People's Republic of Bangladesh

FY2019 Ex-Post Evaluation of Japanese ODA Loan

"South-Western Bangladesh Rural Development Project"

External Evaluator: Tomoo Mochida, OPMAC Corporation

0. Summary

The objective of the project was to increase economic opportunities for the rural poor and improve their access to social services, by the construction and rehabilitation of rural infrastructure such as roads, bridges and markets, thereby contributing to poverty reduction and the alleviation of economic disparities in South-West Bangladesh. Both at the appraisal phase and at the ex-post evaluation, the policy direction of the Bangladeshi government to reduce poverty by enhancing networks of rural roads and Growth Centers (hereinafter referred to as "GCs") / Rural Markets (hereinafter referred to as "RMs") remained unchanged and the project matched the development needs of the project area. This project was also consistent with the aid policies of Japan. Therefore, its relevance is high. The project largely achieved its outputs as originally planned. However, both the project cost and the project period exceeded the original plan. Therefore, the efficiency of the project is low. It is assumed that the project contributed to an increase in traffic volume and expansion of the transportation networks. Furthermore, improvement of economic opportunities for the poor and a redress of social disparities have been recognized since improvements in access to social services, an increase in household income, and employment generation in transportation businesses and the private sector have been observed. Furthermore, participation of women in the project proceeded and their economic capacity was enhanced. Thus, the effectiveness and impacts of the project are high. The operation and maintenance after completion of the project has been carried out as part of their regular work by the Local Government Engineering Department (hereinafter referred to as "LGED"), the executing agency. In terms of the operation and maintenance system of LGED and its technical and financial aspects as well as the status of the operation and maintenance conditions, no serious issue adversely affecting the project effects was found. For the above reasons, the sustainability of the project effects is high.

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

1. Project Description

Project Location

At the site of road maintenance (Barisal)

1.1 Background

In Bangladesh, the poverty rate is high and urban and rural disparity poses a particular challenge. Development of rural infrastructure has been an important policy to reduce poverty in rural areas and the Government of Bangladesh (hereinafter referred to as "GOB") has strived to develop rural infrastructure by increasing development budgets and mobilizing foreign assistance. Moreover, in developing rural infrastructure, GOB has centered its priority on rural roads which are regarded as particularly important among the various types of rural infrastructure. It has set forth an integrated development policy together with facilities such as GCs and RMs, which have synergetic effects with rural roads. In the case of rural roads in particular, it is an increasingly important issue that the quality of the existing roads is upgraded rather than networks expanded by the construction of new roads. However, except for Upazila[1] roads that have been developed with foreign assistance such as from the Asian Development Bank, the demand and supply gap is still found to be large. As the South-Western region, where the project was implemented, is characterized by its soft ground and is prone to flood damages, it is difficult to construct and maintain rural infrastructure. As a result, the development of rural infrastructure has not progressed. As this delayed development is one of the factors limiting economic development in the region, GOB regards the region as a priority area for rural infrastructure development. While the poverty ratio shows a declining tendency across the country, it is hard to see improvement in the conditions in the South-Western region, and, comparatively, the region lags behind other regions in economic development.

The project aimed to develop rural infrastructure as a measure to redress gaps between the rich and poor in the South-Western region, one of the regions where the need for development of rural

[1] The administration system of Bangladesh is multi-layered consisting of Divisions, Districts, Sub-districts (also called "Upazila"), and Unions in the case of rural areas.

infrastructure is still high while improvements in poverty conditions tend to lag behind other regions and the amount of assistance from donors is low.

1.2 Project Outline

The objective of the project is to increase economic opportunities for the rural poor and improve their access to social services in rural areas in the South-Western part of Bangladesh by the construction and rehabilitation of rural infrastructure such as roads, bridges and market-related infrastructure, thereby contributing to poverty reduction and the alleviation of economic disparities in the project area.

<ODA Loan Project>

Loan Approved Amount / Disbursed Amount	14,246 million yen / 14,235 million yen
Exchange of Notes Date / Loan Agreement Signing Date	March 2010 / March 2010
Terms and Conditions	Interest Rate 0.01% Repayment Period 40 years (Grace Period) (10 years) Conditions for Procurement General Untied
Borrower / Executing Agency	The Government of the People's Republic of Bangladesh / Ministry of Local Government, Rural Development and Cooperatives (hereinafter refer to as "MLGRDC") / LGED
Project Completion	June 2018
Target Area	South-West Bangladesh[2]
Main Contractor(s) (Over 1 billion yen)	None
Main Consultant(s) (Over 100 million yen)	Resource Planning and Management Consultants (Pvt) Ltd. (Bangladesh) / BCL Associates Ltd. (Bangladesh) / Kranti Associates Ltd. (Bangladesh) / IC Net Ltd. (Japan) / Hifab International AB (Sweden)
Related Studies (Feasibility Studies, etc.)	(1) Feasibility Study Report on South-Western Bangladesh Rural Infrastructure Development Project (SWBRIDP) (LGED, 2007) (2) JICA Special Assistance for Project Formulation (SAPROF) for South-Western Bangladesh Rural Development Project (SWBRDP) (JICA, 2009)

[2] The project area covers 14 districts in the South-Western Region. The 14 districts are Faridpur, Rajbari, Gopalganj, Madaripur and Shariatpur in Dhaka division, Kulna, Bagerhat and Satkhira in Khulna division, Barisal, Jhalokathi, Pirojpur, Bhola, Patuakhali and Barguna in Barisal division.

Related Projects	[Technical Cooperation] - Rural Development Engineering Center Setting-up Project (2003) - Strengthening of Activities in Rural Development Engineering Center (RDEC) Project Phase 2 (2007) [ODA Loan project] - Northern Rural Infrastructure Development Project (1999) - Greater Faridpur Rural Infrastructure Development Project (2001) - Eastern Bangladesh Rural Infrastructure Development Project (2005) [Grant] - The project for Improvement of Portable Steel Bridges for Feeder Roads (2000) (2001) - The Project for the Provision of Portable Steel Bridges on Upazila and Union Roads (2005) (2006) (2007)

2. Outline of the Evaluation Study

2.1 External Evaluator

Tomoo Mochida, OPMAC Corporation

2.2 Duration of Evaluation Study

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

Duration of the Study: November 2019 - December 2020

Duration of the Field Study: February 8, 2020 - February 22, 2020

2.3 Constraints during the Evaluation Study

A series of monitoring surveys (baseline, mid-term and end-line surveys) was conducted during the project period. In the surveys, a relatively large number of samples were selected through a random sampling process (i.e., 1,800 samples) and panel data analysis was conducted using these samples. However, the qualitative survey conducted under this ex-post evaluation does not necessarily target the same groups of samples for interview. The sampling was not performed through a random process and the samples were small in size.[3] In this ex-post evaluation report, the results of the qualitative survey were compared with the relevant data collected through the monitoring surveys carried out during the project period. However, the results of the qualitative

[3] The areas for the qualitative survey were selected out of roads and markets developed or not developed under the project in the 14 districts. Interviews were conducted with a total of 259 people such as residents living adjacent to roads and markets, users of roads and markets, Market Management Councils, the staff of local governments, the staff of local offices of the executing agency, and women's group members. Face-to-face individual interviews were conducted, but group interviews were also occasionally carried out for some of the questions with groups of three persons.

survey conducted under this ex-post evaluation are different from those of the monitoring surveys conducted during the project period in terms of representativeness and accuracy.

Furthermore, it was not possible to collect some of the information on facts concerning relocation and land acquisition, such as the number of households subject to compensation payment. After the first field study, Coronavirus disease (COVID - 19) spread widely in Bangladesh and restrictions on entering into country were imposed to prevent further spread of infection. Restrictions on overseas travel for the survey were also put in place by JICA. As a result, it turned out to be not possible to reconfirm these points through direct interviews with staff in charge of the local offices of the executing agency and affected residents during the second field survey as initially scheduled.

3. Results of the Evaluation (Overall Rating: B[4])

3.1 Relevance (Rating: ③[5])

3.1.1 Consistency with the Development Plan of Bangladesh

At the time of appraisal, GOB pointed out the importance of the functions performed by rural infrastructure in the *Poverty Reduction Strategy Pape*r (hereinafter referred to as "PRSP"), particularly the strategic importance of upgrading the quality of existing roads and the related infrastructure, which had synergy effects with road development. Furthermore, the *Rural Road Master Plan* (2005) prepared by LGED based on the higher-level plans such as PRSP presented an implementation plan for rural infrastructure (including roads, markets and government office buildings) over a period of 20 years from 2005 to 2025.

