Bangladesh

Ex-Post Evaluation of Japanese ODA Loan Project
"Northern Rural Infrastructure Development Project"

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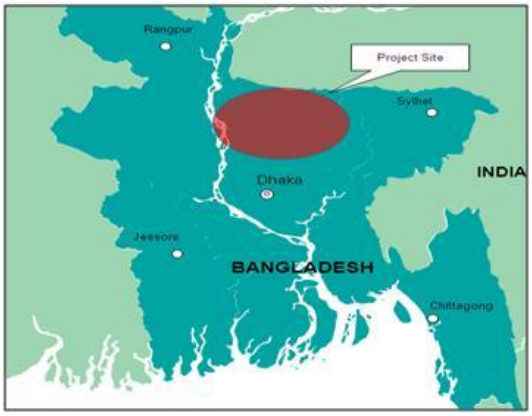
1. Project Description



Project Location

Rural Road Developed in the Project
(Mymensingh District)

1.1 Background

The rural population of Bangladesh accounts for as high as 80% of the total population. It is critically important to promote rural development not only in the agricultural sector, but also to foster non-agricultural industries. However, the problem of underdeveloped roads, village markets and other rural infrastructure poses a major impediment to the smooth distribution and sale of agricultural products, the procurement of fertilizers, seeds, farm machinery and other agricultural inputs, and the promotion of commerce and transportation services.

The project area covers an area with a population of 25 million; roughly 20% of the country's total. Agriculture forms the core of the regional economy, which has a high potential for growth, subject to the vitalization of transportation and physical distribution. However, the poverty rate in the project area is above the national average and literacy rate is below the average. A high percentage (about 40%) of the farmers also either owns land no larger than 0.5 acres or owns no land at all. Most of them are farm workers who are employed only on a temporary basis. Some parts of the project area have never received any large-scale rural infrastructure improvement projects, and the underdevelopment of rural infrastructure has prevented smooth physical distribution, depriving the local residents of the opportunity to realize their growth potential.

It was considered very important to improve the roads and other rural infrastructure on a continuing basis to promote economic growth in the rural areas, and this project was implemented in this context. The project was implemented as a co-financed project with the Asian Development Bank (ADB), the International Fund for Agricultural Development (IFAD) and the Swedish International Development Cooperation Agency (SIDA).

1.2 Project Outline

The objective of this project was to promote distribution of goods in five districts (Jamalpur, Sherpur, Mymensingh, Netrokona, and Kishoreganj) in the northern part of Bangladesh by constructing Feeder Road B, setting up the Rural Development Engineering Center (RDEC) and rehabilitating the roads damaged by the 1998 Summer Flood, thereby contributing to the development of the regional economy.

Approved Amount/Disbursed Amount	6,593 million yen / 6,304 million yen
Exchange of Notes Date/ Loan Agreement Signing Date	June, 1999 / July, 1999
Terms and Conditions	Interest Rate: 1.0% Repayment Period: 30 years (Grace Period: 10 years) (Rural Development Engineering Center portion Interest Rate: 0.75%, Repayment Period: 40 years (Grace Period: 10 years)) Conditions for Procurement: General Untied
Borrower/Executing Agency	President of the People's Republic of Bangladesh/ Local Government Engineering Department
Final Disbursement Date	March, 2007
Main Contractor (Over 1 billion yen)	-
Main Consultant (Over 100 million yen)	-
Related Projects	JICA, "Rural Development Engineering Center Setting-up Project in Bangladesh"

2. Outline of the Evaluation Study

2.1 External Evaluator

Keisuke Nishikawa, Ernst & Young Advisory Co., Ltd.

2.2 Duration of Evaluation Study

Duration of the Study: December, 2009 – November, 2010

Duration of the Field Survey: April 22 – May 9, 2010, and July 13 – July 23, 2010

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

3.1 Relevance (Rating: a)

3.1.1 Relevance with the Development Policy of Bangladesh

Poverty reduction continued to be a major policy objective of Bangladesh under its Fifth Five-Year Plan (1997–2002) as it was also the case under the Fourth Five-Year Plan. In order to achieve this objective, the Plan called for vitalization of the rural economy and the extension of social services (primary education, sanitation and hygiene, etc.) in rural communities. Rural development was particularly given high priority. It enjoyed a 10.13% budget allocation under the Fifth Plan, with a considerable increase from the 4.76% allocation under the Fourth Plan. Rural infrastructure improvement received a particularly strong focus, with 64% of the rural development budget being allocated to this goal.

