Bangladesh

Ex-Post Evaluation of Japanese ODA Loan Project

Jamuna Bridge Access Road Project

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

0. Summary

At the time of the ex-post evaluation, it is confirmed that the project is relevant with the country's policy such as the transportation development plan. It is also confirmed that the project is relevant with the development needs of the country such as to develop and expand road networks. This project has allowed Bangladesh to better respond to the recent increase in transport demands between Dhaka the capital and Jamuna Bridge. It has helped the country to manage the transportation of agricultural products that are on the increase. In addition, it is judged that the project is contributing to the improvement of living environment for local residents as well as to the vitalization of economic activities in Bangladesh. The project period substantially exceeded the original plan because the construction was delayed due to a large-scale flood which occurred in 1998, etc, and the project cost was slightly exceeded the plan. However, no major problems have been observed in the operation and maintenance system. In light of the above, this project is evaluated to be satisfactory.

1. Project Description

Project Location

Road Developed by the Project

1.1 Background

Road network of Bangladesh was not sufficiently developed. Several points on the main corridors were often separated by rivers, while some roads and bridges were not strong enough to tolerate the heavy load of large cargos and buses. Roads were narrow in some places, causing

traffic congestions. One of the five major corridors of the country, "Dhaka - Northwest Area[1]", was no exception. The road width was a major issue; there were many places where the road width was below the national standard of 7.3m. The road had damages, and vehicles had to pass alternatively on some bridges. Therefore, it was a pressing issue for Bangladesh to ensure safe and smooth transportation by improving the existing roads and bridges. Furthermore, this project would improve and connect the road section to Jamuna Multipurpose Bridge, which was completed in 1998 with JICA loan assistance. It was anticipated that the improvement of the road conditions in the project sections was essential for realizing smooth transportation between Dhaka and the Northwest Area.

1.2 Project Outline

The purpose of the project is to improve the transportation efficiency and to secure the safety between Joydepur and Tangail of National Highway No. 4 (N4: approximately 64km), by implementing civil works such as road pavements, etc; thereby contributing to improve the promotion of distribution and the economic activities in Bangladesh.

Approved Amount / Disbursed Amount	6,206 million yen / 6,164 million yen
Exchange of Notes Date / Loan Agreement Signing Date	June 1997 / July 1997
Terms and Conditions	Interest Rate: 1.0％ Repayment Period: 30 years (Grace Period: 10 years) Condition for Procurement: General Untied
Borrower / Executing Agency(ies)	The President of the People's Republic of Bangladesh / Roads and Highways Department (RHD), Ministry of Communication
Final Disbursement Date	June 2009
Main Contractor (Over 1 billion yen)	Sungjee Construction Co., LTD. (South Korea), Abdul Monem Limited (Bangladesh)
Main Consultant (Over 100 million yen)	Japan Overseas Consultants Co., Ltd (Japan)
Feasibility Studies, etc.	F/S prepared by ADB “2nd Road Improvement Project”

[1] This refers to the west and north west area of Jamuna Bridge.

	(1991-92)
Related Projects (if any)	“Jamuna Multipurpose Bridge Project” (JICA Loan / Approved amount: 21,290 million yen). “Jamuna Bridge Access Roads Project[2]” (ADB: approximately 72 million USD).

2. Outline of the Evaluation Study

2.1 External Evaluator

Kenichi Inazawa, Evaluation Consultant, Octavia Japan Co., Ltd.

2.2 Duration of Evaluation Study

Duration of the Study: August, 2011-June, 2012

Duration of the Field Study: November 12-25, 2011 (1st study)

February, 25-March, 2 2012 (2nd study)

3. Results of the Evaluation（Overall Rating: B[3]）

3.1 Relevance (Rating: ③[4])

3.1.1 Relevance with the Development Plan of Bangladesh

At the time of the appraisal, Bangladesh was under the government plan of "Fifth Five-Year Plan 1997-2002", which set poverty alleviation as the ultimate development goal, aiming for an annual economic growth of 7% level on average. It placed emphasis on transportation sector as well as agriculture, rural development, industry..International donors also placed importance on the transportation sector as Asian Development Bank (ADB), for example, prepared their recommendations on the direction of the road sector development in 1991.

At the time of the ex-post evaluation, the government of Bangladesh has developed the “Sixth Five-Year Plan 2011-2015”, which recognizes the importance of transportation system improvement for economic development and market expansion. The plan prioritizes the development of transportation network of the five main corridors: Dhaka-Chittagong; Dhaka-Northwest; Dhaka-Khulna; Dhaka-Sylhet; and Khulna-Northwest.

[2] This project was financed by Japan in parallel with ADB. The sections covered by this project differ from those covered by the ADB-financed project. Therefore, this ex-post evaluation will not cover the sections of the ADB-financed project. At the time of the appraisal of this project, ADB was providing finance for a part of Route 1 (Dhaka-Chittagong) and Route 4; Feni-Chittagong on Route 1, and Demra-Daudkandi, Mirpur-Savar and Nabinagar-Chandra on Route 4.

[3] A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory

[4] ③: High, ②: Fair, ①: Low

In light of the above, the transportation sector continues to be a priority at the time of the ex-post evaluation, and it is judged that the project is relevant with the development policy of Bangladesh both at the time of the appraisal and the ex-post evaluation.

3.1.2 Relevance with the Development Needs of Bangladesh

At the time of the appraisal, transportation system in Bangladesh was not reliable. Some roads and bridges were not structurally strong enough to bear the heavy load of big freight vehicles and buses. The project sections were no exception. There were places where the road width did not meet the national standard of 7.3m, forcing vehicles to pass alternately. Furthermore, the project in combination with the completion of Jamuna Multipurpose Bridge was expected to improve road network and goods movement between Dhaka and the Northwest Area, leading to revitalization of economic activities. In light of the above, there was a clear need for road improvements in the target sections.

At the time of the ex-post evaluation, it has been observed that the project is contributing to the increase in goods movement particularly from the Northwest Area to the Dhaka metropolitan area. Traffic volume is recently on the increase between the Northwest Area and Dhaka[5], and ADB is planning to conduct a feasibility study to look into the possibility of two lanes in each direction. This suggests that Bangladesh has a clear development need to respond to increasing traffic volume.

In light of the above, the project sections are responding to the increase in traffic volume, and it is judged that the project is relevant with the development needs of Bangladesh both at the time of the appraisal and the ex-post evaluation.