At the time of the ex-post evaluation, five-year plans had replaced the role of PRSP. The *7th five-year plan* (2016 – 2020) takes up issues of rural development and the identification of priority areas (such as poverty reduction through employment generation and the implementation of programs including those for rural infrastructure). The project remains consistent with the description of the development of rural roads and rural markets in the *7th five-year plan*. Furthermore, in connection with the changes in policy direction, the executing agency pointed out a shift from ensuring the connectivity of infrastructure, emphasized up until then, to strengthening transportation capacity in order to meet increasing traffic volumes.

Thus, the project is considered to have been consistent with development policy at the time of the appraisal as well as at the time of the ex-post evaluation.

3.1.2 Consistency with the Development Needs of Bangladesh

At the time of appraisal, the South-Western region of the country lagged behind in terms of improvement in poverty conditions. In addition, the amount of damage caused by natural

[4] A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory
[5] ③: High, ②: Fair, ①: Low

disasters was significant. Therefore, the need for the enhancement of the sustainability of various types of infrastructure and the meeting of the development needs of infrastructure by paying attention particularly to resilience towards flood damages, etc., was high.

The poverty ratio[6] of the South-Western region is shown in Table 1 below. Although the poverty ratio exhibits a downward trend, the ratio in Barisal remains higher throughout than the national average.

Table 1: Change of Poverty Ratio

Unit: %

Year	2005	2010	2016
National	25.1	17.6	12.9
Barisal Division	35.6	26.7	14.5
Dhaka Division	19.9	15.6	7.2
Khulna Division	31.6	15.4	12.4

Source: The World Bank, *Poverty Maps of Bangladesh – 2010,*
Bangladesh Bureau of Statistics, *Statistical Yearbook Bangladesh* and *Preliminary Report on Household Income Expenditure Survey 2016*.

Damage caused by the natural disasters (flood damage) which have recently occurred in the South-Western region are shown in the table below. The project area suffered a great deal of damage due to floods, soil erosion and cyclones.

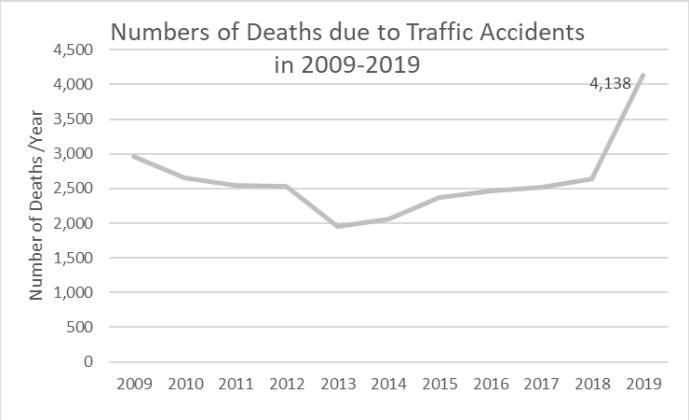
Table 2: Damages of Rural Roads caused by Disaster in the South-Western region

Division	Information of Roads		Information of Structure		Total tentative cost to repair	Ratio of (b) (%)
	Total affected length	Total tentative cost to repair	Total affected length	Total tentative cost to repair		
Unit	km	Lakh Tk Note 3	m	Lakh Tk Note 3	Lakh Tk Note 3	%
Kulna (Total of 3 Districts in the project area)	264.13	16,981.00	14.00	112.00	17,093.00	2.0%
Barisal	1,033.38	65,152.91	887.16	7,097.28	72,250.19	8.5%
Dhaka (Western Part) Note1	445.72	27,766.18	434.00	3,472.00	31,238.18	3.7%
Sub-total (a)Note2	1,743.23	109,900.09	1,335.16	10,681.28	120,581.37	14.3%
Total (b)	10,544.05	660,639.15	23,158.03	185,264.24	845,903.39	100.0%
Ratio (a)/(b) (%)	16.5%	16.6%	5.8%	5.8%	14.3%	14.3%

Source: LGED, *Damage Assessment Report of Rural Roads (Flood and Landslide 2017; Cyclone 2016 and 2017)*, September 2017
Note 1: Dhaka (Western Part) includes 5 districts including Faridupur.
Note 2: Total of 14 Districts under the project area
Note 3: Lakh Tk means 100,000 Taka.

[6] The poverty ratio described in Table 1 represents the ratio of poor households (Head Count Rates using the Lower Poverty Line) calculated by applying the Lower Poverty Line (total expenditures consisting of the cost of acquiring a basic food basket and the cost of consuming non-food items are equal to the food poverty line).

At the time of the ex-post evaluation, revision of the road design standards was in progress in order to cope with the increasing traffic volume. The revised standards were scheduled to be approved at the Planning Commission of the Ministry of Plan within 2020. In parallel with an increase in traffic volume, the issue of traffic safety has become a matter of growing concern. As shown in the figure below (Changes in the Number of Deaths due to Traffic Accidents), the number of deaths in 2019 recorded a significant increase.[7]



Source: Bangladesh Police and Bangladesh Road Transport Authority
Quoted from *Dhaka Tribune* dated on February 12, 2020

Figure 1: Change in the Numbers of Deaths due to Traffic Accidents

As seen above, the development needs of rural infrastructure remain recognized at the ex-post evaluation as was the case at the appraisal.

3.1.3 Consistency with Japan's ODA Policy

Japan's *Country Assistance Program for Bangladesh* (2006) at the time of appraisal set "poverty reduction through economic growth" as one of its goals. In addition, with regard to economic growth, which is one of the priority goals set forth in JICA's "*Country Assistance Implementation Policy*" (2009), focused assistance is to be placed on the development of infrastructure in rural areas. In the implementation policy, because the country is exposed to the threat of natural disasters and as it is regarded as a partner in the Cool Earth Promotion Programme,[8] efforts to cope with climate changes were planned. The objective of the project is to increase economic opportunities for the poor and improve their access to social services, thereby contributing to redressing economic disparities and poverty reduction. In the light of the

[7] The project scope includes installation of road signs. It is noted that Road Safety Unit is set up at LGED head office, which oversees improvement of road safety.
[8] The Cool Earth Promotion Programme is the framework for international financial assistance presented by the then Prime Minister Fukuda of Japan in January 2008 on the occasion of the annual meeting of the World Economic Forum at Davos, Switzerland in order to support measures to cope with climate changes in developing countries.

project objective and the rural infrastructure development to achieve the objective, the implementation of this project is considered to be consistent with the assistance policy of Japan.

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

3.2 Efficiency (Rating: ①)

3.2.1 Project Outputs

The project was designed to develop rural infrastructure in 14 districts in the South-Western region of Bangladesh. Under the project, various activities were conducted to produce the outputs such as the construction and upgrading of roads and bridges, the development of rural markets, and the capacity development of government officials, contractors and construction workers, Market Management Committees (hereinafter referred to as "MMC"), the poor women of Labor Contracting Societies (hereinafter referred to as "LCS") and consulting services. The final outputs are compared with the planned outputs at the appraisal stage in Table 3.

Actual outputs were more or less the same as those planned although minor changes were observed. For instance, the actual length of improved Upazila roads was reduced by 68.2 km from 1,034.5 km to 966.3 km. This is because parts of the roads had already been improved by the Roads and Highways Department or improvements had been implemented by LGED under other projects. Adjustments of works were made based on the actual field conditions revealed by detailed surveys or based on changes in priority in other cases. Upazila road networks were completed. The length of bridges and culverts of Upazila roads was extended from 7,961.9 m to 9,635.52 m. This is due to the results of the engineering survey conducted prior to the detailed design, particularly to changes caused by the construction of large bridges for which hydrological and morphological studies were newly required.[9] It is reported that the reasons for changes in the number of GCs were due to the limited availability of land and space. The length of plantation and caretaking on Upazila and Union roads was reduced from 1,185 km to 112 km because plantation works had been already completed under other projects (by LGED or Forest Department).

