transport network to contribute to national integration, socio-economic development, and regional balance” as an objective in the road sector, and sets the improvement of Mid-Hill Highway, connecting the capital city of Kathmandu, the major city Pokhara, and Birganj, a trade base with India, and

including the area covered by assistance through the Nagdhunga Tunnel Construction Project (hereinafter referred to as the “Project”), as one of the priority issues.

(3) Japan and JICA’s Policy and Operations in Transport Sector in Nepal

The Country Assistance Policy for the Federal Democratic Republic of Nepal (April 2012) gives “building social infrastructure and institutions for balanced and sustainable economic growth” as one of the priority areas, and sets forth the provision of assistance in the development of transport infrastructure. JICA analyzes in its Country Analysis Paper for Nepal (April 2014) that the development of transport infrastructure is a priority issue. This project conforms to this policy and analysis.

The major examples of assistance programs in the transport sector implemented in the past include the grant aid projects, namely the Project for Construction of Sindhuli Road (Section III, 2012–2015), the Project for the Improvement of Kathmandu-Bhaktapur Road (2008–2011), the Project for the Improvement of Community Access (2010–2012), and technical cooperation projects, namely the Road Planning and Maintenance 2009–2011), the Project for the Operation and Maintenance of Sindhuli Road (2011–2015), and the Project on Urban Transport Improvement for Kathmandu Valley (ongoing from 2013).

(4) Other Donor’s Activities

World Bank is assisting the project to improve Mid-Hill Highway west of Pokhara and local roads/bridges. Asian Development Bank is offering assistance for the project to improve the arterial roads near Birganj, which leads to India.

(5) Necessity of the Project

This project conforms to the development issues and policy of Nepal, and is also consistent with the assistance policy and analysis of Japan and JICA. This project constructs Nagdhunga Tunnel at the bottleneck section of the Mid-Hill Highway, which is one of the most important arterial roads in Nepal, and assistance for the implementation of this project is highly necessary and relevant.

3. Project Description

(1) Project Objective(s)

The objective of the Project is to improve the road condition around Nagdhunga pass by constructing a tunnel, thereby contributing to the smooth transportation network between Kathmandu and other principal cities/areas in Nepal.

(2) Project Site/Target Area

Kathmandu District and Dhading District

(3) Project Components

- 1) Civil works (Construction of the Tunnel (2.45km), Construction of the Approach Road (2.6km), Construction of 2 Bridges along Approach Road, Construction of Toll facility, Construction of Control office, Disposal Area Development, Construction of Distribution line (4.1km))
- 2) Consulting service (Detailed Design, Preparation of Bidding Document, Construction Supervision, Capacity Development for Operation and Maintenance, Safeguard)

(4) Estimated Project Cost (Loan Amount)

22,140 million yen (among which, 16,636 million yen is covered by ODA loan)

(5) Schedule

From December 2016 to August 2023 (81 months in total)

The project will be completed upon the commercial opening (August 2022)

(6) Project Implementation Structure

- 1) Borrower: The Government of Nepal
- 2) Guarantor: None
- 3) Executing Agency: Ministry of Physical Infrastructure and Transport. However, the Department of Roads (DOR) under the Ministry of Physical Infrastructure and Transport will be in charge of the actual implementation of the project.
- 4) Operation and maintenance system: The management and maintenance of this project is implemented by the DOR. DOR has abundant experience in transport business of the country since 1996, including the Project for Construction of Sindhuli Road. At the same time, DOR also implements assistance projects by other donors (World Bank, Asian Development Bank, etc.), and has the required ability related to the operation and maintenance of roads. Further, it is scheduled that support for building tunnel operation and maintenance capacity is provided through the consulting service under this Project, and it is expected that no problems in particular will be caused in terms of operation and maintenance.

(7) Environmental and Social Considerations/Poverty Reduction/Social Development

1) Environmental and Social Considerations

(i) Category: B

(ii) Reason for Categorization: This Project does not fall under a large-scale project among the road sectors specified in JICA Guidelines for Environmental and Social Considerations (issued in April 2010) and is unlikely to have a significant adverse impact on the environment. In addition, it does not fall under the characteristic that may have a significant impact or a vulnerable area