3.1.3 Relevance with Japan's ODA Policy

The Japan's ODA Charter endorsed by the Cabinet in 1992 set a number of principles, one of which was to "urge attention to recipient accomplishments in democratizing, establishing market-oriented economic systems, and assuring basic human rights and freedoms." In addition, the Charter listed infrastructure building as a basic condition essential for socioeconomic development. This project is to provide assistance in the area of infrastructure building for Bangladesh who had promoted economic reforms such as state enterprise reforms, achieving an average GDP growth of above 5% since FY 1996/7[6]. Therefore, the project is relevant with the principles of the ODA Charter and thus relevant with Japan's development aid policy.

[5] Refer to the effectiveness/operation and effect indicator, "Annual Average Daily Traffic Volume."
[6] Bangladesh's fiscal year begins in July and ends in June.

This project has been highly relevant with the country's development plan, development needs, as well as Japan's ODA policy, therefore its relevance is high.

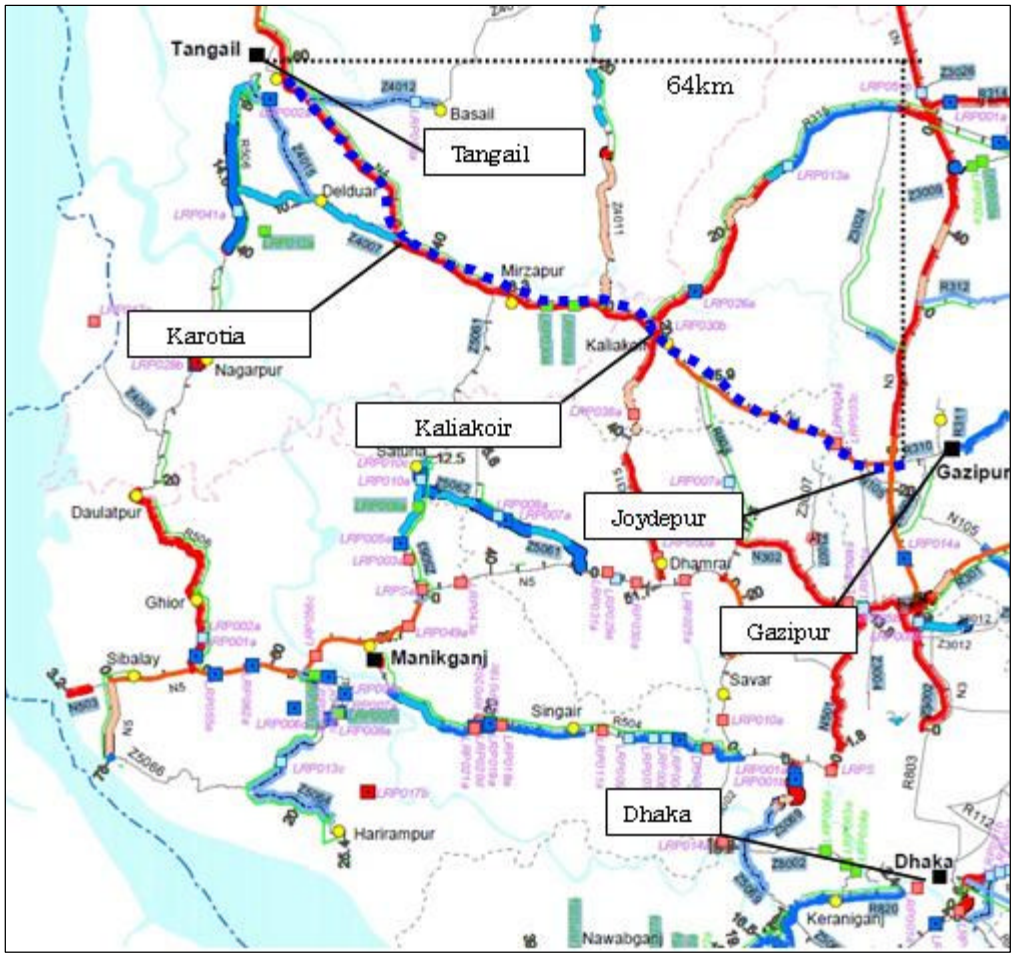


Figure 1: Project Site
(Between Joydevpur and Tangail: approximately 64km)

3.2 Effectiveness[7] (Rating: ③)

3.2.1 Quantitative Effects (Operation and Effect Indicators)

Table 1 shows the annual average daily traffic volume in relation to the quantitative effectiveness of the project.

[7] Sub-rating for Effectiveness is to be put with consideration of Impact.

Table 1: Annual Average Daily Traffic Volume within the Project Section (Joydevpur-Tangail)

(Unit: Number of vehicles per day)

1995 (Before the Project Implementation)	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10
4,087	11,315	N/A	13,660	17,275	N/A	16,333

1) Annual Average Daily Traffic Volume

As shown in Table 1, the average traffic volume was 16,333 vehicles per day in 2009/10.[8] In the project section, the traffic volume of trucks and buses increased along with the rapid economic growth. Traffic congestion is already a serious problem in some places. Among others, Gazipur area near Joydevpur has seen an increasing number of factory constructions and new businesses.[9] At the time of the appraisal in 1997, traffic volume was projected at 11,258 vehicles per day in 2010, and the actual figures indicate that the project section is accommodating higher demands than planned. However, it is necessary to consider the changes in external environment.[10] The Project built a two-lane road from the Dhaka metropolitan area towards the Jamuna Bridge, and as mentioned earlier, ADB is currently conducting a feasibility study for upgrading to a four-lane road to further respond to traffic that continues to grow year after year. Judging from traffic congestion as shown in Figure 2, the Executing Agency also sees the importance of the lane increase and a creation of a bypass in the surrounding area.

2) and 3) Reduction of Travel Time / Faster Average Driving Speed of Vehicles

Before the project completion, many roads did not meet the national standard width of 7.3m. In addition, there were many damaged spots, and vehicles could pass only alternatively on some bridges. The roads were widened by the project which secured one lane each throughout the

[8] This is the most recent data available as the Executing Agency does not collect data every year. The agency subcontracts out to local consultants for data collection on traffic volume. However, budget constraints prevent annual monitoring.

[9] Gazipur is located in the northern suburb of Dhaka the capital. It is an important traffic hub close to the metropolitan area. Gazipur attracts many factories and companies because flat land is available with a modest elevation, which makes the area resistant to floods.