[9] According to LGED, it was agreed at the time of appraisal that 10 large bridges with a length of span stretching over 100 m would be constructed under the project. Out of these 10 bridges, 4 large bridges were constructed after 6 bridges were excluded from the project. The span length of these bridges was increased to ensure that ships could pass underneath the bridges. For example, the span of a bridge at Uzipur in Barisal District was lengthened from a planned length of 180 m to 560 m.

Table 3: Comparison between Planned and Actual Outputs

No.	Description	Plan	Actual
1	Construction and Improvement of Roads and Bridges		
	Improvement of Upazila Roads Improvement of Union Roads	1,034.5 km (112 roads) 66.7 km (18 roads)	966.30 km 99.96 km
	Construction of Bridges and Culverts on Upazila Roads Construction of Bridges and Culverts on Union Roads	7,961.9 m 339.0 m	9,635.52 m 951.24 m
	Protection and strengthening of shoulders: - Tree planting and caretaking of Upazila and Union Roads: - Maintenance of village roads: - Procurement of vehicles and equipment:	 - 1,185 km - 1,400 km - One set (vehicles, motorcycles, vibratory road rollers, office equipment)	 - 112 km - 1,400 km - Vehicles (Jeep, Pick-up), motorcycles, vibratory road rollers, Laptop, photocopiers, etc.
2	Development of GCs / RMs - GCs - RMs	 - 38 GCs - 12 RMs	 - 35 GCs - 12 RMs
3	Training and Capacity Development of government officials, contractors and construction workers, MMC, LCS members and poor women - Training of LGED officials - Training of contractors and construction workers - Training of Upazila / Union representatives - Training of MMC members - Training of LCS members	40,988 Trainee-days	43,467 Trainee-days
4	Consulting services - Package 1: Review of Detailed Design, Tendering Assistance, Construction Supervision - Package 2: Training and Capacity Development - Package 3: Baseline Survey - Package 4: Hydrological and Morphological studies	 - Package 1: International: 99 man-months National: 1,149 man-months - Package 2: Training and Capacity Development - Package 3: Baseline Survey - Package 4: Hydrological and Morphological studies	 - Package 1: International: 99.3 man-months National: 1,138.6 man-months - Package 2: Training and Capacity Development - Package 3: Baseline Survey - Package 4: Hydrological and Morphological studies

Source: Documents provided by JICA

3.2.2 Project Inputs

3.2.2.1 Project Cost

While the original project cost was 20,052 million yen (out of which the amount covered by ODA Loan was 14,246 million yen), the actual cost was 20,425 million yen (out of which the amount covered by ODA Loan was 14,235 million yen), which was slightly above the plan (101.8% of the planned amount). The amounts of the foreign and local currency breakdowns and the breakdowns of the project cost by item are shown in the table below.

Table 4: Plan and Actual of Project Cost Breakdowns

Unit: Million Yen (Planned and Actual Amounts converted in Yen)

Item	Planned Amount						Actual Amount		
	Foreign Currency Portion		Local Currency Portion		Total		Total	ODA Loan	GOB
	Total	ODA Loan	Total	ODA Loan	Total	ODA Loan			
Civil Works	0	0	13,705	11,649	13,705	11,649	18,834	13,550	5,284
Procurement of Vehicles and Equipment	70	70	141	141	211	211	178	140	38
Consulting Services	315	315	441	441	756	756	556	545	11
Price escalation	4	4	1,158	984	1,162	987	0	0	0
Physical Contingencies	4	4	750	639	754	642	0	0	0
Interest during construction	5	0	0	0	5	0	5	0	5
Acquisition of Land	0	0	80	0	80	0	172	0	172
Administration Costs	0	0	833	0	833	0	620	0	620
Taxes (Value Added Taxes and Custom Duties)	0	0	2,547	0	2,547	0	59	0	59
Total	397	392	19,655	13,853	20,052	14,246	20,425	14,235	6,190

Source: Documents provided by JICA

Note: The planned cost is converted at 1 Taka = 1.33 yen (in 2009) and the actual cost is converted using the average exchange rate (1 Taka = 1.28 yen) from 2010 to 2017 (*International Financial Statistics*, IMF). As the amount less than million yen is rounded off, costs of each item do not necessarily add up.

As civil works for the improvement of roads and markets were procured through Local Competitive Bidding (hereinafter referred to as "LCB"), LGED also pointed out cost reductions resulting from the application of LCB. However, the costs of civil works increased for various reasons such as increases in construction materials and labor costs, an increase in the transportation costs of materials due to difficulties in gaining access to the project sites, protective works for sustainable pavements, and an increase in the length of bridge spans. As a result, reallocation of the loan amount among different categories within the loan amount was also necessary.

3.2.2.2 Project Period

While the planned period of the project was from March 2010 to December 2014 (58 months), the project period was actually from March 2010 to June 2018 (100 months), exceeding the planned period by 172%. Major factors behind this delay include delays in the employment of consultants, detailed surveys, design and procurement for the large bridges, non-performance of contracts by contractors, re-contracting procedures[10] and delays in land acquisition. In particular, it is pointed out that hydrological and morphological studies, etc., were newly required for construction of some large bridges because of the length of the span.

[10] It is reported that under the project, over 600 contract / packages were concluded, out of which more than 30 contracts were terminated or cancelled for various reasons such as non-performance of contractors (documents provided by JICA).

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

Economic Internal Rates of Return (hereinafter referred to as "EIRR") of the project were calculated at the time of the project appraisal as follows:

Table 5: EIRR at the time of Project Appraisal

Project Component	Benefits	Costs	Project Life	EIRR
Upazila roads	Reduction in Vehicle Operating Costs (VOC) of motorized and non-motorized vehicles	Capital cost and operation and maintenance cost excluding taxes	20 years	EIRR range from 8.1% to 50.0% per Upazila Road (112 roads in total, average: 26.1%)
Union roads				EIRR range from 23.4% to 38.9% per Union Road (18 roads in total, average: 31.0%)
GCs	Difference in spoilage of perishable goods in the market before and after development		20 years	EIRR range from 25.8% to 74.1% per Market (38 markets in total, average: 56.8%)

Source: Documents provided by JICA

At the time of the project appraisal, benefits and costs were calculated by referring to the results of the traffic surveys by road and sales of agricultural and fishery products at the markets by product, and EIRR estimated by road and market. At the time of the ex-post evaluation, it was not possible to estimate benefits based on results of traffic surveys by road and sales of agriculture and fishery projects by market. It was not possible either to collect data on the project costs by road and market (all the costs were grouped into a single category under civil works in the documents provided by JICA). Accordingly, EIRR was not calculated at the time of the ex-post evaluation.

The project cost slightly exceeded the plan, but the project period significantly exceeded the plan. Therefore, the efficiency of the project is low.

3.3 Effectiveness and Impacts[11] (Rating: ③)

3.3.1 Effectiveness

In evaluating effectiveness of the project, as development and improvement of roads and bridges were implemented under this project, an initial analysis was made of the traffic survey results and the perceptions of the local residents towards benefits derived from the development of road networks. Following this, analyses were conducted on whether or not improvement had been realized as a result of the development of roads and bridges in terms of improvement of economic opportunities for the poor residing in the project area (such as employment opportunities and opportunities for starting new businesses), economic conditions (total household income, living conditions and household savings), and access to social services.

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

3.3.1.1 Quantitative Effects (Operation and Effect Indicators)

(1) Traffic survey results and relevant indicators

Because data comparable to the indicators and target values set at the appraisal was not available at the time of the ex-post evaluation, the results of the traffic surveys (baseline and end-line surveys) conducted during the project period are compared, as in the table below.

