

Islamic Republic of Pakistan

FY2019 Ex-Post Evaluation of Japanese ODA Loan

“Indus Highway Construction Project (III)”

External Evaluator: Kenichi Inazawa, Octavia Japan, Co., Ltd.

0. Summary

This project involved the construction of a road in the underdeveloped section of Sehwan to Ratodero (approximately 200 km) with the aim of addressing the traffic bottlenecks along National Route 55 (hereinafter referred to as the “Indus Highway”), which forms a part of the national trade corridor, thereby contributing to the economic development of the highway as a whole and the areas along the route. The *Medium Term Development Framework* (2005-2010) and the *12th Five-Year Plan* (2018-2023), formulated by the government of Pakistan, recognize National Route 5 and the Indus Highway as strategic main routes of the national trade corridor, while placing the importance on developing and expanding road networks. Considering that there was a need to make the entire sections of the Indus Highway double-tracked (two lanes each way) and increase budgets for the repair and maintenance of National Route 5, as well as the fact that this project was in line with Japan’s assistance policy, its relevance is high. Efficiency is fair, although the project cost was within the initial plan budget, the project period was longer than the initial plan, due to delays in the consultant bidding process, paperwork and agreement in terms of consultant selection, land acquisition, construction and final payments to suppliers / contractors. With respect to the quantitative effect indicators, the “annual average daily traffic” exceeded the target, while the “saving in travelling time” primarily met the target figure. Taking into account the comments made in interviews conducted during the field study, it is believed that driving has become safer and more comfortable along the project area and that this project has contributed to the vitalization of the local economy and improved living conditions. Based on the above, effectiveness and impact is judged to be high. It is assumed that there are no major concerns in relation to the institutional, technical and financial aspects of the project or the status of operation and maintenance works carried out by the National Highway Authority (hereinafter referred to as the “NHA”) Sindh Office. Therefore, the sustainability of the effects achieved through the implementation of this project is considered to be high.

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

1. Project Description



Project Location



Road Developed by This Project
(Sehwan-Ratodero)

1.1 Background

The volume of traffic on National Route 5 that connects Karachi (Pakistan's main business city) and the northeastern region of the Punjab Province was increasing every year, causing a bottleneck which has impacted on economic activities. The Indus Highway is a main road which is located in the west bank of the Indus river, while National Route 5 is located along the other side (or east bank) of the river. Compared to National Route 5, the Indus Highway had shortened the Karachi-Peshawar (the capital of Khyber Pakhtunkhwa Province) section by approximately 500 km. However, the roads were narrow, and some sections were underdeveloped. Therefore, drivers tended to use National Route 5. For this reason, there was a need to improve the transport capacity of the north-south main route by diverting more traffic from National Route 5 to the Indus Highway, constructing new roads and widening existing roads for the Highway at the same time.

1.2 Project Outline

The objective of this project is to eliminate traffic bottlenecks by constructing an additional road (around 200 km between Sehwan and Ratodero) in the undeveloped section of the Indus Highway (National Route 55) that forms part of the national trade corridor, thereby contributing to the production of the planned effect of the entire Indus Highway and the economic development of communities along this highway.

Loan Approved Amount / Disbursed Amount	19,455 million yen / 17,331 million yen
Exchange of Notes Date / Loan Agreement Signing Date	December 13, 2006 / December 15, 2006
Terms and Conditions	Interest 1.3% Repayment period 30 years (of which grace period is 10 years) Procurement condition: General Untied
Borrower / Executing Agency(ies)	The President of the Islamic Republic of Pakistan / National Highway Authority (NHA)
Project Completion	March 2020
Target Area	Between Sehwan and Ratodero in Sindh Province
Main Contractor(s) (Over 1 billion yen)	Frontier Works Organization (Pakistan)
Main Consultant(s) (Over 100 million yen)	Republic Engineering Corporation (Pakistan) / Techniques Consulting Engineers (Pakistan) / EA Consulting PVT LTD. (EA) (Pakistan) / Techno-Consult International (Pakistan) (JV)
Related Studies (Feasibility Studies, etc.)	Feasibility Study (F/S), NHA (1988)
Related Projects	[ODA Loan] -“Indus Highway Construction Project (I)” (1989) -“Indus Highway Construction Project (II)” (1991) -“Indus Highway Construction Project (II B)” (1993) -“Kohat Tunnel Construction Project (I)” (1994) -“Kohat Tunnel Construction Project (II)” (2001) -“Kohat Tunnel Construction Project (III)” (2003) [Technical Assistance] -“Pakistan Transport Plan Study” (master plan) (2005-2006) [Other Agencies] -“National Highway Development Sector Investment Program” (ADB, 2005)

2. Outline of the Evaluation Study

2.1 External Evaluator

Kenichi Inazawa, Octavia Japan, Co., Ltd.

2.2 Duration of Evaluation Study

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

Duration of the Study: November 2019 – December 2020

Duration of the Field Study: International travel was canceled. The field study was conducted remotely, using a local consultant.

2.3 Constraints during the Evaluation Study

Due to the spread of COVID-19, the external evaluator decided against international travel for this study. Utilizing a local consultant, the evaluator conducted site visits and information / data collection remotely, as well as interviews with project-related personnel and residents, and qualitative surveys. The results were analyzed and used in the decision-making process of the external evaluator.

3. Results of the Evaluation (Overall Rating: A¹)

3.1 Relevance (Rating: ③²)

3.1.1 Consistency with the Development Plan of Pakistan

Before this project began, the government of Pakistan formulated the *Medium Term Development Framework* (2005-2010), which listed the following as strategies for developing the road sector: (1) strengthening the transport capacity of existing road networks through improvements and road widening; (2) selective investment in the construction of new roads that are economically viable, including rural roads; (3) development of road networks that contribute to the promotion of trade with Afghanistan, central Asia and India; (4) promoting the private sector's involvement in the road industry; (5) improvement of road maintenance and the promotion of traffic safety measures; (6) stricter control on overloading and (7) improving the capabilities of the road sector's implementing agencies. In addition, the government chose to construct National Route 5 and the Indus Highway, connecting Karachi, Lahore and Peshawar in a north-south direction, as these are the strategic main routes of the national trade corridor.

At the time of the ex-post evaluation, the government of Pakistan has formulated the *12th Five-Year Plan* (2018-2023), which sets a target of a 9.6% increase in road network length and density annually, and placed the significant importance on infrastructure development. This plan has prioritized the promotion of trade and market access, industrial development, global value chains, socio-economic development and the reduction of poverty. Additionally, *Vision 2025*, formulated by the government in 2014, has focused on establishing an integrated traffic system and improving regional connectivity. Furthermore, the government has developed the *National Transport Policy 2018* in 2018, which views road transport networks as an important provider of promoting access between regions.