[10] Presumptively, the actual daily traffic volume in 2009/10 exceeded the projected figure of 11,258 because this area has seen higher level of industrialization than expectations; the country as a whole has achieved economic growth at a faster pace than expected. Predicted figures at the time of appraisal were based on data presented in the ADB's feasibility study conducted in 1991–1992. The main factors of economic growth and expansion of the country are strong private consumption and steady agricultural growth, supported by strong garment exports and remittances from overseas workers, based on the trade and investment deregulation as well as a series of economic reforms.

sections to ease congestion. As a result, travel time has been reduced, and the average driving speed improved. Unfortunately, there is no existing data on travel time and average driving speed. However, according to the beneficiary survey results, a majority of drivers and local residents along the routes responded that the travel time has been reduced by approximately 30 minutes[11] on average between Joydevpur and Tangail; it used to take 149 minutes on average before the project completion whereas it takes 115 minutes at present. Based on the above, it can be judged that the average travel time has been reduced in the project sections.


Figure 2: Congestion on the Project Road (around Joydevpur)

3.2.2 Qualitative Effects (Poverty Alleviation in the Regional Towns and Improved Living Environment for Local Residents)

During this evaluation survey, a questionnaire-based survey was conducted covering 121 truck drivers and local people residing along the three project sections: Joydevpur-Kaliakoir; Kaliakoir-Karotia; and Karotia-Tangail. The survey results are summarized below.

[11] The figure is an average of the respondents' answers and may not be as accurate as measured time.

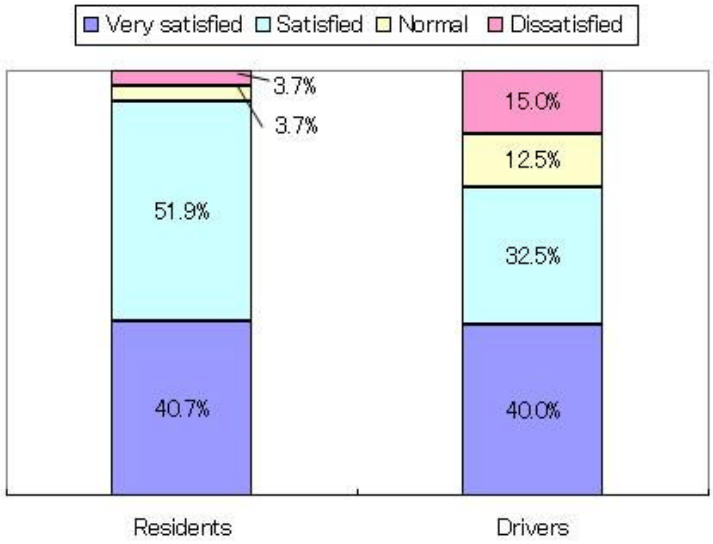


Figure 3: Results from the Beneficiary Survey (Level of Satisfaction)

Figure 3 shows that the level of satisfaction is high among the beneficiaries; a majority of the drivers and local residents responded that they were "Very satisfied" or "Satisfied" with the Project. While they admit that the traffic volume has increased, they see reduced travel time as a positive effect of the project. This is mainly because they were faced with more serious congestions before the Project; many places were damaged, and roads width did not meet the national standard of 7.3m. Vehicles had to pass alternatively in some places. In addition, the trip between Joydevpur and Tangail takes approximately 30 minutes less now[12], according to those who responded that the travel time had reduced. On the other hand, the respondents indicated that incidence of traffic accidents has increased. It might be inevitable that traffic accidents somewhat increase along with the traffic volume, despite efforts made by the local police to promote traffic safety and prevent accidents, which will be discussed in the "Impact" section. Furthermore, vehicles such as rickshaws[13] often obstruct traffic, as will be discussed later. This indicates that there is room for improvement in the area of traffic manners and rules.

[12] For those who responded that travel time had reduced, the average travel time was 149 minutes before the project commencement as compared to 115 minutes after the project implementation.

[13] Rickshaws are a common taxi business that can be started with relatively small capital. Whether it is a national or local road, rickshaws often obstruct traffic. Although they are the main cause of traffic congestions, in reality, there is no strict control.

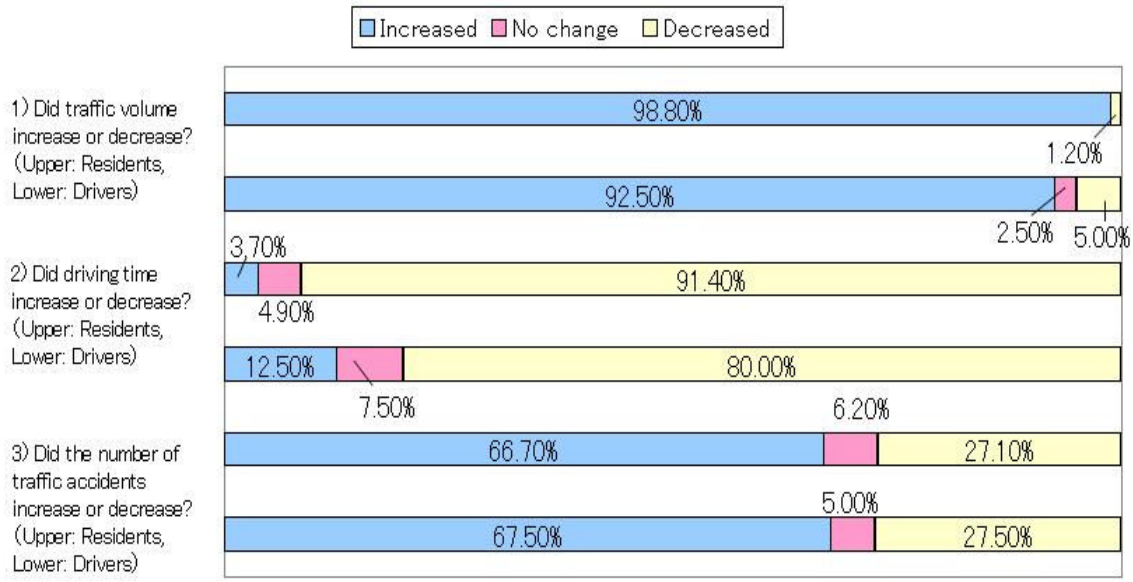


Figure 4: Result from Beneficiary Survey (Direct Effect)
(Sample Size: Local Residents N=81, Drivers N=40)

In light of the above, this project has largely achieved its objectives, therefore its effectiveness is high.