The Poverty Reduction Strategic Paper (PRSP) that followed up the Fifth Five-Year Plan likewise emphasized the rural road improvement as being important for rural poverty reduction and socioeconomic growth. The National Strategy for Accelerated Poverty Reduction II (FY2009-11) that is currently in effect positions road connectivity including rural roads as a major potential contributing factor to socioeconomic growth and poverty reduction in rural communities.

In short, the importance of poverty reduction and socioeconomic development has been recognized constantly by the government from the time of project planning through to the present ex-post evaluation. The government's recognition of the importance is also reflected in the large amount of budget allocated to the Local Government Engineering Department (LGED).

In terms of specific policy measures, the National Land Transport Policy (NLTP) that was formulated in 2004 pursuant to the I-PRSP (developed in 2003) stressed the importance of road connectivity and bridge construction to improve national road networks. A Rural Road Master Plan was then formulated in 2005 setting out the directions for rural road improvement and delineating the road construction and maintenance plans. This ODA project is an embodiment of this Master Plan in the five districts of northern Bangladesh and is therefore highly relevant.

3.1.2 Relevance with the Development Needs of Bangladesh

In rural areas, the shortage of roads, village markets and other rural infrastructure has prevented socioeconomic development from reaching its full potential. Smooth distribution and trading are as important to the rural economy as assured access by the residents to social services, but the inadequacy of many markets and rural roads made it difficult to build up full networks of transport and commerce. During the rainy season, access was virtually cut off even for human-powered means of transportation.

Under these circumstances, the project planned in 1997 by ADB for the 13 districts in the northern and northwestern parts of Bangladesh and JICA's implementation of a portion of the project on a co-financing basis had great significance for alleviating the aforementioned problems that the rural areas of Bangladesh were faced with.

The rural road referred to as "Feeder Road B"[1] was the dominant class of road among the roads that were developed by LGED. As a result of road improvement projects implemented in recent years, the paved proportion of Feeder Road B rose significantly. The proportion of pavement on Feeder Road B that was no higher than 20% in the 1990s has been rising steadily and the improvement efforts can be said to be making substantial progress. However, 51% was still unpaved in 2005 and even at the time of this ex-post evaluation 35% remains unpaved, waiting for improvements. There has been a continuing strong need for road improvements in the development of the rural economy and society, and the implementation of the project under ex-post evaluation has been quite relevant to the development needs of the rural areas of Bangladesh. It is anticipated that in the coming years there will be an increasingly greater need for road maintenance and repairs along with new improvement projects.

3.1.3 Relevance with Japan's ODA Policy

With the recognition that the growth of the agricultural sector and fostering of non-agricultural industries are indispensible for development in rural Bangladesh, a country that had 80% of its people living in rural areas, rural development had been a priority target of JICA's ODA. In particular, road improvements have been regarded as an area for new and focused assistance, since these would contribute not only to the vitalization of local economies, but also to the generation of substantial economic benefits through the integration of these economies into the national economy. Accordingly, this project was found to be relevant to Japan's ODA policy at that time to contribute to rural development through rural infrastructure improvements.

This project has been highly relevant with Bangladesh's development policy,

[1] Feeder Road B is now called an "Upazila Road."

development needs, as well as Japan's ODA policy; therefore its relevance is high.

3.2 Efficiency (Rating: a)

3.2.1 Project Outputs

The project under evaluation pertains to rural infrastructure improvements in 13 districts of northern Bangladesh and was implemented as a co-financed project with ADB, IFAD and SIDA. JICA was responsible for the improvement of Feeder Road B, the Rural Development Engineering Center (RDEC) and emergency flood protection (road rehabilitation), as detailed in Table 1. A comparison of the final outputs for which JICA was responsible and the initial plans at the time of project appraisal is summarized in Table 2.