Table 6: Traffic Survey Results (Actual Data during the Project Period)

Unit: Vehicles/day

Type	Farmer's Market Day (Haat Day)			Annual Growth (B)/(A)^(1/4)-1 (%)	Ordinary Market Day (Non Haat Day)			Annual Growth (D)/(C)^(1/4)-1 (%)
	Baseline Note 1 2012 (A)	Mid-term Note 1 2013	End-line Note 1 2016 (B)		Baseline Note 1 2012 (C)	Mid-term Note 1 2013	End-line Note 1 2016 (D)	
Truck	27	23	37	8.2%	15	17	27	15.8%
Bus	6	15	16	27.8%	5	13	13	27.0%
Minibus	18	20	15	-4.5%	16	11	10	-11.1%
Car / Jeep	21	23	23	2.3%	12	19	12	0.0%
Tempo / Small motor vehicle	81	113	128	12.1%	42	67	81	17.8%
Motor Cycle	202	199	225	2.7%	141	137	156	2.6%
Rickshaw / Van / Cart	177	179	190	1.8%	110	105	122	2.6%
Bicycle	172	180	216	5.9%	119	122	149	5.8%
Auto rickshaw	129	139	161	5.7%	100	108	143	9.4%
Total	835	891	1,012	4.9%	560	598	712	6.2%

Source: EADS (Environment, Agriculture and Development Studies Ltd., hereinafter referred to as "EADS"), *Final Evaluation Study of SWBRDP* (2017) (P.57)

Note 1: Baseline survey (conducted at 30 locations in mid-2012), mid-term survey (conducted at 30 locations in mid-2013) and end-line survey (conducted at 29 locations around the end of 2016). Traffic surveys were conducted for 2 days on Haat Days and Non-Haat Days for 15 hours from 6:00 am to 9:00 pm. The table above shows the average traffic count results at all the locations surveyed. Haat days are "Farmer's Market Days" when more farmers come to market to sell agricultural produce and so on on a temporary basis one or two days per week other than permanent shops.

Note 2: Traffic volumes of the respective vehicle types do not necessarily add up due to rounding after the decimal point.

The traffic volume exhibits an increasing trend although the tendency differs depending on the type of vehicle. As seen from the table above, the growth rate[12] for motorcycles, minibuses, jeeps and so on was not as high as estimated at the time of the appraisal, but that for buses, tempo / small motor vehicles, and trucks exceeded the targets. A decrease in the traffic volume of minibuses at the time of the end-line survey possibly resulted from substitution effects caused by an increase in the traffic volume of buses, implying shifts of traffic volumes taking place among different types of vehicles.

[12] At the time of the appraisal, the target year was set at 2016 with the target traffic volumes. If the annual growth rates of traffic volumes are calculated in comparison with the traffic volumes in the base year (2008), the rates are 10.2% for motorcycles, 10.8% for minibuses ("pick-ups and microbuses" as the original indicator), and 9.1% for jeeps ("jeeps, cars and taxis" as the original indicator).

Table 7: Answers from Interviewees with regard to Benefits from Road Improvement

Unit: Number of Group Responses

Indicators of Benefits		Data taken at Respective Surveys during Project Period			Qualitative Survey at Ex-post Evaluation (Group Interviews with Local Residents: Total of 25 groups)		
		Baseline	Mid Term	End-Line	Target area	Non-Target area	Total
	Survey period	2012	2013	2016	2020		
Travel time reduced	Frequency Note 1	702	1,261	1,606	15	3	18
	%	39	70.1	89.2	78.9	50.0	72.0
Travel cost reduced	Frequency Note 1	498	1,126	1,225	9	3	12
	%	27.7	62.6	68.1	47.4	50.0	48.0
Destinations increased	Frequency Note 1	631	1,141	1,327	18	4	22
	%	35.1	63.4	73.7	94.7	66.7	88.0
Travel Frequency increased	Frequency Note 1	589	1,218	1,341	19	4	23
	%	32.7	67.7	74.5	100.0	66.7	92.0
Access to school easier	Frequency Note 1	654	1,483	1,574	19	4	23
	%	36.3	82.4	87.4	100.0	66.7	92.0
Access to health services easier	Frequency Note 1	623	1,448	1,539	19	4	23
	%	34.6	80.4	85.5	100.0	66.7	92.0
Access to markets improved	Frequency Note 1	638	1,446	1,589	19	4	23
	%	35.4 Note2	80.3	71.6	100.0	66.7	92.0
Access to banks, etc., improved	Frequency Note 1	558	1,255	1,438	19	4	23
	%	31	69.7	89.2	100.0	66.7	92.0
Availability of essential commodities increased	Frequency Note 1	548	1,202	1,307	17	4	21
	%	30.4	66.8	89.2	89.5	66.7	84.0
Availability of agricultural and other inputs improved	Frequency Note 1	521	1,195	1,402	19	5	24
	%	28.9	66.4	77.9	100.0	83.3	96.0
Number of means of transport increased	Frequency Note 1	505	1,179	1,568	19	4	23
	%	28.1	65.5	87.1	100.0	66.7	92.0
Road safety improved (Frequency of traffic accidents decreased)	Frequency Note 1	-	-	-	1	1	2
	%	-	-	-	5.3	16.7	8.0
Environmental conditions improved (air pollution improved)	Frequency Note 1	-	-	-	1	0	1
	%	-	-	-	5.3	0.0	4.0
Environmental conditions improved (traffic noise improved)	Frequency Note 1	-	-	-	1	0	1
	%	-	-	-	5.3	0.0	4.0

Source: The data during the project period was taken from EADS, *Final Evaluation Study of SWBRDP* (2017) (P.33). The data at the ex-post evaluation is based on the results of the qualitative survey conducted from February to March 2020.

Note 1: During the project period, the baseline survey (mid-2012), the mid-term survey (mid-2013), and the end-line survey (around the end of 2016) were conducted for 1,800 households randomly sampled and continuously surveyed as panel data where observations are for the same subjects each time. The questions for the respective indicators were set as "Travel / transportation time," "Travel / transportation cost," etc., with the corresponding options for answers to each indicator being "Favorable Change," "No Change," "Unfavorable Change" and "Do not know." Although it is not clearly stated in the report, it is considered that the above table shows an obvious "Favorable Change" as a sum of responses with "reduced" travel / transportation time, "reduced" travel / transportation cost, and so on. Meanwhile, in the ex-post evaluation, options for answers were presented as "Increased," "No Change," and "Reduced" for questions such as "Travel / transportation time" and "Travel / transportation cost." The summary of the answers in the table above is based on the answers from group interviews with 25 groups, consisting of 3 persons per group.

Note 2: The original value shows 81.6%, but the value has been replaced because it is considered to be a typographical error.

Table 7 summarizes the responses from interviewees with regard to the benefits of road development. The number of samples at the time of the ex-post evaluation was rather small and responses are not from identical beneficiaries constantly followed unlike for the data collected during the project period. However, if compared with the data taken during the project period, the rate of positive perceptions of the benefits arising from road development (such as travel time, destination, frequency and access to social services) shows an increasing tendency throughout as well as after the project period. In particular, the table shows that a larger proportion of the respondents from the target areas of the project point out increasing benefits. On the other hand, the number of respondents who answered that there had been a reduction in travel costs was about half at the time of the ex-post evaluation. Furthermore, respondents recognized lower benefits in terms of improved road safety (i.e., decrease in the frequency of traffic accidents) and improved environmental conditions (i.e., improved air pollutions and traffic noises), although these aspects were not monitored during the project period.

3.3.1.2 Qualitative Effects (Other Effects)

(1) Improvement of Access to Social Services

Based on the evaluation through the sample survey described in Table 7 above, access to social services such as schools and health centers show a tendency of improvement.

(2) Improvement of Economic Opportunities of the Poor

The following table summarizes responses from local residents and women (a total of 28 groups) with regard to increased / improved or decreased / worsened conditions of economic opportunities (employment opportunities and opportunities of starting a new business) and economic conditions (total household income, living conditions and household savings). Most of the respondents answered “Increased / Improved” or “Increased / Improved Slightly” for all the question items (85% of the respondents under “Total”).

Responses of the local residents with regard to employment opportunities refer to labor at various places such as shops that sell iron construction materials and cement, brickfields, jute mills, rice mills, construction sites, and fish processing factories. They also include rental services for automobiles and motorcycles, and transport workers. There was also a case where an existing jute mill provided employees with commuter bus services following the improvement of roads. Various business opportunities were also pointed out. These include retail shops for agricultural inputs and construction materials, vehicle repair shops, rice mills, groceries, agent banking services, cow fattening, poultry farms, and fish farms. The answers are not necessarily limited to employment opportunities and new business opportunities of the poor. However, they ostensibly represent a picture of increasing tendencies of employment and new business opportunities, which can be accessed by the poor in the project area.