3.3 Impact

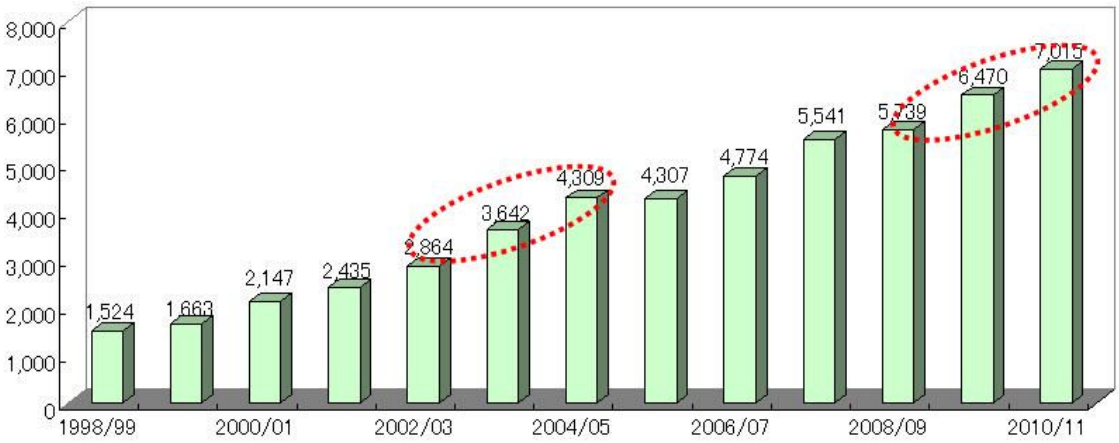
3.3.1 Intended Impacts

3.3.1.1 Contribution to the Logistics Improvement

Figure 5 shows changes in the volumes of agricultural products transported, measured adjacent to the project sections.[14]

[14] This data was collected on N405. N405 extends up to Tangail via Jamuna Bridge, which connects to the target section. One can interpret this data as indications of volumes transported on the project road because trucks carrying agricultural produce typically depart the Northwest Area, cross the Jamuna Bridge, and pass through N405 and the project road before arriving in Dhaka.

(Unit: Daily Average in Tons)



Source: Bangladesh Bridge Authority

Figure 5: Changes in Volumes of Agricultural Products Transported Adjacent to the Project Section
(Dotted circles indicate that the growth rates are particularly high in keeping with the completions of each project component[15])

The transportation volume grew approximately 4.6-fold in 2010/11 compared to 1998/99, immediately after project commencement. In particular, the growth rates are high in 2002–2004 in keeping with the completion of Contract 2 and 3 (2,864→3,642→4,309 tons per day) and in 2009 in keeping with the completion of Contract 1 (5,739→6,470→7,015 tons per day). As shown by the data, it can be said that this project has played a role in assisting the steady expansion of transportation and revitalization, resulting in a remarkable increase in transportation demand, preventing the occurrence of transporting bottleneck.

(Reference) Table 2 shows the estimated values[16] of five main agricultural products in Hili, located in the northwest part of Bangladesh near the Indian border. Trucks that transport agricultural products typically start their journeys in India and drive through Hili, the Northwest Highway, Jamuna Bridge, and the target section before reaching Dhaka the capital. While the products vary from year to year, the total estimated value of the five main agricultural products increased dramatically from 4,820,097 thousand Taka in 2004/5 to 7,406,286 thousand Taka in 2010/11.

[15] The completion period will be discussed in the Efficiency/Output section.
[16] Values converted to market price

Table 2: Change in the Estimated Value of the Main Agricultural Products Coming from India to the Northwest Area of Bangladesh (Top 5 Products)

(Unit: Thousand Taka)

2004/05		2010/11	
Rice	1,793,080	Corn	3,105,157
Wheat	833,242	Fertilizer/ Oil cake	1,170,068
Lentils	645,122	Onions	811,665
Onions	328,253	Rice Vermicelli	543,698
Corn	295,684	Snack Food	429,820
Others ↓	… ↓	Others ↓	… ↓
Total	4,820,097	Total	**7,406,286**

Source: Hili Customs Authority (Indian Border)

3.3.1.2 Impact on the Living Environment and Social Economy

Figure 6 shows that an overall result was positive with regard to the living environment and social economy. Among all, great improvements are observed on "1) Employment" and "6) Income from Agriculture." In addition to the rapid economic growth, the Project is believed to have brought the employment and income-generating opportunities for the local people. One shop owner,[17] for example, increased his income approximately 2.5-fold. Further, one farmer explained that he was able to expand his markets and improve his profitability because the road access was improved following the project, which enabled those engaged in food processing businesses to purchase directly from him and other farmers. Also, the time and cost reduction realized for those engaged in the businesses. Based on the above, it is judged that the project has contributed to improvement of the local people's livelihood.

[17] The shop mainly sells daily products.

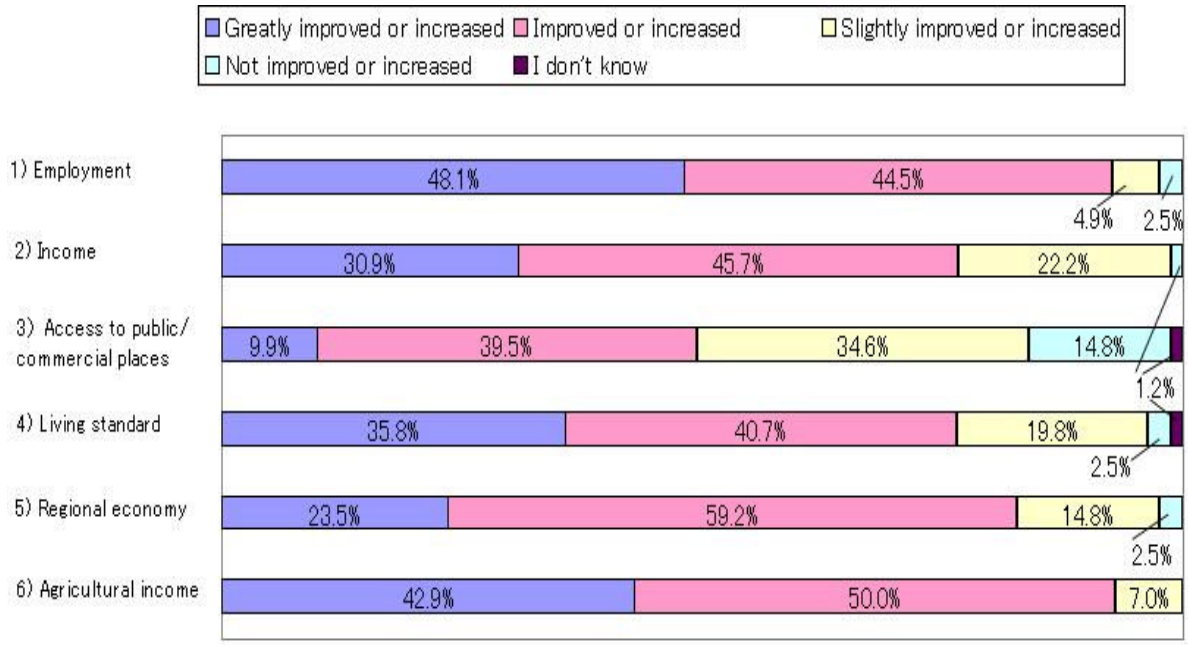


Figure 6: Beneficiary Survey (Questions related to Living Environment / Social Economy) (Sample Size: N=81 except for 6) which had a sample size of N=42 as it was meant only for farmers along the project sections)