Based on the above, there is a need to develop and expand road networks to encourage trade

¹ A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory

² ③: High, ②: Fair, ①: Low

and market access in Pakistan at the time of the appraisal, as well as at the time of the ex-post evaluation. Therefore, this project is in line with national and sector plans in place at the time of the appraisal, as well as those in place at the time of the ex-post evaluation.

3.1.2 Consistency with the Development Needs of Pakistan

Before this project began, road was considered to be the main transport method of the future. Above all, national roads accounted for a large portion of cargo and commercial transport and were expected to play a significant role in the national economy. While National Route 5 was the most important route connecting Karachi Port, the country's main port, and the Punjab Province, the center of the economic activity, it was overloaded with increasing traffic volumes. There was a need to develop the Indus Highway as an alternative to National Route 5. The Indus Highway is on the west bank of the Indus River and runs alongside National Route 5, which is on the east bank. The distance between Karachi and Peshawar is around 500 km shorter on the Indus Highway than on National Route 5. However, the road was narrow, and some sections were underdeveloped. Thus, drivers tended to use National Route 5. For this reason, there was a need to construct a new road in Indus Highway, widen the existing road and encourage more drivers to use the Indus Highway, rather than National Route 5, thereby strengthening the transport capacity of the key north-south route.

According to the NHA, around 20% of the traffic from Karachi (southern region of Pakistan) to the North has been diverted from National Route 5 to the Indus Highway since its completion, some of which is a direct result of this project. Under this project, a new road was constructed which was double-tracked (two lanes each way) in the targeted section (Sehwan-Ratodero) and was around 200 km long. As a result, traffic flows have improved. In addition, at the time of the ex-post evaluation, the government of Pakistan formulated a plan to make the remaining sections of the Indus Highway double-tracked by 2024, with a view to improving its traffic transport capacity. As for National Route 5, which is a north-south route just like the Indus Highway, all sections were double-tracked at the time of the ex-post evaluation. In the near future, measures will be taken to deal with increased traffic volume and larger vehicles, and it is planned to increase the budget for sustainable restoration and maintenance work.

Based on the above, efforts have been made to strengthen the transport capacity of the Indus Highway and National Route 5 at the time of the project appraisal, through to the ex-post evaluation. Therefore, the project is in line with the development needs at the time of the appraisal as well as at the time of the ex-post evaluation.

3.1.3 Consistency with Japan's ODA Policy

JICA formulated the *Medium-Term Strategy for Overseas Economic Cooperation Operations* in April 2005, which listed “a foundation for sustainable growth” as one of the priority areas. JICA also developed the *Country Assistance Strategy* in March 2006, which recognized the need to improve the road sector, in order to support economic development led by the private sector and claimed that JICA would actively support it, with a view to reducing poverty and improving market access. Considering that this project aimed to eliminate traffic bottlenecks by constructing new roads in the underdeveloped section of the Indus Highway, thereby contributing to the economic development of the communities along the highway, it can be stated that this project was in line with the ODA policy of Japan.

This project has been highly relevant to Pakistan's development plan and development needs, as well as Japan's ODA policy. Therefore, its relevance is high.

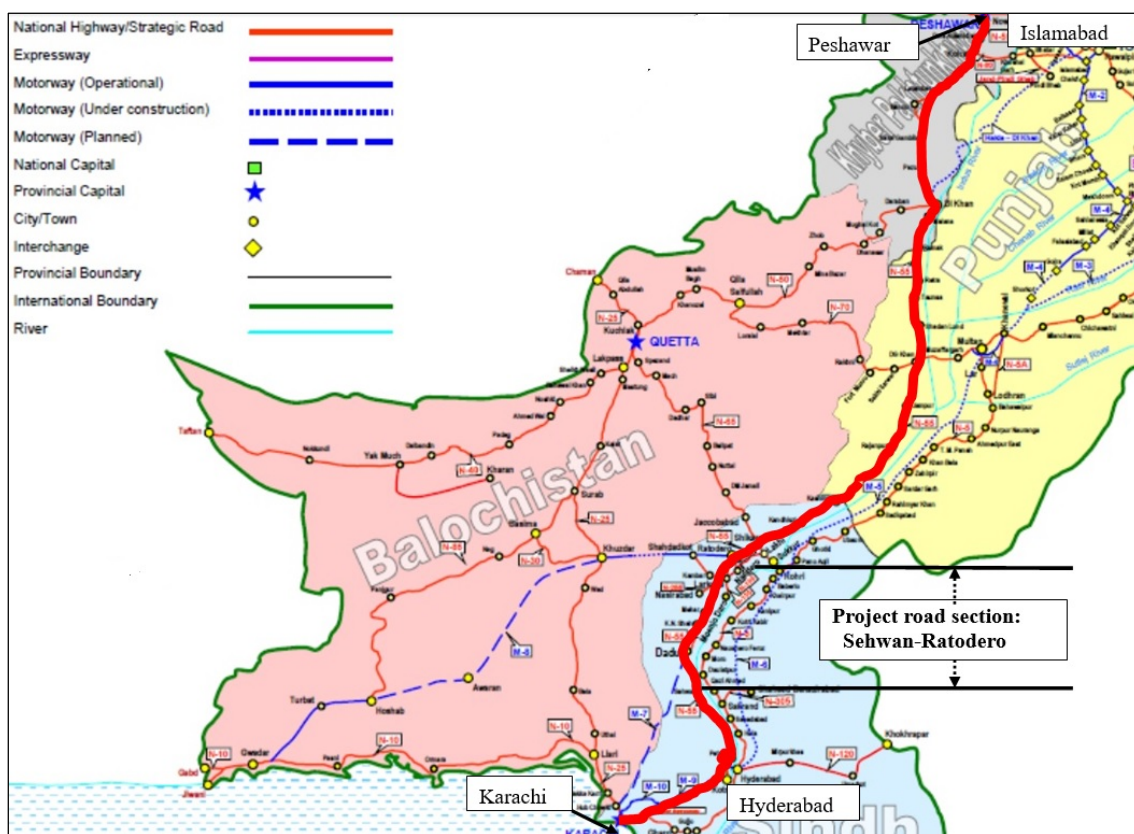


Figure 1: Location of the Project Site (overall map)
(Bolded red line is the Indus Highway: a map provided by the NHA was edited by the evaluator)