Table 8: Results of Interview with Local Residents and Women about Economic Opportunities and Conditions

Unit: Number of Group Responses

Rating	Employment Opportunities	Opportunities of starting a new business	Total income of your household	Living conditions of your household	Your household savings	Total	Ratio of Total
5: Increased / Improved	4	6	4	6	4	24	17%
4: Increased / Improved Slightly	17	15	21	19	23	95	68%
3: Same	7	7	3	3	1	21	15%
2: Decreased / Worsened Slightly	0	0	0	0	0	0	0%
1: Decreased / Worsened	0	0	0	0	0	0	0%
Total	28	28	28	28	28	140	100%
(5+4)/Total	75%	75%	89%	89%	96%	85%	-

Source: Results of the Qualitative Survey under the ex-post evaluation

3.3.2 Impacts

3.3.2.1 Realization of Impacts

The extent to which the impact was realized has been examined in terms of the following: (1) poverty reduction, (2) redressing of social disparities in the project area (increased participation of women in society), and (3) mitigations of the risks of climate change.

(1) Poverty Reduction

Average household income[13] from the main income sources in nominal terms increased from 87,335 Taka / year (in May – June 2012) to 169,322 Taka / year (in September – October 2016) as shown in the table below. As the increase in the Consumer Price Index (CPI) from 2012 to 2016 was 6.5% per year, the real growth rate of the household income was 10.8% per year. Some of the households surveyed have secondary income sources. At the time of the baseline survey in 2012, the number of households that had secondary income sources was 307, with the amount being 94,044 Taka / year. At the time of the end-line survey in 2016, the number of households was 389 with the secondary household income being 161,113 Taka / year. The real growth rate of the secondary income was calculated at 7.4% per year.

Types sources of the main income at the end-line survey are compared with those at the time of the baseline survey. The number of households who answered “transport driver / helper,” “agriculture” and “private sector” had increased while the number of households that answered “daily labor” decreased. Meanwhile, the number of households who have secondary incomes

[13] According to documents provided by JICA, analysis is made separately on main and secondary income sources. The “average household income” represents the amount of household income in nominal terms from the main income source. (the number of samples at the time of the baseline survey is 1,782 households while it is 1,800 households at the end-line survey.)

had increased by 82 households at the time of the end-line survey. The income sources were mainly daily labor, fishing, and traders. If the conditions of the main and secondary income sources are comprehensively evaluated, it can be inferred from the sample survey that there have been increases in the employment opportunities such as drivers / helpers, employees in the private sector and workers in the agriculture and fishery sectors. It is considered that the improvement of the rural road network and the development of markets had promoted entries into the transport business, and the vitalization of trade and agriculture.

The increasing trend of household income is also seen in the qualitative survey conducted under the ex-post evaluation. The table below compares changes in housing structures at the times of the survey conducted during the project period and the qualitative survey performed under the ex-post evaluation. From the project period through to the time of the ex-post evaluation, those who answered that their housing structure was of tin walls and a tin roof accounted for about 60% of the total. However, the ratio of those who answered that their structures were of earthen walls and a tin roof tended to decrease. Meanwhile, that of those who answered that their structures were of Pucca walls and a Pucca roof, which are relatively strong because of more sustainable construction materials, exhibited an increasing tendency.

Table 9: Changes in Housing Structure

House Type		During the Project Implementation Period			Data collected at the time of the Ex-post Evaluation	
Wall	Roof	Baseline Survey (2012)	Mid-term Survey (2013)	End-line Survey (2016)	3 years ago (2017)	Ex-post Evaluation (2020)
Earthen	Tin	23.3%	20.6%	12.3%	7.5%	2.9%
Tin	Tin	58.4%	61.1%	58.9%	49.3%	59.4%
Pucca Note 1	Tin	12.2%	13.1%	19.8%	17.9%	23.2%
Pucca Note 1	Pucca Note 1	2.6%	2.6%	3.1%	7.5%	10.1%
Others	-	3.50%	2.60%	5.90%	17.80%	4.40%
Total (%)		100.0%	100.0%	100.0%	100.0%	100.0%
Total sample size		1,800	1,800	1,800	67 Note 2	69 Note 2

Source: Results of the qualitative survey conducted during the ex-post evaluation
Note 1: Pucca Housing means houses built with high quality construction materials.
Note 2: The interview survey was conducted with a total of 75 local residents.

Furthermore, according to answers from 75 local residents about the main durable goods purchased over the last three years (in and after 2017), mobile phones accounted for about 67% of the respondents, agriculture machinery about 23%, refrigerators about 17% and televisions 20%.

The following table summarizes the responses about changes that had taken place in the past three years. The question was designed with a view to analyzing the factors behind income increases, mainly in the agriculture sector, in connection with the implementation of the

project.[14] As many groups of respondents pointed out increases in agricultural products and sales, it is considered that increases in agricultural production have contributed to increases in income. Furthermore, respondents replied that they had increased their use of hybrid seeds / seedlings for higher production as well as their use of chemical fertilizers. Meanwhile, respondents rarely replied that they had increased their production areas and an only limited number of responded referred to an increased frequency of cultivation times. Accordingly, it is assumed that inputs of hybrid seeds and chemical fertilizers have contributed to productivity increase.[15] As seen in Table 7 the item "availability of agricultural and other inputs improved" continued to be recognized during the project period and in the period after the completion of the project. Thus, a causal relationship between the effect of improvement of the road networks and increases in agriculture income can be inferred.

Table 10: Changes in the Past 3 Years in and after 2017

Unit: Number of Group Responses

No	Description	No. of Groups that answered "Increase" (A)	% of (A) out of 25
1	Production volume of agricultural products	21	84%
2	Sales volume of agricultural products	21	84%
3	Sales value of agricultural products in terms of Taka values	18	72%
4	Variety of seeds / seedlings	23	92%
5	Hybrid seeds / seedlings for increased production	25	100%
6	Use of chemical fertilizers	23	92%
7	Use of organic fertilizers	5	20%
8	Use of chemical pesticides	19	76%
9	Production area (cultivated lands)	1	4%
10	Frequency of cultivation times (for example, from 1 time to 3 times a year)	12	48%
11	Spoilage of agricultural products during transportation	3	12%
12	Transportation costs of agricultural products	14	56%

Source: Results of the qualitative survey conducted under the ex-post evaluation
Note: Results of interviews with 25 groups, each group consisting of three local residents, are summarized.

Furthermore, local residents (25 groups) were asked about the places where they sell their agricultural products. In comparison with the practice in the past, an increase was observed in such cases where agricultural products are sold to traders who come to farm gates (an increase from 9 groups (36%) three years ago to 23 groups (92%) at the time of the ex-post evaluation) and where agriculture products are transported and sold at GCs (an increase from 16 groups (64%) three years ago to 25 groups (100%) at the time of the ex-post evaluation). There is a growing mobility among the traders and producers themselves.

[14] Results of interviews with 25 groups, each group consisting of three local residents, are summarized.
[15] When the qualitative survey was conducted, progress of residential land development was observed in parallel with an increase in the population. The effects of increases in productivity are also pointed out in the *Final Evaluation Report* (P.25).

(2) Redressing of Social Disparity in the Project Area

According to the evaluation conducted during the project period, in terms of disparity in the project area, the participation of women in economic activities such as agriculture, sales of agricultural products and engagement in shop-keeping gradually increased, as shown in Table 11. Furthermore, the duration for which women received education now tends to be more prolonged. It is considered that implementation of the project positively affected the promotion of women's participation in economic activities and society, as well as their economic activities.[16]

The project strived to promote the participation of women by making use of LCS. In the qualitative survey conducted during the ex-post evaluation, 9 women engaged in LCS were asked how they utilized the amount of money saved though their engagement in the LCS activities. Their responses include the starting of a small business (shops in the market), cow fattening and goat rearing, savings in banks, and investment in money lending. Although the scope of works for tree plantation by LCS was substantially reduced in comparison with the original scope, it is considered that, based on the responses from members who participated in LCS, the project contributed to increases in opportunities for economic activities by women, and causal relationships are inferred between the project and women's participation / activities.