Table 1: Overall Plan and Supporting Agencies at the Time of Project Appraisal

Component	Sub-component	Details	Supporting agency	
Development of the Road Network	Improvement of Feeder Road B • Roads 1,250 km • Bridges, culverts 3,300 m	Surface the unpaved roads / Build bridges and culvers	5 northern districts JICA 652 km JICA 2,340m	8 northwestern districts ADB 598 km ADB 960 m
	Rural roads (bridges/culverts) 4,800 m	Develop/improve rural roads connecting to Feeder Road B	ADB	
Rural Development Engineering Center	Center construction and equipment procurement	Increase the sustainability of the infrastructure facilities constructed under the project	JICA	
	Consulting services	Design the Center, supervise construction, plan training programs	JICA	
	Technical assistance	Technical cooperation project requested for the capacity enhancement of officials	JICA (considered as a separate project)	
Development of Growth Centers	Development of 173 Growth Centers	Develop markets connecting to Feeder Road B and other core markets	ADB	
Development of Ghats	Development of 41 ghats	Develop ghats	ADB	
Flood Protection	Construction of 64 evacuation centers Submersible roads 15 km	Construct roadside evacuation centers Construct experimental water-resistant submersible roads to prepare for the flood season	IFAD	

Component	Sub-component	Details	Supporting agency
Community Support	Improvement of women's income (tree planting, setting up shop at Growth Centers)	Employ female workers for roadside tree planting and weeding to maintain the roads in good condition	IFAD
Capacity Enhancement	Training of LGED officials Training of local government officials, etc.	Enhance the capacities of officials in the treasury, information and other bureaus	IFAD
Project Implementation Support	Consulting services	Design the infrastructure facilities except for the Center construction, assist the bidding process, supervise the construction	ADB, SIDA
	Machinery and equipment procurement	Purchase construction machinery and equipment, civil construction test equipment	
Emergency Flood Protection (road rehabilitation)	Road rehabilitation	Rehabilitate roads in the northern region that were damaged by floods	JICA

Source: JICA appraisal document

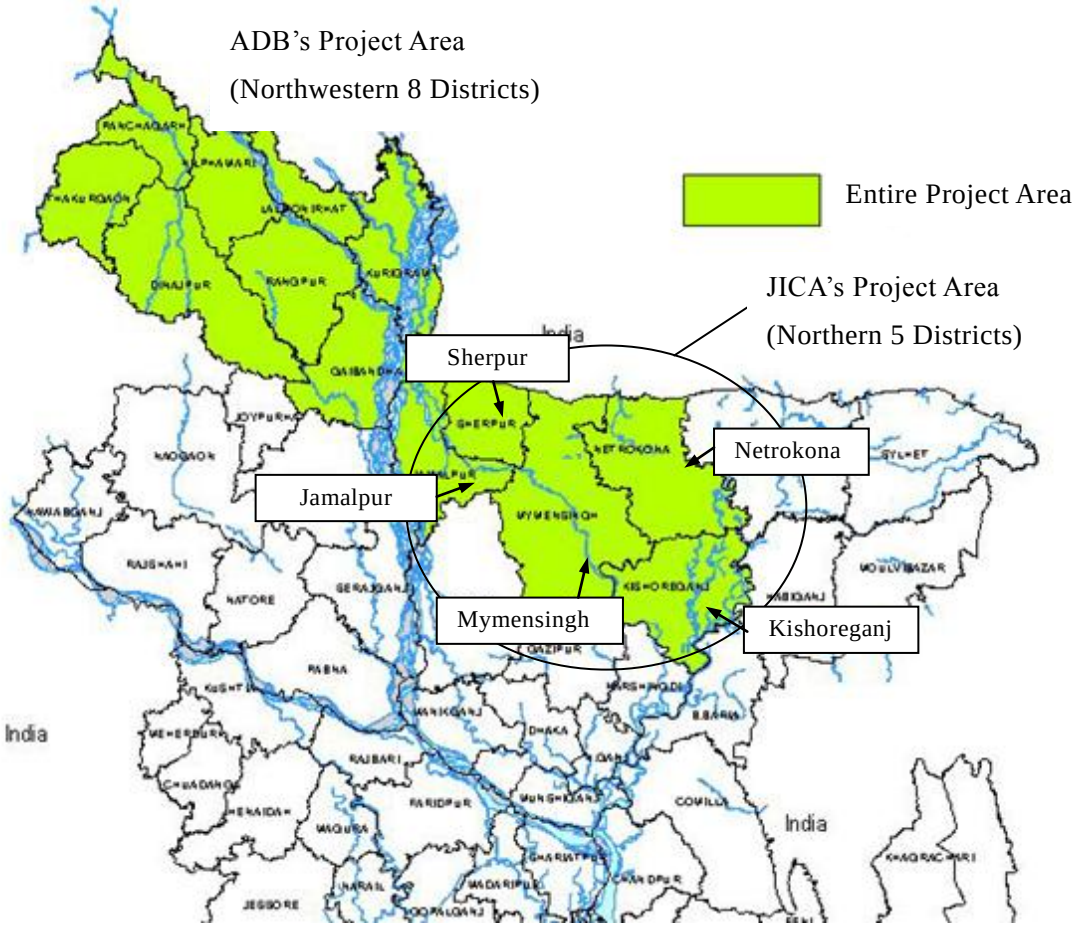
Table 2: Comparison of the Original/Actual Outputs