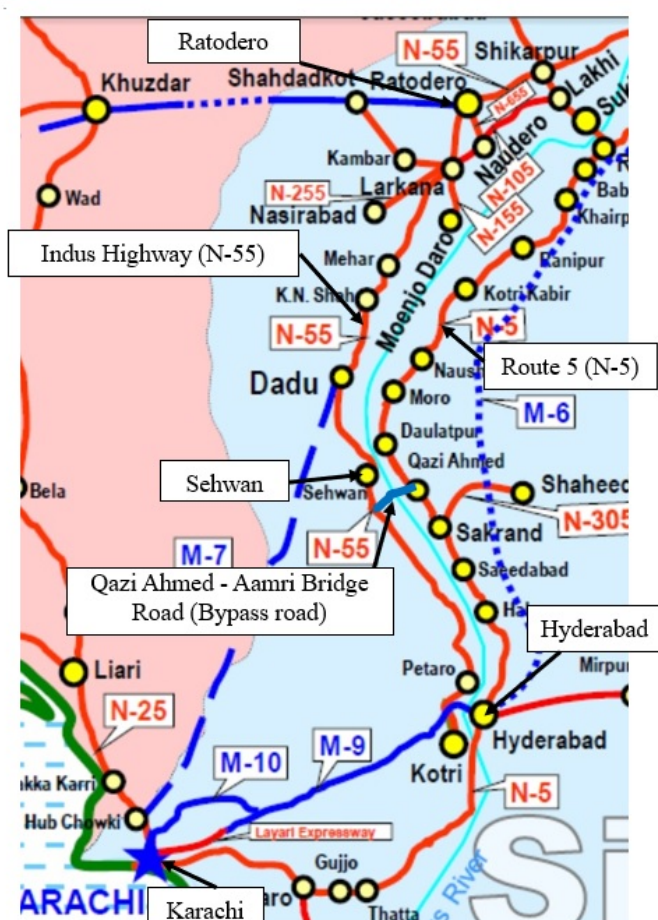


Figure 2: Location of the Project Sites (details of the targeted section)

3.2 Efficiency (Rating: ②)

3.2.1 Project Outputs

The plan and actual outputs at the time of the ex-post evaluation are shown in Table 1. (Underlined are the major discrepancies of the plan)

Table 1: Project's Output Plan and Actual Outputs at the Time of the Ex-Post Evaluation

Plan (at the time of the appraisal in 2006)	Actual (at the time of the ex-post evaluation: 2019-2020)
1) Civil work / equipment procurement	1) Civil work / equipment procurement
a) Construction of a new double-tracked road (around 200 km, 13.3m wide (lane 3.65m x 2, road shoulder 3m x 2), including toll stations)	a) Construction of a new double-tracked road (around 197.75 km, 13.3m wide (lane 3.65m x 2, road shoulder 3m x 2), three toll stations)
b) Construction of bypasses (eight locations)	b) Construction of bypasses (<u>13 locations</u>)

c) Development of traffic control centers (truck weighing station, traffic counting system, road information boards, etc.)	c) Development of traffic control centers (<u>*not implemented during this project</u>)
2) Consulting services a) Review of the detailed design, related to civil work b) Bidding assistance c) Construction management d) Detailed design of a traffic control center	2) Consulting services Implemented as planned

Source: JICA document (at the time of appraisal), Project Completion Report and questionnaire answered by the NHA (at the time of the ex-post evaluation)

The differences between the plan at the time of the appraisal and the actual outputs at the time of the ex-post evaluation shown in Table 1 are analyzed below:

1) Civil work / equipment procurement

With respect to the actual outputs, a) a new road was constructed as per the initial plan including a double-tracked (two lanes each way) section of around 200 km; b) the number of bypasses built exceeded those originally planned, as it was expected before this project began that population numbers and the volume of goods being transported, would not only increase in the areas along the Indus Highway but also in major cities, and that building bypasses would improve traffic flow and movement to each destination and c) the “traffic control centers” that aimed to prevent the overloading of trucks and ensure road safety were not developed as part of this project.³ The reason was that the security around the project sites were not stable and there was a challenge for the land acquisition. As an alternative measure, the NHA allocated funds to develop truck weighing stations in safer locations; both Petaro and Sehwan (north bound) and Petaro and Ratodero (south bound) have been completed. In addition, in order to better regulate traffic rule violations, such as speeding and overweight vehicles, the NHA is coordinating with the Mobile Police Corps for traffic safety measures. Therefore, the “traffic control centers” were not developed as a result of a situation that had not been foreseen at the project planning stage. Nevertheless, speed and weight are regulated at truck weighing stations as a part of the safety measures and the NHA periodically records traffic volumes. Thus, the intended results of this project have been achieved.

³ The NHA and JICA agreed on the exclusion of this component from the project in February 2013.

2) Consulting Services

These were implemented as per the plan. While the detailed design of the traffic control centers mentioned in “d)” was conducted, the construction was not carried out during this project as mentioned above.

3.2.2 Project Inputs

3.2.2.1 Project Cost

While the planned total cost was 23,079 million yen (of which the ODA loan equated to 19,455 million yen), the actual total cost was 21,098 million yen (of which the ODA loan was 17,331 million yen), which was within the budget of the plan (around 91% of the plan). Although more bypasses were constructed during this project which slightly inflated the cost, the overall cost remained within the budget because (1) the traffic control centers were not developed and (2) the exchange rate changed (the yen became stronger against the rupee). The budget for the “traffic control center” was estimated to be around 705 million yen (or approximately 401 million rupees, using the exchange rate at the time of the appraisal⁴), which is around 3% of the total budget of 23,079 million yen. This component did not account for a significant share compared to other outputs (new road construction, bypass construction) in terms of scale. Although accurate data could not be obtained during this study with regard to the cost breakdown, the total project cost would not have exceeded the plan, even if the “traffic control centers” had been developed.⁵ In any case, the total project cost would have been within the plan.

3.2.2.2 Project Period

Table 2 shows the initially planned and actual project periods. At the time of the appraisal, the planned project duration was seven years and one month (85 months) from December 2006 to December 2013.⁶ However, the actual period duration was 13 years and four months (160 months) from December 2006 to March 2020. The actual project period constituted around 188% of the plan, which was significantly longer than planned. The main factors accounting for this were as follows: (1) there was a delay in the consulting bidding process; the approval procedures of the NHA and the Ministry of Finance of Pakistan were prolonged, which created delays in the

⁴ The source is the NHA Sindh Office.

⁵ To explain further, the difference between the planned total project cost (23,079 million yen) and the actual total project cost (21,098 million yen) is around 2 billion yen. Even if the centers had been developed at a cost of around 705 million yen, this would not have exceeded the overall planned cost of the project.