Table 11: Redressing of Social Disparity (Increase of Women's Participation in Society)

Indicators	Baseline Survey (2012)	End-line Survey (2016)
Women (aged≥15) engaged mainly in household chores	73.3%	65.4%
Engaged in agriculture on their own farm	19.7%	25.1%
Engaged in marketing farm produces	10.1%	12.0%
Women taking care of children's education	13.6%	18.4%
Year of Education of Sample Female Population Age 7 +		
No formal education	19.7%	16.5%
1-5 years	45.8%	39.0%
6-10 years	29.8%	36.1%
11-12 years	3.6%	5.8%
13-14 years	0.8%	2.32%
15-17 years	0.3%	0.22%

Source: EADS, *Final Evaluation Study of SWBRDP* (2017) (P.54-55)

[16] As shown in Table 7 above, access to schools, health services and markets have been greatly improved. One person interviewed during the site survey, who works for a relatively well-known school, said the number of students had increased at his school because, coupled with an increase in the population, students had become able to commute from greater distances by using the improved roads. Interviews with a group of women who have experience in working as LCS members revealed that household savings increased because sources of income were diversified and also because more family members came to be involved in income generating activities. They planned to make use of savings for future needs such as health services and education for children.

Table 12: Use of Savings from LCS

Use of Savings (Total Number of Respondents: 9 persons)
Built a new house
Started a small business (shops in the market) (Number of responses: 2 persons)
Invested in money lending
Spent total money for medical treatment purposes
Spent partially for goat rearing
Built a new house, Cow fattening
Deposited in the Bank
Savings still in hand, planned to purchase cow

Source: Results of the qualitative survey conducted under the ex-post evaluation

(3) Mitigation of Possible Risks caused by Climate Change

As the project targeted areas where natural disasters such as floods frequently occur and cause damage, the project was expected to contribute to the mitigation of the risks associated with climate change which the country is exposed to. The following table summarizes responses to questions regarding the capacity of local residents and roads to cope with natural disasters. As those who reside adjacent to roads improved under the project answered either that capacity had "Increased" or "Increased slightly," it is considered that the improvement of the capacity to cope with natural disasters has been recognized.

Table 13: Responses to Questions regarding the Capacity of Local Residents and Roads to cope with Natural Disasters

Unit: Number of Responses / Number of Group Responses [Note2]

Question 1[Note 1]	Question 2[Note 1]	Local Residents live adjacent to the following roads				Total	Ratio
		Targeted Roads		Non-targeted Roads			
5: Increased	5: Decreased	45 / 8	38% / 36%	6 / 2	17% / 33%	51 / 10	33% / 36%
4: Increased slightly	4: Decreased slightly	60 / 14	51% / 64%	22 / 2	61% / 33%	82 / 16	54% / 57%
3: Same	3: Same	4 / 0	3% / 0%	3 / 0	8% / 0%	7 / 0	5% / 0%
2: Decreased Slightly	2: Increased slightly	8 / 0	7% / 0%	5 / 2	14% / 33%	13 / 2	8% / 7%
1: Decreased	1: Increased	0 / 0	0% / 0%	0 / 0	0% / 0%	0 / 0	0% / 0%
Total		117 / 22	100% / 100%	36 / 6	100% / 100%	153 / 28	100% / 100%

Source: Results of the qualitative survey conducted under the ex-post evaluation
Note 1: "Question 1: Do you observe a decrease or an increase in the capacity of local residents and Upazila / Union roads to cope with natural disasters in the last 3 years (from 2017 until now)?" (Respondents: groups of local residents, women groups who used to work as LCS members, users of roads and GCs / RMs, local government officials, and LGED officials). "Question 2: Compared with the conditions 3 years ago (around 2017), how frequently were you prevented from visiting the Growth Center or Rural Market because of closure of Upazila / Union roads due to damage caused by disasters such as floods and cyclones?" (Respondents: Market sellers)
Note 2: The "Number of Responses" is a sum of responses from the users of roads and GCs / RMs, local government officials, LGED officials, and market sellers. On the other hand, the "Number of Group Responses" is a sum of responses from groups of local residents and women groups who used to work as LCS members.
Note 3: Each item does not necessarily add up due to rounding.

With regard to the "increased capacity" to cope with natural disasters, respondents point out a number of concrete examples such as agile mobilization of emergency support activities

during the time of disasters, the quick arrival of fire services and ambulances, increased availability of goods at markets and the prompt delivery of goods to affected areas, less damage incurred during disasters, reduction of recovery time, and quick evacuation. A causal relationship between improved rural roads and the increased capacity to cope with natural disasters is assumed from their responses. It is noted that some local residents who reside away from targeted areas answered that the capacity had "decreased slightly".

3.3.2.2 Other Positive and Negative Impacts

(1) Benefits to Local Residents in the Project Area and Surrounding Areas

As shown in Table 7, responses from local residents adjacent to the targeted roads are compared with those from local residents not adjacent. As seen from the table, the project has brought a positive impact not only to the improved road sections, but also more broadly to the areas near improved sections that form part of the network.

At the time of the appraisal, another Japanese ODA loan project entitled "Rural Electrification Upgradation Project" (the Loan Agreement was signed in March 2010) was under consideration. Since the project area of the Rural Electrification Upgradation Project partly overlaps with that of this project, synergy effects were expected, particularly on rural markets. So far as was seen during the site survey of the ex-post evaluation, coordination in terms of the areas to be targeted was not deemed to have taken place with the Rural Electrification Upgradation Project. However, as seen from the monitoring results during the project period (Table 14) and the result of the qualitative survey conducted during the ex-post evaluation, it is considered that the conditions of electrification gradually improved. During the interviews with MMC at markets at the time of the ex-post evaluation, 13 persons (62%) out of 21 interviewed answered "Improved Slightly" or "Improved."

Table 14: Conditions of Electrification

Item	Baseline Survey in 2012	Mid-term Survey in 2013	End-line Survey in 2016
Electricity Connections	48.7%	58.0%	76.1%

Source: EADS, *Final Evaluation Study of SWBRDP* (2017) (P.21)

(2) Impacts on the Natural Environment

This project is classified into Category B because it is not classified with large-scale projects in the road sector in accordance with the Japan International Cooperation Agency Guidelines for Environmental and Social Considerations (2010). Its potential adverse impacts on the environment are considered less adverse. In addition, the project does not fall into the category of projects with sensitive characteristics, or with sensitive areas, as described in the said guidelines. Initial Environmental Evaluation (IEE) reports for this project were approved by

the Department of Environment (DOE) under the Ministry of Environment and Forests in April 2009. For four large bridges having a span length of more than 100 m and another two bridges, which were initially included but later taken out of the project scope during the project period, LGED obtained approval of Environmental Impact Assessment (EIA) reports in May and November 2012 from DOE. LGED obtained Environmental Clearance Certificates (ECC) from DOE and No Objection to the Contract (NOC) from JICA prior to contracts being awarded. In addition, appropriate mitigation measures against water pollution, noise and air pollution were taken during the project period. The consultant and LGED staff constantly monitored whether or not the mitigation measures were complied with.

(3) Resettlement and Land Acquisition

It was reported that 235 project affected households were listed and that affected persons were engaged in village road maintenance works (an income generating program under the project), according to documents provided by JICA. However, at interviews held at LGED, it was explained that although houses were partly affected, relocation of residents did not take place and a Resettlement Action Plan was not prepared.[17] When houses needed to be partly set back due to road widening works, LGED extended support to affected households in the form of the provision of employment opportunities[18] as members of LCS, instead of making cash compensation to them. However, according to the site survey and the qualitative survey, comments were received on the relocation of local residents. This may be due to differences in the interpretation of what the relocation of residents means. There might also be the possibility that LGED head office did not necessarily receive and capture accurate information on relocation in the field. With regard to land acquisition, 11.35 ha of land was acquired and 134 million Taka[19] of compensation was paid to landowners according to the governmental rules of Bangladesh.

This project has mostly achieved its objectives. Therefore, the effectiveness and impacts of the project are high.

[17] Other than setting back of structures due to the widening of roads, land acquisition took place at the sites where bridges were newly constructed. It was confirmed that LGED paid compensation for the land acquisition. Furthermore, during the site survey, it was heard that relocation also took place at the site where a bridge was constructed. According to the local residents interviewed, people were informed of the construction schedule and compensation packages prior to the commencement of the construction works. LGED pointed out that the local people perceived benefits derived from the construction of bridges and explained that payment of the compensation had been made. There was no issue being reported concerning the land acquisition.

[18] According to LGED, the number of local residents who received employment opportunities was about 10% of the affected households.