Item	Original	Actual
Development of the Road Network	Feeder Road B 652 km Bridges/culverts 2,340 m	Feeder Road B 617 km Bridges/culverts 3,664 m
Establishment of a Rural Development Engineering Center	Center construction (6-storied) Machinery and equipment procurement Consulting services	Center construction (15-storied) Machinery and equipment procurement Consulting services
Emergency Flood Protection (road rehabilitation)	1998 flood Roads 160 km Bridges/culverts 650 m	1998 flood Roads 117 km Bridges/culverts 648 m 2004 flood Roads 142 km Bridges/culverts 174 m

The loan agreement was concluded on the basis of the project scope that was defined at the time of project planning. However, the detailed studies that were subsequently-conducted revealed the actual needs of the rural villages concerned. The total length of road to be developed was reduced and the length of bridges and culverts was extended to reflect the actual needs. These project modifications were made in close consultation with the entities involved in the project, including other donor agencies. The contents of these modifications are considered to be relevant.

Given the need for more floor space reflecting the anticipated increase in the LGED workload, a decision was made before starting the construction of RDEC to make the building 15 stories high instead of the originally-planned 6 stories. The additional construction costs were financed from the annual budget of the Government of Bangladesh. JICA was consulted in advance and concurred with the decision. No particular problems were found with respect to this project modification.

As far as the 1998 flood was concerned, the actual total length of rehabilitated road under the emergency flood protection component fell short of that planned, partly because the component was also financed by the government and other donor agencies. The surplus in the project budget was directed to the rehabilitation of roads that were damaged by the 2004 flood. Given the urgency involved at the time of this flood, the addition of this project component may be described as a timely and justifiable decision.



Source: LGED

Figure 1: Project Area

3.2.2 Project Inputs

3.2.2.1 Project Period

The project under evaluation is a co-financed project with other donor organizations, and some preliminary work was underway when the loan agreement was signed. As far as the project components under JICA's responsibility are concerned, however, they were launched following the signing of the agreement. For this reason, the project period was defined to have started in July 1999 with the conclusion of the agreement. As was described in the preceding Paragraph 3.2.1, the project scope was modified at an early stage of project implementation as a result of detailed studies conducted following the signing of the agreement. However, owing to the very efficient project management by LGED, the construction work was virtually completed in June 2005, ahead of schedule.

The overall project period was from July 1999 through March 2006 (81 months), slightly longer than the plan of 78 months from July 1999 through December 2005 (104% of the original plan). The apparent delay, however, was due to the addition of the component "road rehabilitation for the 2004 flood" and it can be said that there was virtually no delay in the original project implementation. Other co-financing organizations implemented their respective project components generally without delay.