⁶ At the time of the appraisal, the completion period of this project was defined as “when the payment is completed after the defect liability period.”

selection of consultants and in the signing of agreements; (2) the bid consent and document approval processes within the NHA took longer when selecting a contractor; (3) additional time was required for construction because of the increase in the number of bypasses to be constructed, while land acquisition took longer than planned, resulting in delayed construction. Despite the fact that the defect liability period ended in October 2016, the final payment to the contractor for the facilities on the highway, which was borne by the Pakistani side, has not been completed at the time of the ex-post evaluation (as of March 2020).⁷ According to the NHA, the internal audit department is spending a significant amount of time confirming the actual performance of the contractor against the contract and the monitoring department is checking the project sites, as well as verifying and negotiating the details and the amount of the invoice submitted by the contractor. It is considered necessary that the NHA and the contractor finalize the process in a timely manner.⁸

Table 2: Initial Plan and Actual Project Period

	Initial Plan	Actual Project Period
(Entire Project)	December 2006 - December 2013 (85 months)	December 2006 - March 2020 (160 months)
1) Consultant Selection	December 2006 - November 2007 (12 months)	December 2006 - January 2008 (14 months)
2) Consulting Services	December 2007 - December 2013 (73 months)	February 2008 - October 2016 (104 months)
3) Bidding Procedure	January 2008 - June 2009 (18 months)	August 2008 - July 2010 (24 months)
4) Construction	July 2009 - June 2012 (36 months)	December 2010 - June 2014 (43 months)
5) Defect Liability Period and Payment Period	July 2012 - June 2013 (12 months)	June 2014 - March 2020 (70 months) (*Note that the defect liability period ended in October 2016)

Source: Document provided by JICA (initial plan), Project Completion Report and questionnaire answered by the NHA (actual)

3.2.3 Results of Calculations for Internal Rates of Return (Reference only)

(Financial Internal Rate of Return (FIRR))

FIRR was not calculated at the time of the appraisal because the nature of this project was not to improve profitability. For the same reason, FIRR was not re-calculated at the time of the ex-post evaluation.

⁷ All payments to the contractor for the ODA loan scope have been completed, but payments by the Pakistani side have not been completed. Meanwhile, according to the NHA, the payment is expected to be completed by December 2020.

⁸ As of May 2020, the NHA expressed its concern regarding an even further delay due to COVID-19. The NHA estimates that the final payment may take close to a year.

(Economic Internal Rate of Return (EIRR))

At the time of the appraisal, the travel time reduction and the travel expense reduction were used as “benefits” and the project cost and the operation and maintenance costs, were used as “costs”, while assuming a project life of 10 years; EIRR was calculated to be 12.2%. EIRR was re-calculated at the time of the ex-post evaluation, with the same conditions as those applied at the time of the appraisal. It transpired that the construction cost could not be recovered within the project life (10 years). More specifically, the “benefits”, such as the travel expense reduction and the travel time reduction would not exceed the “costs” incurred over the span of 10 years after the completion of the construction, failing to make the re-calculated EIRR positive.⁹ In addition, as the “benefits” and “costs” were calculated in rupees at the time of the appraisal, the re-calculation was also conducted in rupees. As a result, it was found that the depreciation of the currency (weakening rupee)¹⁰ over the period of project implementation, greatly affected the result. For this reason, the “costs”, which was in rupees, was inevitably greater at the time of the re-calculation. Since the “benefits” could not cover the “costs” affected by the exchange rate change, the re-calculated EIRR could not be positive. On the other hand, if the standard project life for road projects, 20 years, is applied, the re-calculated rate would be 11.5%.

As previously mentioned, while there was a slight inflation of cost due to the increased number of bypasses, the traffic control centers were not developed and the exchange rate changed during the project implementation (the yen became more expensive against the rupee); thus, the project cost remained within budget. The project period was longer than planned because the consultant bidding procedure, the bid consent and document approval for selecting contractors, the land acquisition and the construction were delayed and the final payment has not been made to the contractor. Based on the above, although the project cost was within the plan, the project period exceeded the plan. Therefore, the efficiency of the project is fair.

⁹ It could not be revealed during this study how the project life of 10 years was assumed at the time of the appraisal.

¹⁰ Reference: 1 rupee equated to 1.87 yen at the time of the appraisal (2006). Taking the average over the project implementation period, 1 rupee equated to 1.03 yen, which constitutes a depreciation of around 81%.



Photo 1: Toll Station Developed as a Result of This Project



Photo 2: Truck Weighing Station Developed by the NHA

3.3 Effectiveness and Impact¹¹ (Rating: ③)

3.3.1 Effectiveness

3.3.1.1 Quantitative Effects (Operation and Effect Indicators)

Table 3 shows the quantitative effect indicators of this project (baseline, target and actual).

Table 3: Operation and Effect Indicator (Baseline, Target and Actual)

Indicator	Baseline 2005	Target 2014 Two Years after Completion	Actual *Note 3		
			2017 Three Years after Completion *Note 2	2018	2019
1) Annual Average Daily Traffic Volume (Unit: PCU/Day) *Note 1	6,404	11,013	14,805	15,945	16,545
2) Savings in Traveling Time (Unit: minute)	-	108	Passenger Cars and Shared Minibuses: 75-90 Trucks: 30		

Source: JICA document (baseline and target) and answers to the questionnaire (actual)

Note 1: PCU is an acronym for Passenger Car Unit

Note 2: Although two years after completion should have been 2016, the data were not collated properly in 2016. This table shows data starting from 2017 (three years after completion) when appropriate data collection began.

Note 3: According to the NHA Sindh Office, these data were measured using the same methods and under the same conditions as the baselines (2005).

The actual figure for the annual average daily traffic volume after project completion, was higher than that of the target. Since 2017, three years after completion, the traffic volume has exceeded the target and has been on the increase. The reason for this was an increase in logistic

¹¹ Sub-rating for Effectiveness is to be put with consideration of Impacts.

demand and transport volume, associated with the economic development in the provinces along the Indus Highway. By absorbing the potential traffic demand as per initial expectations, this project is thought to be contributing to the relieving of traffic congestion on National Route 5 which was previously the preferred route.

With respect to the saving in terms of travelling time, it was expected at the time of the project appraisal that the development of the Sehwan-Ratodero section (around 200 km) would shorten travelling time by 108 minutes. It used to take four to five hours to travel along this section. With the construction of the new road and double-tracked road (two lanes each way), the average travelling time has been reduced to around 3.5 hours, after completion of the project. While the time saved in terms of smaller vehicles, such as passenger cars and shared minibuses was 75-90 minutes, the time saving for trucks transporting goods was 30 minutes. The target of 108 minutes could not be achieved for the following reasons: (1) in addition to traffic volume having increased across the entire Indus Highway, a bypass road (Qazi Ahmed-Aamri Bridge Road) was constructed after completion of this project as a result of the surge in traffic on the Highway, connecting National Route 5 and Aamri, located around 35 km south of Sehwan, the starting point of the section targeted by this project, with a view to easing congestion on National Route 5; (2) it takes time for the NHA and the local police to check the weights of trucks at the truck weighing stations.¹² It can be said that the saving in travelling time has, generally, been achieved (actual saving of 75-90 minutes versus target of 108 minutes). Nevertheless, there is a continuous need to take further measures considering the fact that traffic volumes are on the rise. As mentioned in “3.1.2 Consistency with the Development Needs of Pakistan”, the NHA is making the entire Indus Highway double-tracked (two lanes each way), which is presumed to lead to significant savings in terms of travelling time.

3.3.1.2 Qualitative Effects (Other Effects)

(Improvement of Safety)

Regarding the safety of vehicles passing the developed section (Sehwan-Ratodero), interviews were conducted as part of the field study of this evaluation.¹³ Drivers commented on the safety of the entire Indus Highway, “The road surface is in good condition. There are no holes, and it is

¹² If there is no weight check at the weighing stations, the travelling time of trucks is likely to be more or less the same as that of passenger cars and shared minibuses.