[19] According to the documents provided JICA, the amount was spent on land acquisition, but the amount may have included compensations for the relocation of local residents necessitated by the construction works of bridges and so on.

3.4 Sustainability (Rating: ③)

3.4.1 Institutional / Organizational Aspects of Operation and Maintenance

The executing agency of the project is LGED of MLGRDC. The actual number of personnel working at LGED was about 9,000 at the time of the ex-post evaluation although there were 13,394 positions (the actual number is less than 70% of the number of the positions). It is pointed out that this shortage is not due to budgetary constraints but due to the lengthy period required for the recruitment of new staff. At the time of the site survey of the ex-post evaluation in February 2020, LGED was in the middle of its recruitment process of new staff. It is noted out that the staff members employed on a project basis are not included in the above number of positions.

Routine maintenance of roads is carried out off and on pavement every month and as required. Off pavement maintenance works include earth works on shoulders and slopes performed by LCS. On pavement maintenance works are carried out by Mobile Maintenance Teams (hereinafter referred to as "MMT")[20] consisting of 5 members per team, which are set at a district level. The maintenance works include the repair of potholes. Periodic maintenance includes resealing, overlaying and rehabilitation. Periodic maintenance is conducted by local construction contractors, which are procured through competitive bidding processes. Emergency maintenance works (for example, repair works of parts damaged by floods, which take place every year) are carried out as required and contractors are selected through a bidding process.

After completion of the project, GCs, RMs and ghats were placed under the administrative jurisdiction of local governments. The routine maintenance of GCs, RMs and ghats is supposed to be carried out by MMC and periodic maintenance is carried out by the local governments, the owners of the facilities.

3.4.2 Technical Aspects of Operation and Maintenance

As described later, LGED operates and maintains roads by making use of the Rural Road Asset Management System with a software called the Road & Structure Database Management System-VIII (RSDMS-VIII). Furthermore, LGED utilizes the *Guideline for Implementation of Rural Roads and Culverts Maintenance Program* (June 2010) prepared with the support of JICA. In addition, LGED was in the middle of revising the design standards in order to cope with an increasing traffic volume at the time of the site survey conducted under the ex-post evaluation in February 2020. During the project period, domestic and overseas trainings were conducted for LGED staff and others. After completion of the project, LGED's learning process of

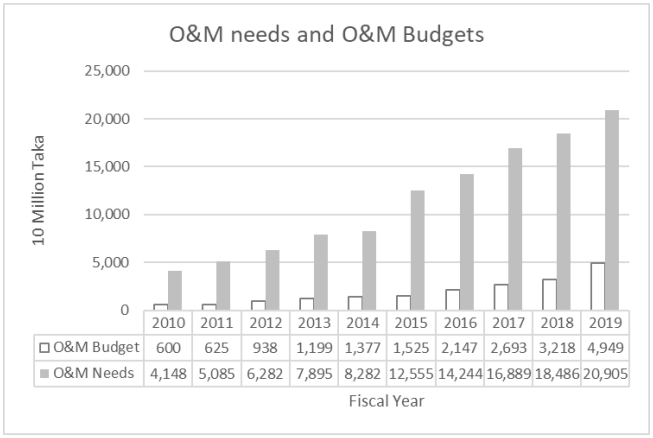
[20] MMT consists of five members: one foreman, two skilled and two semi-skilled laborers. Depending on the size of a district and the number of Upazila, the number of MMT ranges from two to three groups per district. The Sub-Assistant Engineer of the district coordinates works with MMTs.

operation and maintenance techniques is continued through On-the-Job Training since LGED used to be engaged in maintenance works of rural roads over a long period of time.

3.4.3 Financial Aspects of Operation and Maintenance

LGED runs the Rural Road Asset Management System using the aforementioned software called RSDMS-VIII. LGED classifies the surface conditions of roads into four categories based on the International Roughness Index and estimates the needs for maintenance budgets by category. However, as traffic surveys are not conducted on a regular basis, traffic data is not utilized for the Asset Management System.

The budgets (both development and current budgets) to be appropriated during the Fiscal Year 2019/20 will be one-fourth of the funds needed, but the growth rate is 53.8% over the budgets of the previous year. LGED points out that no maintenance budgets would be appropriated for three years after the completion of sub-projects. In order to make effective use of the limited budget amounts, prioritization of the use of maintenance budgets is discussed at district level based on such factors as the traffic volume (although traffic surveys are not conducted for this purpose), connectivity and road conditions. With limited budgets, LGED carries out maintenance through prioritization (maintenance budgets are appropriated by focusing on roads, which are classified into "Bad" or "Poor" out of the four categories mentioned below).



	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
O&M Budget	600	625	938	1,199	1,377	1,525	2,147	2,693	3,218	4,949
O&M Needs	4,148	5,085	6,282	7,895	8,282	12,555	14,244	16,889	18,486	20,905

Source: LGED

Figure 2: Funds Needed for O&M and Budgetary Appropriation over the Years

3.4.4 Status of Operation and Maintenance

O&M needs during the Fiscal Year 2019/2020 were estimated by applying the following categories ("Good," "Fair," "Poor" and "Bad") to rural roads based on the roughness survey. While the following table does not describe the road conditions limited only to the roads in the project area, it is noted that roads classified into "Good" or "Fair" account for more than 60% on a nation-wide basis.

Table 15: Classification of Conditions and Lengths of Rural Roads

Category	Road Length (km)	Ratio
Good	39,582	34%
Fair	33,762	29%
Poor	24,448	21%
Bad	18,627	16%
Total	116,419	100%

Source: LGED

The following table summarizes the results of the qualitative survey. While responses of "Satisfied / Improved" or "Satisfied to some extent / Improved slightly" account for 80%, it is noted that responses of "Dissatisfied to some extent / Worsened slightly" also account for 13%. During the qualitative survey period, damage to pavement roads, such as stripped asphalt pavements and potholes, were occasionally observed. One local resident also commented that paved roads were not necessarily strong enough to cope with the current traffic volume. However, surveys of the road conditions are regularly conducted and maintenance works corresponding to the results of each survey is carried out, prioritizing the roads to be maintained. It is considered that measures have been taken so as not to pose serious hinderances to the realization of the project effects.

Table 16: Perceptions of Road Conditions

Unit: Number of Responses

Rating	Rating Scale for Types 1 to 4	Type 1	Type 2	Type 3	Type 4	Rating Scale for Types 5 to 6	Type 5	Type 6	Total (Type 1 - Type 6 in total)	Ratio
		Local Residents	Women	Local Government	LGED		Market Sellers	Drivers		
Interview Methods		Group		Individual			Individual			
5	Satisfied	8	2	6	9	Improved	9	13	47	34%
4	Satisfied to some extent	12	1	7	5	Improved slightly	22	18	65	46%
3	Neither dissatisfied nor satisfied	2	0	1	0	Same	3	3	9	6%
2	Dissatisfied to some extent	2	0	0	0	Worsened slightly	8	8	18	13%
1	Dissatisfied	1	0	0	0	Worsened	0	0	1	1%
Total		25	3	14	14	Total	42	42	140	100%
[(5)+(4)]/Total		80%	100%	93%	100%		74%	74%	80%	80%

Source: Results of the qualitative survey conducted at the time of the ex-post evaluation

The following table summarizes responses from sellers at markets and market users / drivers with respect to the conditions of the markets. It is noted that responses of "Worsened" are occasionally observed with regard to toilet facilities, waste disposal systems and the overall cleanness of the market.

Table 17: Responses from Sellers at Markets and Users / Drivers of Roads and Markets

Unit: Number of Responses

Indicator	Worsened (1)		No Change (2)		Improved (3)	
Sellers at Markets: Total Number of Interviewees 42 persons (the percentages represent the ratio of 42)						
Toilet facilities	11	26%	16	38%	15	36%
Waste disposal system	5	12%	29	69%	8	19%
Overall cleanness of the market	2	5%	23	55%	17	40%
Users / Drivers of Roads and Markets: Total Number of Interviewees 84 persons (the percentages represent the ratio of 84)						
Toilet facilities	27	32%	27	32%	30	36%
Waste disposal system	9	11%	60	71%	14	17%
Overall cleanness of the market	9	11%	37	44%	36	43%

Source: Results of the qualitative survey conducted during the ex-post evaluation

MMC members were interviewed about the availability of the water supply, the conditions of the drainage system and the availability of cleaning and waste disposal systems. Some of the respondents answered that they had “Worsened Slightly” or “Worsened” with regard to the conditions of these facilities over the last three years. As GCs and RMs are placed under the administrative jurisdiction of local governments, continual maintenance works of markets are beyond LGED’s jurisdiction. However, LGED is in the position to be ready to extend its support if required.