3.2.2.2 Project Cost

The originally-planned project cost was 6,593 million yen for JICA's components of the total project cost of 22,566 million yen for the entire co-financed project. The actual amount disbursed was 6,304 million yen, which was lower than the plan (96%) for the following positive and negative reasons:

- Alterations to the total length of roads, bridges and culverts to be developed/improved as a result of the detailed studies
- Increased materials costs
- Cost increases owing to the choice of better road specifications
- Cost reductions through the use of competitive bidding
- Exchange rate differences
- Addition of road rehabilitation for the 2004 flood

The additional expenditures for road rehabilitation for the 2004 flood that was decided upon during the project implementation were offset by the cost savings that had been achieved through efficient implementation of the original project components.

This is worth a high evaluation. Another important element in the project cost savings was the competitive bidding that was adopted for the selection of consultants. Five to six bidders competed and the final contract amount was about one quarter of the originally-budgeted amount.

Although the project period slightly exceeded the plan, the change of the plan, that is, the addition of new project component, can be considered relevant. Therefore, efficiency of the project is high.

3.3 Effectiveness (Rating: a)

3.3.1 Quantitative Effects

3.3.1.1 Results from Operation and Effect Indicators

(1) Annual Average Daily Traffic (AADT)[2]

Under this project numerous roads were either developed or improved. The annual average daily traffic of randomly-sampled road segments has increased after the project implementation in practically all of the districts involved as shown in Table 3. Some segments saw the traffic diminished after the road improvement, but this was due to the road improvements separately implemented in nearby areas and the resulting diversion of some traffic to the new routes. From the perspective of overall traffic flows, there are apparently no problems.

It should be added that comparison of traffic volume before and after the project implementation was difficult, since the first traffic survey of significance was carried out in 2003 and no such data existed at the time of project planning.

Table 3: Trend in the Annual Average Daily Traffic Volume

(Unit: Number of vehicles)

District	Road Section	2003	2005	2006 (Com-pletion)	2007	2008	2009
Jamalpur	Bakshiganj – Jabbergonj	216					814
Sherpur	Nakla – Tarakanda - Nalitabari				318		384
Mymensingh	Nandail – Bakchanda			267		586	780
	Shambugonj – Ambikagonji	722		626		411	240
Netrokona	Kalmakanda – Nazipur	2,329				3,402	
Kishoreganj	Karimganj – Gundhar		410		1,231		1,272

[2] Computed from data collected during a 12-hour period (8:00 a.m. – 8:00 p.m.) on a day on which the market was operating and another when it was not.

Note: The data are not necessarily exhaustive since surveys were not conducted every year at the same sections.
Source: Prepared from LGED data

(2) Improved Average Speed and Reduced Transportation Costs

Before the project was implemented, the roads were unpaved and the surfaces were rough. There were not enough bridges and in the rainy season even rickshaws could not be used. People simply had to move around on foot. For these reasons, it took 18 minutes on average to move a distance of 1 kilometer (about 3 km/hr) before the project implementation, while people were able to use vehicles after the project was completed, needing only 3 minutes to travel the same distance (about 20 km/hr) as is shown in Table 4. A beneficiary survey[3] revealed that the cost of transportation was reduced to about one-third overall. These findings lead to the conclusion that the road development/improvement had the effect of significantly increasing the average speed of travel and of considerably reducing transportation costs.

Table 4: Improved Average Speed of Travel and Reduced Transportation Costs

	Speed of travel (km/hr)		Transportation costs (Taka/km)	
District	Before	After	Before	After
Jamalpur	3	10	7.46	1.83
Sherpur	3	20	7.55	2.27
Mymensingh	3	20	7.25	2.45
Netrokona	3	20	5.55	2.92
Kishoreganj	4	20	5.44	2.05
Average	**3**	**20**	**6.67**	**2.44**

Note: The transportation cost reductions represent the difference between the fees the residents paid for the means of transportation before and after the project.
Source: Beneficiary Survey

[3] The beneficiary survey was conducted in the form of interview with 100 respondents in the five districts concerned (in proportion to the lengths of the improved Feeder Road B, 40 respondents in Mymensingh (the largest), 24 in Netrokona, 21 in Kishoreganj, 10 in Jamalpur, 5 in Sherpur).