¹³ Key informant interviews were conducted targeting four drivers. Interviewees were selected based on the criterion that they could compare the targeted road before the project completion and at the time of the ex-post evaluation, as well as National Route 5 which was used as an alternative route.

comfortable to drive along it. The widening of the road has improved vision.” Thus, it is thought that the comfortability of driving has improved, while tiredness during driving has been reduced. It is possible that the number of accidents has been reduced as a result of the improvements made during this project. The number of traffic accidents and overload violations for the entire Indus Highway are shown in Table 4.

(Reference) Table 4: Number of Traffic Accidents and Overload Violations
(entire Indus Highway)

Indicator	2016	2017	2018	2019
1) Number of Traffic Accidents	311	296	271	245
2) Number of Overload Violations	N/A	N/A	N/A	8,583

Source: NHA Sindh Office

Note: Data relating solely to the section targeted by this project (Sehwan-Ratodero) were not available.

The data provided in this table are labeled as reference data, because traffic accident data were not collated in 2015 or earlier, and it is difficult to compare the numbers with those before this project began. It can be said that the number has been decreasing every year since 2016. According to the NHA Sindh Office, the Indus Highway is being widened to have two lanes each way, as mentioned in “3.1.2 Consistency with the Development Needs of Pakistan”, which is improving traffic safety. In addition, it was pointed out that municipalities periodically organize safety awareness activities for drivers (mainly prevention of accidents, overloading and speeding) and that no problems were reported in relation to the maintenance carried out by the NHA Sindh Office.

With respect to the data regarding overload violations, the number is listed as a mere reference, as there are no data for 2018 or earlier and it is not possible to judge whether the number quoted is too small or too large. The NHA Sindh Office maintains that its representatives are coordinating with local police to impose stricter controls, based on the *National Highways Safety Ordinance 2000*¹⁴ which sets out the rules for safe driving on national roads. More specifically, as mentioned in “3.2.1 Project Outputs”, the NHA is using its own funds to check weights at truck weighing stations. The number of such weighing stations is likely to increase in the future, and an even better control of overloaded vehicles is expected. On the other hand, the regulation relating to

¹⁴ NHSO 2000

penalty payments for overloaded vehicles is not being complied, and there are cases of payments not being settled in reality. Apparently, the actual situation is not well documented.¹⁵ This indicates that the NHA headquarters responsible for the regulation and implementing the thorough systems need to strengthen rule enforcement on penalties and payments relating to overloaded vehicles through discussion with the relevant agencies. With the stricter enforcement of penalty payments, the number of penalties is likely to decrease.

As mentioned in “3.2.1 Project Outputs”, although the “traffic control centers” were not developed and there were concerns about traffic accidents and overloading, vehicle speed and weights are being checked at the truck weighing stations and road safety measures are being implemented. In addition, traffic volumes are measured by the NHA regularly and the local police is also involved in making traffic safety improvements. Considering the above, it can be said that the improvements in safety, initially intended by this project, have been achieved.

3.3.2 Impacts

3.3.2.1 Intended Impacts

(1) Qualitative Effect

(Contribution to the Production of the Planned Effect of the Entire Indus Highway and the Economic Development of Communities along the Highway)

As a part of the field study of this survey, interviews were conducted to determine whether an improved traffic flow had been realized (relieving traffic congestion, driving comfortability, travel time reduction), whether similar results were being observed along the entire Indus Highway and whether the economy along the highway had been vitalized.¹⁶ Certain comments recorded during the interviews were as follows:

- “Currently the road surface is in a good condition. There are no holes, and we can drive in comfort. The widened roads allow us to see better and travelling time has been reduced.” (drivers)
- “Speaking of the entire Indus Highway, I think we could reduce our car maintenance cost by 30% and fuel by 25%, compared to around 10 years ago. We can save cost as well as time.” (drivers)

¹⁵ The actual number of unsettled cases was not clear. Throughout the interview, it was confirmed that the crackdown was strengthened, however there was ambiguity relating to the number of people who had settled payments after having received traffic tickets; the actual situation was not well documented.

¹⁶ Key informant interviews and group discussions were conducted targeting 20 people, such as officials of the Sindh Province Government, the NHA Sindh Office, municipalities along the Indus Highway, residents along the highway and drivers who usually use the highway. In a similar manner to the interviews mentioned in “3.3.1.2 Qualitative Effects (Other Effects)”, individuals were selected based on the criterion that they were aware of the situation prior to project completion, as well as at the time of the ex-post evaluation.

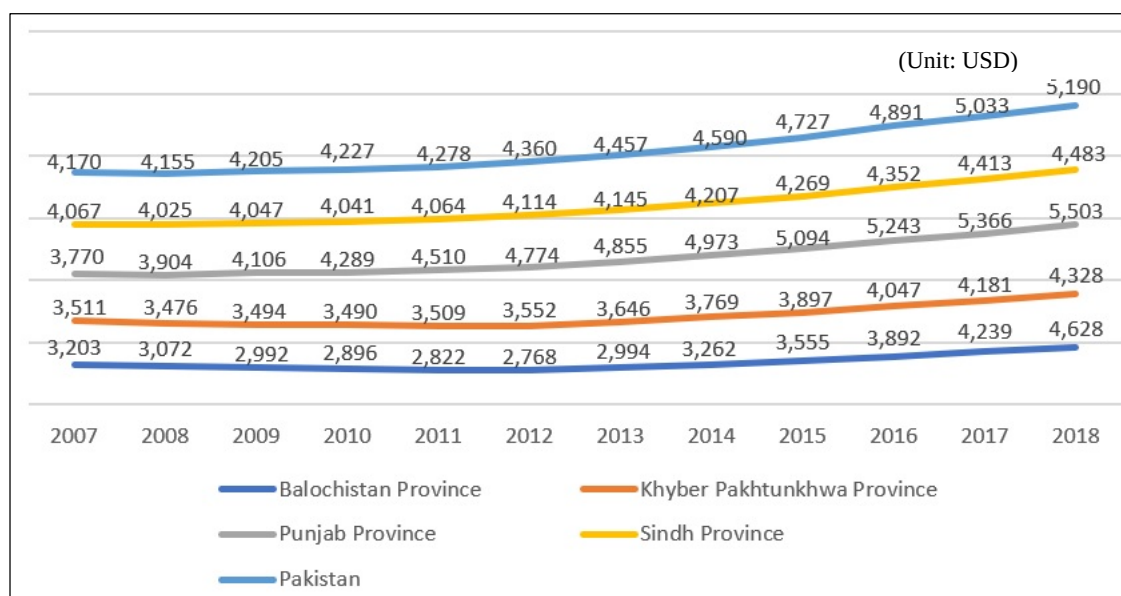
- “It used to take four to five hours to travel between Sehwan and Ratodero (approximately 200 km) before this project began. Now, at the time of the ex-post evaluation, it takes around 3.5 hours on average. Traffic volume is on the rise, the condition of the road surface is improving, we think driving has become more comfortable.” (local residents, NHA Sindh Office)
- “The number of traffic accidents has been decreasing in the sections targeted by this project, because the road has been widened and the road surface has been improved by this project.” (local police, officials of Sindh Province)
- “Security has improved in the section targeted by this project. With new and widened roads, safe passage has been realized. Before this project began, there were cases of mugging and kidnapping for money, which is no longer the case (there are no longer acts of folly, such as stopping cars to commit a crime). It has become easier for police officers to carry out their duties.” (local residents, local police)
- “Thanks to this project’s section, the prices of farmland and residential land are rising. Roughly speaking, I think the prices tripled or quadrupled from the period before this project began until its completion.” (local residents)
- “Access to public facilities such as schools, hospitals, markets and governmental buildings has improved. In addition, access to Hyderabad and Karachi has dramatically improved, which is beneficial with regard to transporting manufactured goods and agricultural products. It is more profitable to trade in big cities like Hyderabad and Karachi, than in smaller neighboring towns and villages.” (local residents, a factory manager)
- “I think the economy has been vitalized along the highway, following the development of the entire Indus Highway. More shops have opened, and we see more trading of agricultural products. There are more opportunities for the residents along the highway to earn income in Karachi and Hyderabad. There were only daily labor jobs in the neighboring villages before. I think the number of options and opportunities to work has increased, as traffic access has improved. It is not only Karachi and Hyderabad; the number of farmers and transporters who sell / buy agricultural products in Balochistan Province and Punjab Province using the Indus Highway is gradually increasing. Factories along the highway have been able to transport their products to Port Qasim (Karachi City) easily. It is likely that they have not only reduced their transportation costs, but also increased their sales greatly. All in all, we think the Indus Highway is contributing to the expansion of business opportunities and economic vitalization.” (officials of Sindh Province)