3.3.2 Other Impacts

3.3.2.1 Incidents of Traffic Accidents

Incidents of traffic accidents in the project sections[18] are shown in Table 3. According to the Executing Agency and the local police, incidents of accidents, number of injuries, and the death toll had been on the increase up to 2010, although it finally declined in 2011 as compared to the previous year. They explained that traffic accidents had increased in proportion to: 1) the rapid economic growth; 2) the increasing inflow of population and goods into Dhaka; and 3) the increase in traffic volume. In addition, rickshaws obstruct traffic in some places, and it is essential to improve traffic rules adherence.

According to the Executing Agency and local police, they have been strengthening their promotional work in recent years, targeting local residents and children through workshops and communication materials such as flyers and DVD. The police are enforcing tighter controls on illegal passing. However, it is clear that these efforts should continue because many interviewed residents and drivers responded that accidents increased after the project implementation.

[18] The table shows total figures of three years (2008-2010) as annual figures are not available.

Table 3: Incidents of Traffic Accidents in the Project Sections

	2008-2010 (Total for 3 years)	2011 *Note 1
Incidents of Accidents	383(127.6)*Note 2	45
Number of Injuries	877(292.3)	105
Death Toll	437(145.6)	73

Source: Police stations covering the project sections (six total)
Note 1: The 2011 figure represents data up to the end of October.
Note 2: The figures in parentheses are annually averages.

Figure 7: Rickshaws

Figure 8: Long Distance Bus

3.3.2.2 Impacts on the Natural Environment

According to the Executing Agency, no major negative impacts were observed on the natural environment such as pollutions and noises, during the project implementation. It was also the case during this field survey. However, some beneficiaries responded that they thought the air pollution, noise and vibration increased as shown in Figure 9. When the respondents were interviewed, they associated the problems with the continuous increase of the traffic volume and congestion. They also explained that respiratory diseases such as asthma, cough and cold somewhat increased, though they did not observe any environmental destruction nor negative impacts on the ecosystem. In Joydevpur near Dhaka in particular, relatively more respondents expressed their concerns about the environmental impacts as the area is densely populated and has severe traffic congestions. However, there were also comments from the respondents whether it was directly caused by the Project or not.[19] There is no quick remedy as this area is extremely densely populated and that the traffic volume continues to increase. Therefore, the effective measurements are not expected. Meanwhile, for example, if the city planning and the related projects are formulated, such environmental considerations are also to be necessary.[20]

[19] It can be considered that these comments exist, because there are influences such as the vehicle's performance and parking, etc.
[20] In addition, the government of Bangladesh has made it mandatory for taxis and imported used cars to use

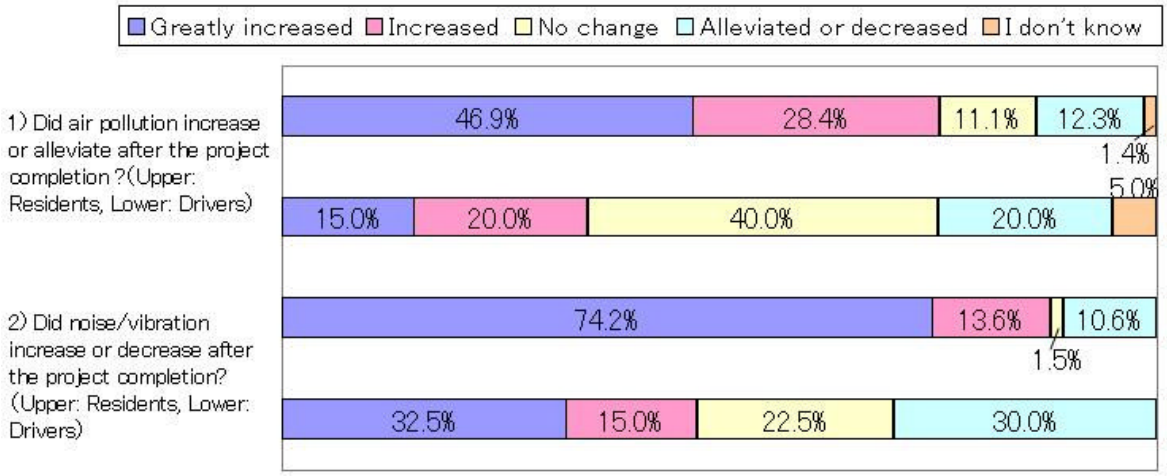


Figure 9: Beneficiary Survey on Environment
(Sample size: Local people residing along the roads N= 66, Drivers N＝40)

3.3.2.3 Land Acquisition and Resettlement

Table 4 shows a comparison between the planned and actual figures with regard to land acquisition and resettlement. Residents subject to resettlements are mainly categorized into PAP and SREP.[21] The difference between the planned and actual ones occurred as which the necessary land, PAP and SREP were decided, through the detail design implemented after the project commencement.[22] Normally resettlements are carried out based on Resettlement Action Plans (RAP), however, the RAP of this project did not have accurate numbers of PAP and the others before the project commencement; it was difficult to identify the numbers. The same was true for the land acquisition, which explains the discrepancy between the planned and actual figures. According to the Executing Agency and the local NGO, it was after the detailed design that the precise areas subject to land acquisition were identified.

compressed national gas or CNG. The transition to CNC was smooth as it is produced domestically and cheaper than fossil fuels.

[21] Project Affected People (PAP) and Socially Recognized Entitled People (SREP) such as illegal residents who are not counted as PAP.

[22] Land co-owners were also identified at this stage. It is judged that the planned figures identified before the project commencement are not accurate and unsuitable for a baseline. Therefore there is no point in comparing the planned and actual figures.