Photo 1. A Bridge Constructed under the Project (Jamalpur District)

Photo 2. A Scene from the Beneficiary Survey (Sherpur District)

3.3.1.2 Results of Calculations of Internal Rate of Return (IRR)

Economic Internal Rate of Return (EIRR)

The EIRR of the project has been computed for roads of all the 13 districts in northern Bangladesh covered by the project with the exception of the emergency flood protection component. As Table 5 shows, the planned EIRR of 29.0% at the time of project appraisal fell to the actual rate of 20.1% at the time of the ex-post evaluation. According to an interview with ADB that served as the overall project coordinator, there was a cost overrun mainly in Mymensingh, the largest district in the project area. This district has many lowlands and most rural roads are built on embankments constructed for flood protection purposes. The road surface had to be elevated for the improvements and this resulted in higher construction costs than originally anticipated.

Table 5: EIRR of the Project

(%)

	Plan	Actual
EIRR (road portion)	29.0	20.1

Note: Costs include project costs and maintenance costs. Benefits include: vehicle travel costs saved, travel time saved and incremental agricultural value added.

Source: Ex-ante appraisal documents, ADB Project Completion Report

3.3.2 Qualitative Effects

(1) Number of Beneficiaries / Employment Creation

The contemplated beneficiaries of the project include: residents who use the roads, bridges, culverts, village markets and submersible roads[4], users of female-only shops in the marketplace and female road maintenance workers. The total beneficiary population is estimated to have reached 23.58 million.

Photo 3. Women's group doing routine road maintenance work (Jamalpur District)

The project brought about direct employment amounting to 19.17 million person-days for the road construction during the project implementation, and created 183 Women Market Sections (under IFAD's responsibility) as a result of the overall project implementation. Teams of women workers have been organized to perform routine maintenance of the constructed/improved roads; two female workers are employed by the LGED per kilometer of road length. Consequently, a new employment opportunity equivalent to about 1,200 jobs has been created for women in the project area.

(2) Other Qualitative Effects

The road conditions have been substantially improved by the project. Access by the residents to educational institutions, hospitals and other public services has become considerably easier, and so has the provision of public services to the villages. All the respondents in the beneficiary survey confirmed that access to social services had improved. The substantial renovation of road conditions has stimulated physical distribution, which was confirmed by 99% of the respondents in the beneficiary survey.

The asphalt pavement and the construction of highly-durable bridges, culverts and other concrete structures did indeed display a significant effect in preventing flood damages during the rainy season, as was expected at the time of project appraisal.

This project has largely achieved its objectives; therefore its effectiveness is high.

3.4 Impact

3.4.1 Intended Impacts

[4] "Submersible Road" refers to a road that is laid on the ground and is accessible during the dry season but becomes under water and inaccessible during the rainy season. During the rainy season, these localities are only accessible by boat.

The major impacts of the road improvements include the increased number of retail shops along the road and in village markets and also the overall revitalization of village markets. An ADB survey showed that the number of small roadside shops increased 2.3 times on average after the project implementation and the sales revenues of the shops more than doubled, suggesting significant impacts on the regional economy.

According to a private-sector survey contracted by LGED during the project implementation, farmers along the roads not only came to find it easier and less expensive to procure agricultural inputs, but also saw their agricultural outputs increasing by 15% in 2001, 19% in 2002 and 18% in 2003. In the beneficiary survey, all respondents also stated that their farm income had increased due to the road improvements. As Table 6 shows, major contributors to the increased farm income were the lower costs required for the purchase of goods and services and the quicker delivery of products to consumers and the resulting increase in shipment volumes, both achieved due to the improved transport system. Through these impacts, the residents living along the roads feel that their rural life has changed.

Table 6: Factors Contributing to Increased Income

(Unit: %)

Factors contributing to increased income	Percentage
Improved transport system	72
Reduced travel time	13
Reduced transportation costs	11
Creation/expansion of village markets	4
Total	**100**

Source: Beneficiary survey

3.4.2 Other Impacts

(1) Impacts on the Natural Environment

It was hoped at the time of project planning that the road improvements would curb soil erosion from the surface and slopes and prevent degradation of the quality of drain water. After the project implementation, the drain water is reportedly running more smoothly than before and its quality has improved, as a result of the construction of durable structures and the work of local contracting societies in protecting the road surface (unpaved portions) and slopes, planting trees and cleaning. The on-site survey also found no sections of stagnant drains or water contamination.