Taking into consideration the comments above, it can be judged that an improved traffic flow has been achieved in the section of road, targeted by this project. It is also thought that this project

is supporting improved traffic access between regional cities, the rectification of economic disparities within the country and improved living conditions along the Indus Highway.

(2) Quantitative Effect

For reference purposes, the figure 3 shows the changes in the Gross National Income (GNI) of Pakistan and the provinces along the Indus Highway, between 2007 and 2018. While there are no significant differences among the provinces or in national data, GNI per capita in all provinces along the highway has been increasing. In addition to the aforementioned comments, these statistical data show that the development of main roads, such as those improved during this project, is thought to support economic activities in the provinces along the roads and contribute to the increased transportation of agricultural products. It is also thought to contribute to the improved, long-distance transportation of port goods between Peshawar, Hyderabad and Karachi, a main artery of the Indus Highway, supporting the development of the economic zones in these big cities. Taking into consideration the fact that travelling times have been shortened with the development and widening of the entire Indus Highway, it is thought that the contribution of this project is not small.



Source: Global Data Lab¹⁷

Note: GNI refers to “an income residents earned from within and outside the country over the period of a year.”

(Reference) Figure 3: GNI per Capita of Provinces along the Indus Highway and in Pakistan as a Whole

¹⁷ <https://globaldatalab.org/shdi/gnic/PAK/?interpolation> (accessed on July 21, 2020)

3.3.2.2 Other Positive and Negative Impacts

1) Impact on the Natural Environment

This project, which is considered to be a road sector project, was classified as Category A (likely to have a significant adverse impact on the environment) based on the “Japan Bank for International Cooperation Guidelines for the Confirmation of Environmental and Social Considerations.”¹⁸

The Environmental Impact Assessment (EIA) was approved by the Sindh Environmental Protection Agency in October 2005. During the implementation of this project, the NHA was responsible for environmental monitoring and the construction supervision consultant carried out the actual works. At the time of commencing services of project facilities, the monitoring measurement data could not be confirmed. However, according to the NHA, if there is a problem associated with the Indus Highway, the Ministry of Environment would address the matter.

During the implementation of this project, the contractors undertaking the road construction took measures to prevent the natural environment around the Indus Highway being affected. This study confirmed the influence to the environment by means of a questionnaire and interviews with the concerned parties, that there had been no negative influence in particular on the natural environment, including air pollution, noise, vibration and disruption to the ecosystem. On the other hand, traffic volume increased following the project completion, which presumably caused an increase in gas emissions to the areas along the highway. Thus, the NHA has planted trees (around 120,000 trees) along the shoulder of the sections with the highest volume of traffic. It was confirmed during interviews conducted with the NHA and residents along the highway as a part of this study, that there had been no major complaints or discontent regarding issues such as noise, vibration and air pollution. Nevertheless, should the volume of traffic continue to increase in the future, there could be potential negative effects. It has been concluded that measures would be taken when required.

2) Resettlement and Land Acquisition

Over the course of this project, the NHA prepared the Resettlement Action Plan (RAP), based on which, resettlement and land acquisition were conducted with the support of the municipalities around the targeted section. 863 landowners and 143.9 ha¹⁹ (of which 141.5 ha was private land

¹⁸ Established in April 2002.

¹⁹ As a supplementary explanation, 198 households were targeted for relocation at the time of the project appraisal, but the data on the number of residents who actually relocated could not be confirmed. Similarly, the land acquisition area was calculated to be approximately 430 ha at the time of appraisal, but as a result of reviewing the route plan and

and 2.4 ha was state-owned land) were subject to the land acquisition, and 279.66 million rupees were paid as compensation. Other than the landowners, 1,320 households (10,668 family members) were affected by the road construction. The RAP was prepared by the NHA before this project began and approved by the federal government of Pakistan and JICA. According to the NHA, assessments of the people affected and the situation in the areas surrounding the project sites needed to be carried out a number of times and there were many cases of negotiations. There were many reviews and revisions of the initial plan, which took a considerable amount of time.

During the project implementation, the NHA was monitoring the land acquisition and resettlement. Compensation was categorized into different groups, such as payment to the landowners, payment for structure removal and relocation, and compensation for agricultural products. Although the process of resettlement and land acquisition required time, payment for the resettlement. Land acquisition had almost been completed by the time of the ex-post evaluation.²⁰ The structure removal and relocation, as well as the relocation of gas pipes and utility poles was also time consuming and affected the road construction period.

Before this project commenced, any cultural heritage along the Indus Highway²¹ was to be protected according to the national law. The NHA handled the matter according to the aforementioned RAP, as a result of which the cultural heritage was not negatively affected.