Table 4: Resettlement and Land Acquisition

		Plan	Actual
Resettlement (Unit: person)	a) PAP	10,620	18,310
	b) SREP	586	772
Land Acquisition (Unit: ha)		87.0	93.2

Source: CCDB (local NGO)

Table 5 shows a comparison between the planned and actual amounts of compensation related to the resettlement and land acquisition. The compensations were paid either by the Local Authority called the "Deputy Commissioner (DC)" or the Executing Agency through the local NGO (CCDB). The actual amounts were less than planned, because the DC could not make sufficient payment available for the PAP and SREP due to budget shortage and others (It seems that the amount estimated before the project commencement was a rough figure. Therefore it is presumably not possible to compare the estimated amount with the actual amount.).[23] This was influenced by a lack of clarity in the land-related law, the legal basis of the resettlement. According to a socioeconomic professor at Dhaka University, the problem happened because there was defect and ambiguity in the legal basis used at the time of the appraisal: "Acquisition and Requisition of Immovable Property Ordinance, 1982." To site a few examples, 1) there is no clarity in the process of calculating the land value; and 2) objections are not heard and taken into consideration sufficiently. Although it is impossible to judge at this point of time what went on in reality, it is considered that there was a problem with the ways in which the scale of resettlement and land acquisition were estimated. In fact, the land law and land acquisition process are under further validation, and it is expected that the system and implementation will be improved in the future.

According to the beneficiary survey, some target residents expressed their dissatisfaction with the compensation. They explained that "we did not receive satisfactory compensation. The actual compensation was less than what we were told initially."

In fact, the local NGO processed complaints from the target residents (total 24 cases). However, none of these complaints made it to court because the residents assumed that it would be difficult to win the case in light of the defect and ambiguity of the land law. On the other hand, it was not necessarily a loss for some target residents who had land except the scope of this project because land prices went up after the project, so their land became more profitable whether it is for a sale or running business.

[23] In fact, the DC could not make money available for sufficient compensation.

Table 5: Compensation for Resettlement and Land Acquisition

(Unit: Taka)

Payer of Compensation	Plan	Actual
Local Government	266,123,771	169,740,000
Executing Agency / NGO	173,734,953	137,194,427

Source: CCDB (local NGO)

3.4 Efficiency (Rating: ①)

3.4.1 Project Outputs

Table 6 is a comparison between the planned and actual outputs of the project.

Table 6: Planned and Actual Outputs of the Project

Planned (At the Time of the Appraisal)	Actual (At the Time of the Ex-post Evaluation)
a) Engineering Work ・Road Improvement Works: Approximately 67.00km in Total - Contract 1: 26.60km (Joydevpur- Kaliakoir) - Contract 2: 21.40km (Kaliakoir-Karotia) - Contract 3: 19.09km (Karotia-Tangail) ・Earthworks, Pavement and Linear Improvement: 51.50km ・Construction of Bypass: 15.50km ・Improvement of Culverts: 59nos. ・Improvement of Bridges: 27nos.	a) Engineering Work ・Road Improvement Works: 63.50km - Contract 1: 26.40km (Joydevpur- Kaliakoir) - Contract 2: 21.00km (Kaliakoir-Karotia) - Contract 3: 16.10km (Karotia-Tangail) ・Earthworks, Pavement and Linear Improvement: 48.19km ・Construction of Bypass: 15.33km ・Improvement of Culverts: 81nos. ・Improvement of Bridges: 14nos.
b) Consulting Services M/M: 520M/M (International: 100M/M, Local: 420M/M, TOR: Supports of bidding evaluation for civil works, Supervision of civil works, Technical education providing for staff of Roads and Highways)	b) Consulting Services M/M: 2,552M/M (International: 188M/M, Local: 2,364M/M, TOR: Supports of bidding evaluation for civil works, Supervision of civil works, Technical education providing for staff of Roads and Highways as planned)

The reason behind the underachievement of the Contract 3[24] is that some 3km interval were excluded from the project scope following a large-scale flood[25] in 1998. The flood raised concerns that the project fund would fall short, and consequently the detail design was reviewed. As a result of the review, a section of 3km was excluded from the project scope[26] based on its level of urgency and significance. Similarly, this review of the detail design brought about the

[24] The excluded interval is around 3km, from Tangail (final point) to the city center.

[25] The flood occurred from July to September 1998. It flooded more than 70% of the nation and was responsible for killing more than 700 people.

[26] The current condition of this interval was checked during this evaluation survey, and it was found that no major repair or overlay would be needed at this time.

discrepancy between the plan and actual outputs for the improvement of the earthworks, pavement, linear, culverts and bridges.

3.4.2 Project Inputs

3.4.2.1 Project Cost

The original project budget was 9,056 million yen (out of which 6,206 million yen was to be financed by JICA loans) as compared to the actual project cost of 9,123 million yen (out of which 6,164 million yen was financed by JICA loans). Therefore, the actual project cost slightly exceeded the plan (101% of the plan). The reasons are summarized below:

1) Bangladesh had the large-scale flood in July-September 1998, which caused massive damage to the foundation work. This led to a decision to change the construction method to make the structures more resistant to floods. Similarly, the leveling and culverts improvement works were strengthened. Such modifications increased the construction costs.

2) During the detail design, soft ground was found in the Contract 1 target area (Kaliakoir Bypass construction section). In response to this, ground improvement construction was added, which increased the construction costs.

3) An Iranian company contracted for the Contract 1 section had objections to the changes in their contact based on the abovementioned changes. They refused to cover the cost for recover work on the foundation damaged by the flood. Furthermore, they caused a dispute with the Executing Agency, seeking a relocation of underground gas pipelines in the project area[27]. They finally ceased the engineering work in November 2000, followed by a cancellation of the construction contract in September 2001. The Executing Agency performed a re-bid and signed a new contract with another company, a local company contracted in April 2003 onwards. As a result, the project period was greatly extended, and the cost related to consulting services and administration increased.

In spite of these three factors, the actual project cost became higher than the planned, because there has been a difference of the exchange rate between at the time of the appraisal and the ex-post evaluation (1 taka = 2.9 JPY at the appraisal, 1 Taka = 1.97 JPY at the ex-post evaluation applying the average exchange rate during the project implementation). In other words, although the total actual project cost greatly increased due to these factors, it actually remained as 101% because of the currency depriciation. Considering this point, the efficiency

[27] This issue was not assumed at the time of the appraisal, and the pipelines were found after the project commencement.

evaluation needs to be judged.

3.4.2.2 Project Period

As shown in Table 7, the project period was initially set for 3 years and 3 months, or 39 months. However, it actually took 12 years or 144 months from July 1997 to June 2009 (369% of the plan). Major reasons for the delay were:

1) Changes in the construction method following the flood of 1998.

2) Work stoppage on the Kaliakoir Bypass construction section (2.9 km) when there was anticipation that project funds would fall short following the flood. However, it turned out that the country did come up with the funds needed for the bypass, and construction resumed after some time.