As described above, there exist some concerns over the continual maintenance of markets. However, as far as the operation and maintenance of the project, in which LGED plays the role of the executing agency, is concerned, no major problems have been observed in the institutional / organizational, technical, financial aspects or in the current status. Therefore, the sustainability of the project effects is high.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

The objective of the project was to increase economic opportunities for the rural poor and improve their access to social services, by the construction and rehabilitation of rural infrastructure such as roads, bridges and markets, thereby contributing to poverty reduction and the alleviation of economic disparities in South-West Bangladesh. Both at the appraisal phase and at the ex-post evaluation, the policy direction of the Bangladeshi government to reduce poverty by enhancing networks of rural roads and GCs / RMs remained unchanged and the project matched the development needs of the project area. This project was also consistent with the aid policies of Japan. Therefore, its relevance is high. The project largely achieved its outputs as originally planned. However, both the project cost and the project period exceeded the original plan. Therefore, the efficiency of the project is low. It is assumed that the project contributed to an increase in traffic volume and expansion of the transportation networks. Furthermore,

improvement of economic opportunities for the poor and a redress of social disparities have been recognized since improvements in access to social services, an increase in household income, and employment generation in transportation businesses and the private sector have been observed. Furthermore, participation of women in the project proceeded and their economic capacity was enhanced. Thus, the effectiveness and impacts of the project are high. The operation and maintenance after completion of the project has been carried out as part of their regular work by LGED, the executing agency. In terms of the operation and maintenance system of LGED and its technical and financial aspects as well as the status of the operation and maintenance conditions, no serious issue adversely affecting the project effects was found. For the above reasons, the sustainability of the project effects is high.

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

4.2 Recommendations

4.2.1 Recommendations to the Executing Agency

Enhancement of the Asset Management System

LGED adopted RSDMS-VIII for the Rural Road Asset Management System in order to grasp current road conditions and O&M needs. However, the road traffic data is yet to be incorporated in the system. In order to improve and maintain road conditions while coping with growing traffic needs, it is recommended that regular traffic surveys are conducted and that the survey results are utilized in the Asset Management System in the mid-term. In parallel, data management should be shifted from the current desktop-based system to the web-based RSDMS.

Environmental and Social Considerations

The policy direction for the improvement of rural roads is being changed from the improvement of connectivity to enhancement of transportation capacity. In order to strengthen transportation capacity, rural roads are expected to be widened to a larger extent than that implemented so far. It is considered that far more people could subsequently be affected by such road widening works compared to in the past. For this purpose, it is deemed important that LGED set up a team or a section specializing in examination of the satisfaction of requirements of, and confirming compliance with, the guidelines and procedures on environmental and social considerations set by the Government, JICA and other donor agencies in the mid-term.

Review and update of the Road Master Plan (2005)

The project was formulated based on the *Road Master Plan* (2005). At the time of the site survey, however, it was difficult to confirm whether or not the achievement level of the *Road Master Plan* (2005) had been reviewed. It was also not clear if preparation of the updated road master plan had been started based on the current conditions. It is recommended that LGED start

reviewing the *Road Master Plan* (2005) and preparing for the new road master plan based on the results of the review.

4.2.2 Recommendations to JICA

None

4.3 Lessons Learned

Consideration of more rational procurement packages

Under the project, the number of civil works contracts / packages exceeded 600, out of which more than 30 contracts / packages were terminated or cancelled. While the reasons behind the mid-term terminations or cancellations include problems with the poor performance of contractors, the ability of LGED to successfully manage many contracts / packages, including the construction contracts for large bridges, is highly commendable. On the other hand, in the case of rural development projects where the construction works are carried out through many local construction contracts, there is some room for improvement of current practice such as combining small local contracts into fewer contract packages. Such improvements could make contract administration easier. There is also room for improvement of the prequalification and technical evaluation of contractors. In rural infrastructure development projects being carried out in areas where construction works have many construction contracts, the executing agency should prepare construction contract packages in a rational manner, which will be easier to manage, and set up stringent technical evaluation criteria to screen the capacity of local contractors from the stage of detailed design to the preparation of procurement documents.

Incorporation of operation and maintenance budgets in the project costs of ODA loans

Under rural infrastructure development projects where the project sites are scattered over a geographically extensive area, many sub-projects will be implemented in a comparatively longer period of time. In some cases, the executing agency of the project may not receive the operation and maintenance budgets allocated during a certain period of time right after completion of the construction works simply because the road section was newly constructed. Therefore, at the time of the appraisal, JICA and the executing agency should examine whether or not the government allocates O&M budgets after the completion of construction works. In the case where the government has the policy that O&M budgets are not allocated for a certain period of time after the completion of the construction works, the appropriateness of allocating O&M budgets out of the concerned ODA loan should be discussed.

Implementation of studies that adversely affect progress of the project at the project formulation stage

Large bridges were expected to be constructed under the project. Foreseeing the risks of obstructing the operation of ships sailing underneath the bridges, it was found necessary to elevate the height of the bridges, which resulted in the prolongation of the bridge lengths. In parallel, it was necessary to conduct hydrological and morphological studies and EIA to obtain the Environmental Clearance Certificates. Accordingly, the project period was significantly prolonged and delayed in comparison with the original plan. When it is deemed necessary to conduct prior or preparatory studies that are likely to have a large impact on the duration of the project period, JICA and the executing agency should examine the necessity of conducting such prior or preparatory studies at the time of project formulation and, if they are found to be necessary, they should implement such studies as part of the project formulation activities.

Comparison of the Original and Actual Scope of the Project

Item	Plan	Actual
1. Project Outputs Construction and Improvement of Roads and Bridges		
Improvement of Upazila Roads Improvement of Union Roads	1,034.5 km (112 roads) 66.7 km (18 roads)	966.30 km 99.96 km
Construction of Bridges and Culverts on Upazila Roads Construction of Bridges and Culverts on Union Roads	7,961.9 m 339.0 m	9,635.52 m 951.24 m
Protection and strengthening of shoulders: - Tree planting and caretaking of Upazila and Union Roads: - Maintenance of village roads: - Procurement of vehicles and equipment:	- 1,185 km - 1,400 km - One set (vehicles, motorcycles, vibratory road rollers, office equipment)	- 112 km - 1,400 km - Vehicles (Jeep, Pick-up), motorcycles, vibratory road rollers, Laptop, photocopiers, etc.
Development of GCs / RMs - GCs - RMs	- 38 GCs - 12 RMs	- 35 GCs - 12 RMs
Training and Capacity Development of government officials, contractors and construction workers, MMC, LCS members and poor women. - Training of LGED officials - Training of contractors and construction workers - Training of Upazila / Union representatives - Training of MMC members - Training of LCS members	40,988 Trainee-days	43,467 Trainee-days
Consulting services - Package 1: Review of Detailed Design, Tendering Assistance, Construction Supervision - Package 2: Training and Capacity Development - Package 3: Baseline Survey - Package 4: Hydrological and Morphological studies	- Package 1: International: 99 man-months National: 1,149 man-months - Package 2: Training and Capacity Development - Package 3: Baseline Survey - Package 4: Hydrological and Morphological studies	- Package 1: International: 99.3 man-months National: 1,138.6 man-months - Package 2: Training and Capacity Development - Package 3: Baseline Survey - Package 4: Hydrological and Morphological studies
2. Project Period	March 2010 – December 2014 (58 months)	March 2010 – June 2018 (100 months)
3. Project Cost Amount Paid in Foreign Currency Amount Paid in Local Currency Total ODA Loan Portion Exchange Rate	 397 million yen 19,655 million yen (14,778 million Taka) 20,052 million yen 14,246 million yen 1 Taka = 1.33 yen (As of November 2009)	 NA NA (NA) 20,425 million yen 14,235 million yen 1 Taka = 1.28 yen (Average between January 2010 and December 2017)
4. Final Disbursement	March 2017	