In the aforementioned discussions relating to the effectiveness and quantitative effect indicators, the actual “annual average daily traffic volume” of the section targeted by this project (Sehwan-Ratodero) has been higher than the targeted volume. In addition to absorbing the potential traffic demands as expected, the project is also thought to be relieving traffic congestion on National Route 5, which traffic tended to use before commencement of the project. The “saving in travelling time” has been generally achieved, although a certain increase in travelling time and traffic congestion has been observed, caused by the increase in traffic volume. Although the number of traffic rule violations is unknown, it is thought that traffic accidents have decreased in

identifying landowners, the land acquisition area became 143.9 ha.

²⁰ On the other hand, payment to certain landholders (two or three people) has not been completed. The reason is that these landholders are requesting higher compensation amounts upon realizing that the price of their land has increased, despite the fact that they had already signed agreements with the NHA in relation to the land acquisition and the compensation amount. (After agreeing to relinquish their farmlands at the proposed compensation amounts, they are now requesting compensation amounts for commercial lands, which are of higher value.) The landholders have sued the NHA, and the NHA has submitted all relevant evidence to the court, participated in the public hearing and submitted additional evidence, requested by the court. According to the NHA, this law suit will be resolved soon because the NHA had duly explained the situation to the landowners and entered into agreements with them before beginning the land acquisition process.

²¹ These consist mainly of a mosque (masjid) in the old capital, Khudabad and a ruin in Pakho City.

recent years and driving is becoming safer and more comfortable. Taking into account the comments of NHA representatives and residents along the highway that were recorded during the interviews, this project is thought to be supporting the economic vitalization of communities along the highway and improving living conditions. Based on the above, the effectiveness and impact of the project is high.



Photo 3: Overloaded Trucks



Photo 4: Accident Caused by Overloading

3.4 Sustainability (Rating: ③)

3.4.1 Institutional / Organizational Aspects of Operation and Maintenance

The executing agency of this project is the NHA. The NHA Sindh Office is responsible for the operation and maintenance of the targeted section (Sehwan-Ratodero). At the time of the ex-post evaluation (March 2020), the NHA Sindh Office employed around 25 operation and maintenance staff members. The staff of the maintenance units in Dadu and Larkana, under the jurisdiction of the NHA Sindh Office, are responsible for the actual operation and maintenance work. The NHA formulates an annual maintenance plan (AMP) and classifies it into two types: “routine” and “periodic”. The former refers to routine repairs and inspections, while the latter refers to large-scale repairs and restorations that are conducted every few years. In fact, the actual maintenance work is outsourced to local private construction companies.²² The NHA Sindh Office supervises and monitors the outsourced works. As a result of responses to the questionnaire and interviews with the NHA Sindh Office, it was confirmed that staffing was sufficient at this office, so as were

²² At the time of the ex-post evaluation (end of March 2020) 10 companies were outsourced. However, the road section is subdivided into 46 maintenance contracts. Regarding the selection criteria, passing the “maintenance contract” qualification examination set by the Pakistan Engineering Council is a prerequisite. A technical evaluation is carried out before the bidding (financial aspect). Maintenance equipment / machinery owned, and the technical level of the company are also subjects of the evaluation. Companies that meet all of these criteria can participate in the bidding (financial aspect) for final selection.

the scale and staffing levels in the outsourced companies. It was observed that staff are placed based on the actual type and volume of the maintenance work required.

With respect to maintenance equipment, this is owned and stored by the outsourced companies. No particular problems were reported in relation to the maintenance work of the targeted section being hindered by a lack of / problems with maintenance equipment.

Based on the above, it can be assumed that there are no problems regarding the institutional/organizational aspects of the operation and maintenance of this project.

3.4.2 Technical Aspects of Operation and Maintenance

The NHA Sindh Office is staffed with personnel who have extensive experience in operation and maintenance.²³ Training is conducted at the NHA headquarters and the Highway Research and Training Center (HRTC²⁴) in Islamabad. The courses aim to enhance technical and managerial capabilities and many staff from the NHA Sindh Office attend the courses. On the job training is also provided for newly recruited staff as needed.

It was confirmed during the interviews that the private construction companies, which are responsible for the maintenance work, have provided maintenance training periodically and working toward improving staff capabilities. In addition, it was also confirmed that the staff of the NHA Sindh Office have been visiting the contractors to supervise their work regularly and carry out quality assurance tasks. No defect or problem related to maintenance was reported at the time of the ex-post evaluation.

Based on the above, it may be confirmed that there are no major problems in relation to the technical aspects of the operation and maintenance of this project.

3.4.3 Financial Aspects of Operation and Maintenance

Table 5 shows the operation and maintenance budgets related to the section targeted by this project (Sehwan-Ratodero).

²³ All staff in charge hold a university degree with a major in engineering / technology.

²⁴ HRTC was developed with the support of JICA, "Project for the Establishment of the NHA's Highway Research and Training Center" (Technical Assistance 2006). The project was also aimed at developing road construction and maintenance standards, as well as training technical personnel.

Table 5: Operation and Maintenance Budget for the Sehwan-Ratodero Section

(Unit: thousand rupees)

Item	2016/17 *Note	2017/18	2018/19
Periodic Maintenance Budget	-	59,807	-
Routine Maintenance Budget	418	183,260	202,418
Emergency Maintenance Budget	10,451	4,440	-
Main Road Safety Measures Budget	33,420	35,147	16,914
Special Maintenance Budget	20,270	-	46,109
Weighing Stations, Toll Stations Operation Budget	-	1,630	332,777
Total	64,559	284,284	597,218

Source: NHA documents, answers to the questionnaire

Note: Pakistan's financial year starts in July and ends in June.

With respect to the operation and maintenance budget, the NHA's on-site supervising staff compile the necessary amounts, which will be examined and approved internally, then allocated. The budget for 2016/17 was small because this was the period immediately after the opening of the road. The periodic maintenance budget is allocated once every few years for major maintenance works, while the routine maintenance budget is allocated every year to the outsourced companies, based on the annual maintenance plan. The other items are requested when needed, which will pass through the NHA's internal procedure before allocation. According to the NHA Sindh Office, "Required budget is sufficiently allocated. Compared to the time before this project began, the cost for repairing the road surface has been reduced thanks to the new road, and we think our maintenance work has become efficient. We are allocating budgets as and when needed." On the other hand, given that the volume of traffic of the Indus Highway is increasing, there was also an indication that future budgets might increase.

Table 6, presented as a reference, shows the revenue from the toll stations, situated within the section targeted by this project, as well as the revenue from all the toll stations along the Indus Highway.

(Reference) Table 6: Revenue Collected at Toll Stations

(Unit: million rupees)

Year	Revenues from Toll Stations Within the Section Targeted by This Project	Revenues from All Toll Stations Aalong the Entire Indus Highway
2015	0 (0%)	38.61
2016	24.66 (24%)	102.61
2017	86.42 (48%)	179.72
2018	96.58 (64%)	150.47
2019	115.15 (70%)	165.68

Source: NHA Sindh Office

Note: The percentages in brackets refer to the proportion of revenue from the section targeted by this project by comparison with the total revenue generated from all sections of the Indus Highway.