3) The contractor of Contract 1 suspended construction, forcing the Executing Agency to cancel the contract and re-bid for a new contractor.

In addition, as shown in Table 7, the Contract 2 and 3 were completed during 2002, however the Contract 1 continued its construction until 2009. Under these circumstances, it is necessary to consider the delay of the total project period with 105 months.

Table 7: Plan and Actual of the Project Period

	Plan	Actual
1. Civil works	Oct. 1997 – Sep. 2000	Contract 1: March 1998 – June 2009
		Contract 2:March 1998 – Dec. 2002
		Contract 3:March 1998 – Jan. 2002
2. Land Acquisition	July 1997 – June 2000	July 1997 – June 2000
3. Consulting Service	July 1997 – Sep. 2000	March 1998 – June 2009

To sum up, the project period was longer than planned (however it became slightly longer due to the exchange rates' decrease), and the project cost was slightly higher than planned. Therefore, efficiency of the project is low.

3.4.3 Results of Calculations of Internal Rates of Return (IRR) (Reference)

Economic Internal Rate of Return (EIRR)

At the time of the appraisal, the financial analysis was made based on: 1) reduction in

mileage and travel time as benefits; 2) investment cost (project cost) and expenses related to operation and maintenance as costs; and 3) an assumed project life of 20 years. As a result, the Economic Internal Rate of Return (EIRR) was calculated at 14.5%. It was attempted to recalculate the EIRR at the time of the ex-post evaluation. However, there were unclear points on the method of calculation used at the appraisal. Furthermore, data needed for benefits calculation were not available through this evaluation survey. Therefore, analysis for the internal rate of return was not possible.

3.5 Sustainability (Rating: ③)

3.5.1 Structural Aspects of Operation and Maintenance

The Executing Agency at the time of the ex-post evaluation is the Roads and Highways Department, Ministry of Communication. Headed by the Chief Engineer, the department has five wings (Planning and Maintenance, Technical and Bridge Management, Technical Services, Management Services and Mechanical Services), under which many divisions exist. They have 2,805 employees, 392 of which are technical staff. On the other hand, it is the Local Road Divisions that are responsible for the Operation and Maintenance (O&M) of project components such as the roads, bridges and culverts. Gazipur Road Division with 15 staff is responsible for the Joydevpur-Kaliakoir section (26.40km). Similarly, the Tangail Road Division with nine staff is responsible for the Kaliakoir-Karotia section (21.00km) and the Karotia-Tangail sections (16.10km). Their main duty is to maintain roads and bridges.

The O&M of the project roads can be categorized into the “routine” work and “periodic” work in principle. The routine work is about local divisions conducting day-to-day checks and repairs[28], whereas the periodic work is about more extensive inspections and repairs. As for extensive repairs, it is often the case that big construction companies based in Dhaka are commissioned by the Executing Agency.

3.5.2 Technical Aspects of Operation and Maintenance

Gazipur and Tangail Road Divisions are staffed with experts who have rich experience in O&M. In particular, these offices have many staff with years of experience in the “routine” O&M. Training courses are conducted at the Training Center located in the Head Office of the Executing Agency; staff from local offices also attend the trainings. They have various courses

[28] Road maintenance is contacted out to local construction companies as needed. The local Divisions play a supervising and monitoring role in the maintenance.

such as on management, procurement and computer skills among others.[29] 56 staff were trained in 2009/10 and 28 staff in 2010/11. In addition, induction courses are held for new recruits every year.

3.5.3 Financial Aspects of Operation and Maintenance

Table 8 shows the O&M budgets of the project in the past three years (Gazipur and Tangail Road Divisions together). As mentioned, O&M is categorized into "routine" and "periodic" works, and they are budged separately. Budgets for day-to-day maintenance are prepared annually by local Road Divisions and submitted to the Head Office of the Executing Agency. The Head Office allocates budgets in order of priority, considering the road conditions, traffic volume, and others. As for the periodic maintenance, the Head Office identifies sections that require extensive repairs and allocates budget to local Road Divisions accordingly.[30] When interviewed, Gazipur and Tangail Road Divisions expressed that "minimum budget required for the day-today O&M had been allocated in recent years, although it rarely matches the requested amounts (as shown in Table 8)." In addition, 390 million Taka has been allocated and is under execution for "periodic" maintenance in 2011/12.[31] The budget is geared mainly towards the Kaliakoir-Karotia section and the Karotia-Tangail section under the jurisdiction of Tangail Road Division[32], and repair works are expected to take place going forward. In light of the above, no major problems have been observed in the financial aspects of the O&M.

[29] According to the Executing Agency, their training budget is on the decrease in recent years, therefore they are trying to streamline.
[30] Therefore, there are some years with no budget allocation.
[31] Especially, the budget has been executed for the O&M of Kaliakoir – Karotia and Karotia – Tangail, which are under the control of Tangil Road Division. As one of the reasons, these two sections were completed about 10 years ago, which has already passed much time, and it has judged that large scale repair is necessary on these sections.
[32] Among all, it is because these two intervals were completed in 2002, almost nine years ago, and naturally they require more extensive repairs.

Table 8: O&M Budget of
Gazipur and Tagail Local Division (Total Amount)

(Unit: Million Taka)

Fiscal Year	Routine Maintenance Budget		Periodic Maintenance Budget (Actual)	(Reference) Total O&M Budget of the Executing Agency
	Required	Actual		
2008/09	23.10	15.95	40.72	5,143.84
2009/10	30.35	21.55	18.04	6,094.74
2010/11	35.59	24.67	N/A *Note	6,678.00

Source: Documents provided by the Executing Agency
Note) Although there was no budget allocated for the periodic maintenance in 2010/11, 390 million Taka has been allocated and under execution in 2011/12.

3.5.4 Current Status of Operation and Maintenance

Gazipur and Tangail Road Divisions contract local construction companies as needed to undertake the day-today maintenance such as asphalt repair and cleaning. The divisions supervise technical aspects and monitor the works of the construction companies. As for the current condition, although no damage significant enough to undermine the project effect was observed during the field survey, cracks were found on the surface of some sections (around Kaliakoir and Tangil bypass)[33]. As seen in Figure 10, a high proportion of the drivers made positive comments about the road conditions and maintenance such as "comfort improved while driving" and "maintenance condition improved."