- specified in the Guidelines.
- (iii) Environmental permission: The Environmental Impact Assessment (EIA) report required under the environmental laws of Nepal was approved by the Ministry of Science, Technology and Environment in December 2015.
 - (iv) Anti-pollution measures: Impact on air quality and water quality is expected during the construction period, and avoidance/mitigation measures including the sprinkling of water, maintenance of equipment and sewage treatment will be taken. Although 228,000 m³ of the soil is expected to be excavated due to the construction of the tunnel, the soil will be reused for the foundation of access roads and roadside stations.
 - (v) Natural environment: The project site is not designated as being a national park or other area sensitive to impact or nearby such an area, and it is assumed that any undesirable impact on the natural environment will be minimal.
 - (vi) Social environment: This Project requires the acquisition of approximately 11.6 ha of land and involuntary resettlement of 27 people. The land acquisition and resettlement will be carried out in accordance with the domestic procedures and a simplified resettlement assistance plan. A council among the residents was implemented in the course of the preparation of the resettlement assistance plan, and the outline of the project and compensation policy was explained. No specific objection to the project was confirmed throughout the council. Measures to recover the livelihood including income increase will also be carried out by the implementing organization as assistance for socially vulnerable and low-income groups.
 - (vii) Other/Monitoring: Under this Project, the air and water quality will be monitored by the implementing organization during the construction and after operation. Also, before and during the construction, the implementing organization monitors whether the land acquisition, residents relocation and assistance for livelihood restoration are implemented adequately.

2) Promotion of Poverty Reduction: None in particular

3) Promotion of Social Development:

- (i) Gender Category: Gender mainstreaming needs survey/analysis project
- (ii) Reason for Categorization: Because it was confirmed through the preparatory survey that women's access to a water source and market may be limited due to the construction of access roads, it is scheduled to take measures so that information is diffused among women in advance in this Project.

(8) Collaboration with Other Donors: None in particular

(9) Other Important Issues: This Project constructs the first mountain road tunnel in Nepal, and because it is necessary to reinforce the ground safely, technology of the tunnel auxiliary method, regarding which Japan has superiority, will be utilized.

4. Target Outcomes

(1) Quantitative Effects

1) Performance Indicators (Operation and Effect Indicators)

Indicator	Baseline (Recorded in 2016)	Target (2024) (2 years after completion)
Annual average daily traffic (vehicle/day) ^{***}	7,700	10,200
Travel time (min)	30 (east), 20 (west)	7 (east), 6 (west)
Average travel speed (km/hour)	15 (east), 25 (west)	40 (east), 50 (west)
Traffic accident	240 (vehicle), 130 (personal)	120 (vehicle), 65 (personal)

* east...Indicators traveling to Kathmandu, west...Indicators traveling from Kathmandu

** vehicle...number of vehicle involved in accidents, personal...number of personal involved in accidents

*** Traffic was confirmed from 24 hour survey on both weekday and on holiday

(2) Qualitative Effects

Promotion of sustainable economic development in the region.

(3) Internal Rate of Return

Based on the conditions indicated below, Economic Internal Rate of Return (EIRR) of the Project is 12.5%, and Financial Internal Rate of Return (FIRR) is negative. The Project Operation and Maintenance cost will be based on toll fee which is 25 Nepal rupees and 35 Nepal rupees for normal and heavy vehicle respectively. DOR will consult with Nepal Road Board to form Toll Policy to make sure toll revenue will be raised.

EIRR: Cost: project cost (excluding taxes), O&M cost

Benefit: Reduction of Travel Time Cost, Reduction of Vehicle Operating Cost

Project life: 30 years

FIRR: Cost: project cost, O&M cost

Benefit: toll revenue

Project life: 30 years

5. External Factors and Risk Control

External condition: No hindrance to the construction work caused by flooding during

the rainy season or other reasons will occur.

6. Lessons Learned from Past Projects

(1) Lessons Learned from Similar Projects

From the results of the ex-post evaluation of the Hai Van Tunnel Construction Project in Vietnam, one lesson learned is that the preparation for maintenance should be started from during the construction work, for example preparing the maintenance plan beforehand, in projects to which new technology is applied.

(2) Utilization of the Lessons in this Project

Because the first mountain road tunnel in Nepal is constructed in this Project, the lesson above is taken into account. The reinforcement of organizational structure and implementation capacity of the implementing organization is intended, and the maintenance plan will be prepared, through the assistance for operation and maintenance capacity building.

7. Plan for Future Evaluation

(1) Indicators to be used

- 1) Annual average daily traffic (vehicle/day)
- 2) Travel time (min)
- 3) Average travel speed (km/hour)
- 4) Traffic accident

(2) Timing of the next evaluation: Two years after the completion of the project (ex-post evaluation)

End