The source of the operation and maintenance budget is the federal government's "Road Maintenance Account (hereinafter referred to as "RMA")". Besides toll revenues nationwide, the RMA consists of revenue from land along national highways, fines for traffic rule violations, government budget, etc. The RMA is mainly used to allocate budgets required for road repairs, toll station installations and maintenance. According to the NHA Sindh Office, sufficient budgets have been allocated by the RMA. Table 6 presents the revenue from the toll stations. Both the revenue from the section targeted by this project and that of the entire Indus Highway have been increasing. This is mainly because of the increase in the volume of traffic. Especially in recent years, the proportion of the revenue in the section targeted by this project, by comparison with that of the entire Indus Highway, has been increasing every year, indicating that the maintenance budget for the targeted section is viewed as important.

Based on the above, it can be assumed that there are no particular problems relating to the financial aspects of the operation and maintenance of this project.

3.4.4 Status of Operation and Maintenance

As mentioned in "3.4.1 Institutional / Organizational Aspects of Operation and Maintenance", the operation and maintenance of this project is divided into two categories: routine maintenance and periodic maintenance. The NHA Sindh Office commissions the local private construction companies to carry out maintenance works, such as asphalt repairs and cleaning, while monitoring and supervising the technical aspects. During the field study, such as site inspections and interviews with on-site staff carrying out the maintenance work, no damage that could negatively affect the results of the project, such as road surfaces or bypass structures, were observed. As mentioned previously, the drivers, when interviewed, commented that driving along this section

had become more comfortable and that the maintenance status had improved (by comparison with previously). Therefore, no particular problems are observed in the operation and maintenance status of the section targeted by this project.

No major problems have been observed in the institutional / organizational, technical and financial aspects or relating to the current status of the operation and maintenance. Therefore, the sustainability of the project effects is high.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

This project involved the construction of a road in the underdeveloped section of Sehwan to Ratodero (approximately 200 km) with the aim of addressing the traffic bottlenecks along the Indus Highway, which forms a part of the national trade corridor, thereby contributing to the economic development of the highway as a whole and the areas along the route. The *Medium Term Development Framework* (2005-2010) and the *12th Five-Year Plan* (2018-2023), formulated by the government of Pakistan, recognize National Route 5 and the Indus Highway as strategic main routes of the national trade corridor, while placing the importance on developing and expanding road networks. Considering that there was a need to make the entire sections of the Indus Highway double-tracked (two lanes each way) and increase budgets for the repair and maintenance of National Route 5, as well as the fact that this project was in line with Japan's assistance policy, its relevance is high. Efficiency is fair, although the project cost was within the initial plan budget, the project period was longer than the initial plan, due to delays in the consultant bidding process, paperwork and agreement in terms of consultant selection, land acquisition, construction and final payments to suppliers / contractors. With respect to the quantitative effect indicators, the "annual average daily traffic" exceeded the target, while the "saving in travelling time" primarily met the target figure. Taking into account the comments made in interviews conducted during the field study, it is believed that driving has become safer and more comfortable along the project area and that this project has contributed to the vitalization of the local economy and improved living conditions. Based on the above, effectiveness and impact is judged to be high. It is assumed that there are no major concerns in relation to the institutional, technical and financial aspects of the project or the status of operation and maintenance works carried out by the NHA Sindh Office. Therefore, the sustainability of the effects achieved through the implementation of this project is considered to be high.

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

4.2 Recommendations

4.2.1 Recommendations to the Executing Agency

- Despite the fact that the defect liability period ended in October 2016, the final payment to the contractor for the facilities on the highway, which was borne by the Pakistani side, has not been completed. This is because a significant amount of time has been spent in the internal audit department, confirming the actual performance of contractor against the contract, and in the monitoring department, inspecting the project sites, checking and negotiating the details and the amount of invoice submitted by the contractor, which is on-going at the time of ex-post evaluation. The NHA and the contractor need to make an effort to solve this issue in a timely manner.
- The NHA Sindh Office, which is responsible for this project's operation and maintenance, cooperates with the local police to regulate the overloading of vehicles by weighing trucks in the Indus Highway. It is expected that the number of weighing stations will increase along the Indus Highway in the future, which will impose stricter controls on the overloading of vehicles. On the other hand, there are cases when the penalties for overloading are not complied and fines are not paid. It is thus desirable that the NHA headquarters, which is responsible for ensuring that rules and regulations are complied with, seriously negotiate and collaborate with the relevant agencies, so as to establish a thorough system ensuring the payment of fines.

4.3 Lessons Learned

(The Need to Combine Facility Construction with Capacity Building (e.g., Advocating for Rule and Penalty Compliance) for Optimal Operation)

- As stated above, although the NHA Sindh Office works in coordination with the local police to weigh trucks along the Indus Highway, some fines are not duly paid. While the NHA headquarters is responsible for the compliance to the rules and regulations, the response of the headquarters was not necessarily sufficient at the time of the ex-post evaluation. It was thought that advocacy for rule compliance was necessary. It would have been more effective if the system had been established in the way that the construction of weighing stations (hard component) was combined with capacity building to ensure compliance to the rules (soft component). For future projects of a similar nature, establishing a system in which the construction of structures (hard component), such as facilities, is accompanied by efforts to ensure the compliance to the rules and regulations (soft component), is thought to be key to success, with a view to achieving an optimal operation.

Comparison of the Original and Actual Scope of the Project

Item	Plan	Actual
1. Project Outputs	1) Civil work / equipment procurement a) Construction of a new double-tracked road (about 200 km, 13.3m wide (lane 3.65m x 2, road shoulder 3m x 2), including toll stations) b) Construction of bypasses (8 places) c) Development of traffic control centers (truck weigh station, traffic counting system, road information boards, etc.) 2) Consulting services a) Review of the detailed design related to civil work b) Bidding assistance c) Construction management d) Detailed design of a traffic control center	1) Civil work / equipment procurement a) Construction of a new double-tracked road (about 197.7 5km, 13.3m wide (lane 3.65m x 2, road shoulder 3m x 2), 3 toll stations) b) Construction of bypasses (<u>13 places</u>) c) Development of traffic control centers (<u>*It was not implemented under this project.</u>) 2) Consulting services Implemented as planned.
2. Project Period	December 2006 – December 2013 (85 months)	December 2006 – March 2020 (160 months)
3. Project Cost		
Amount Paid in Foreign Currency	8,972 million yen	8,228 million yen
Amount Paid in Local Currency	14,107 million yen	12,870 million yen
Total	23,079 million yen	21,098 million yen
ODA Loan Portion	(19,455 million yen)	(17,331 million yen)
Exchange Rate	1.87yen / rupee, 112yen / USD (As of May 2006)	1.03yen / rupee, 98.5yen / USD IFS (IMF) average rate of

		2009-2017 (duration of main expenses)
4. Final Disbursement	June 2017	