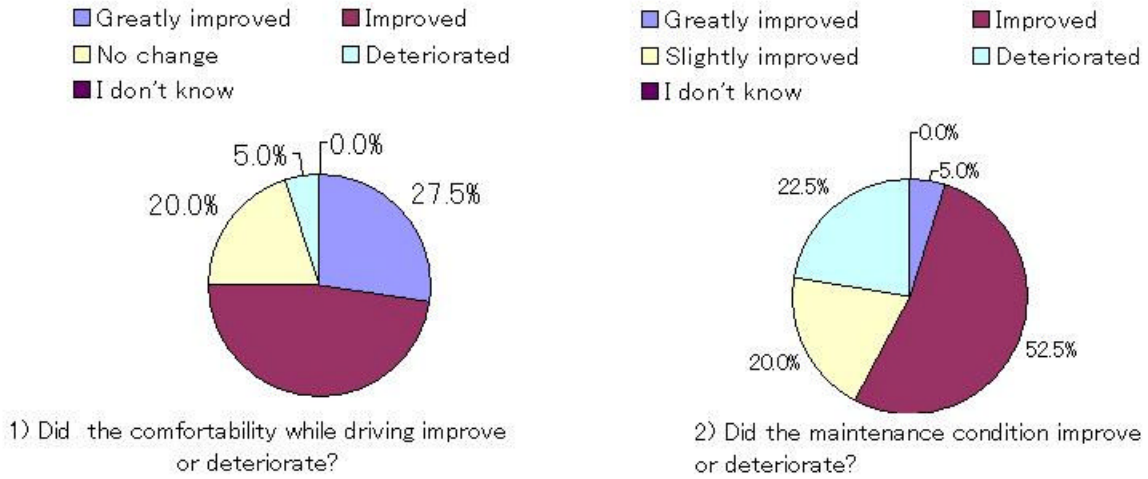


Figure 10: Results from the Beneficiary Survey on the Road Conditions and Maintenance
(Sample Size: N = 40)

[33] According to the report that a road expert who belongs to the Executing Agency made in February 2012, these cracks occurred because many over-loading vehicles pass on the sections, damaging the pavements.

Gazipur Road Division carries out their maintenance work around the clock. On the other hand, Tangail Road Division does its maintenance work during daytime only. This is because the traffic volume is high day and night in the Gazipur area while it is not the case in sections under Tangail Road Division. The machines needed for O&M such as loaders and haul trucks are utilized sufficiently. Although some machines are getting old, they are not out of order, and it does not affect the maintenance works. Manuals and checklists are also in order.

Figure 11: Machines used for Maintenance

Figure 12: Maintenance Work

In relation to the above, no major problems have been observed in the operation and maintenance system, therefore sustainability of the project effect is high.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

It is confirmed that the project is relevant with the country's policy such as the transportation development plan. It is also confirmed that the project is relevant with the development needs of the country such as to develop and expand road networks. This project has allowed Bangladesh to better respond to the recent increase in transport demands between Dhaka the capital and Jamuna Bridge. It has helped the country to manage the transportation of agricultural products that are on the increase. In addition, it is judged that the project is contributing to the improvement of living environment for local residents as well as to the vitalization of economic activities in Bangladesh. The project period substantially exceeded the original plan because the construction was delayed due to a large-scale flood which occurred in 1998, etc, and the project cost was slightly exceeded the plan. However, no major problems have been observed in the operation and maintenance system. In light of the above, this project is evaluated to be satisfactory.

4.2 Recommendations

(Recommendations to Bangladesh side)

■ It is recommended that the Executing Agency, in cooperation with the local police, promote adherence to traffic rules. It is also recommended that have tighter controls on illegal passing judged from the fact that traffic accidents are on the increase in the project sections. In addition to the on-going promotions for traffic safety, it would be effective to have exclusive lanes for pedestrians and rickshaws. It is also reccomended to upgrade various safety measures such as traffic strips, lane separators, blocks, and protection walls.[34]

■ With regard to payment of compensations related to the resettlement and land acquisition, some residents expressed their discontent. This was due to the budget shortage and lack of clarity in the land law. As Bangladesh has other road improvement projects that are either on-going or planned to be implemented, it is thus recommended that the government make efforts to consolidate the land law and ensure fair and sufficient compensation payment related to resettlements and land acquisitions.

4.3 Lessons Learned

■ The historically large-scale flood occurred after the project commencement in July-September 1998. Following the flood, the project design and construction method were modified, and road leveling was added. In Bangladesh, natural disasters[35] of unpredictably large scale such as cyclones and floods have occurred since then, and these modifications have proven to be effective in times of floods (e.g., the project sections have not been severed by floods since its completion.). Therefore it was good judgment that Bangladesh side took early actions on the preventative measures against natural disasters and applied them to the design change while JICA flexisibly accepted their actions.

[34] According to the Executing Agency, there are no exclusive lanes for rickshaws in Bangladesh to date. However, they are considering building such lanes along the national roads in the future. There is an opportunity to add exclusive lanes for rickshaws if it is decided to upgrade the target roads to four lanes.

[35] To site one example, Cyclone Sidr occurred in November 2007 brought widespread damage with the death toll of over 4000, around 9 million victims, and 1.5 million damaged buildings.

Comparison of the Original and Actual Scope of the Project

Item	Plan	Actual
1. Project Outputs	(Engineering Work) ・Road Improvement Works: approximately 67.00km - Contract 1: 26.60km (Joydevpur- Kaliakoir) - Contract 2: 21.40km (Kaliakoir-Karotia) - Contract 3: 19.09km (Karotia-Tangail) ・Earthworks, Pavement and Linear Improvement: 51.50km ・Construction of Bypass: 15.50km ・Improvement of Culverts: 59nos. ・Improvement of Bridges: 27nos.	(Engineering Work) ・Road Improvement Works: 63.50km - Contract 1: 26.40km (Joydevpur- Kaliakoir) - Contract 2: 21.00km (Kaliakoir-Karotia) - Contract 3: 16.10km (Karotia-Tangail) ・Earthworks, Pavement and Linear Improvement: 48.19km ・Construction of Bypass: 15.33km ・Improvement of Culverts: 81nos. ・Improvement of Bridges: 14nos.
	(Consulting Services) 520M/M (International: 100M/M, Local: 420M/M)	(Consulting Services) 2,552M/M (International: 188M/M, Local: 2,364M/M)
2. Project Period	July 1997-September 2000 (39 months)	July 1997-June 2009 (144 months)
3. Project Cost Amount paid in Foreign currency Amount paid in Local currency Total Japanese ODA loan portion Exchange rate	 2,681 million yen 6,375 million yen 9,056 million yen 6,206 million yen 1Taka = 2.9yen (July 1997)	 5,689 million yen 3,434 million yen 9,123 million yen 6,164 million yen 1 Taka = 1.97 yen (Average over July 1997 - June 2009)