(2) Land Acquisition and Resettlement

A total of 250 hectares of land were to be acquired for the entire project area including the components under the responsibility of other donor organizations. The LGED states that all the land was acquired in accordance with applicable local laws and the Action Plan set out by the World Bank and ADB and that the affected citizens were duly compensated pursuant to the provisions of the Action Plan. Interviews with former landowners confirmed that they were generally satisfied with the levels of compensation they received. There was no resettlement in connection with the land acquisition.

(3) Other Positive/Negative Impacts

It was planned that the project would create employment opportunities for women in the areas of roadside tree planting, maintenance of road shoulders, etc. As was reviewed in sub-paragraph 3.3.2 above, women's groups have in fact been organized and jobs have been created. The hired women take turns after two years of work. The daily wage is 90 Taka, out of which 54 Taka/day is paid to the female worker at the end of every month and the balance of 36 Taka/day is deposited in a separate account for two years. At the end of the two-year employment period, the total deposit of about 26,000 Taka is paid to the worker as a one-time payment. Some workers use this mandatory saving to purchase farm animals or to set up small shops. This is a very effective way of wage payment, particularly for female employees and is working with positive results. The success is attributed to the direct initiative taken by LGED in organizing and leading the women workers out of its Upazila Offices by taking advantage of the proximity of these offices to the local communities.

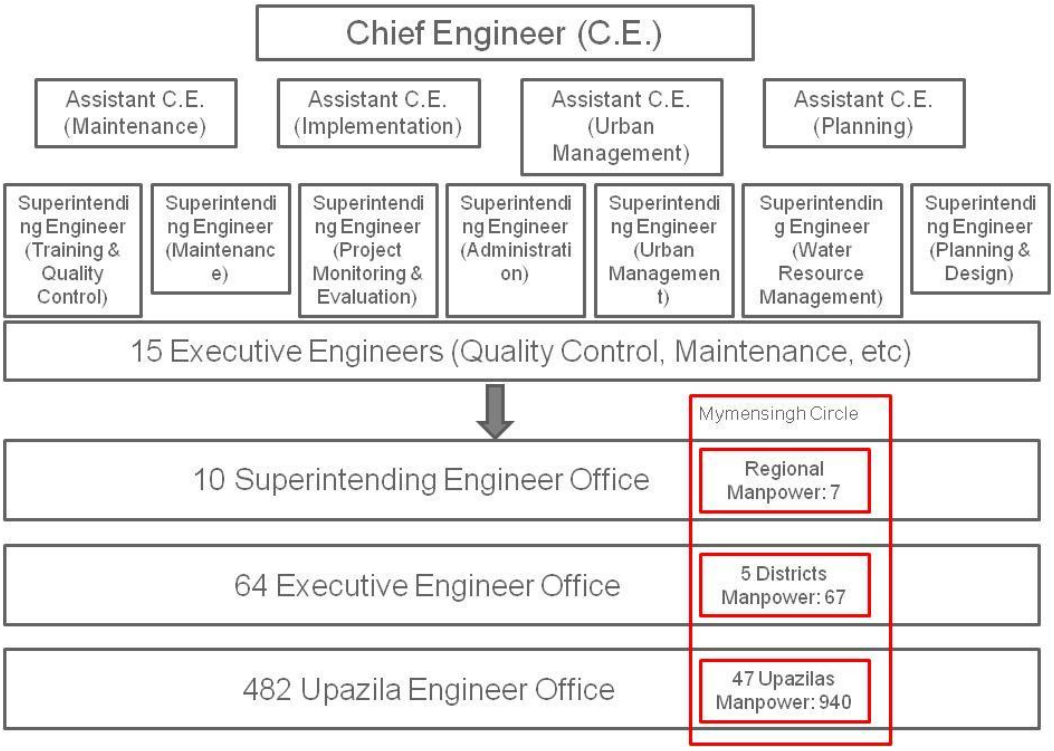
3.5 Sustainability (Rating: b)

3.5.1 Structural Aspects of Operation and Maintenance

After completion of the project, the Feeder Road B is to be maintained by the Rural Infrastructure Maintenance Management Unit (RIMMU). Under RIMMU, three-tier Operation and Maintenance (O&M) teams have been organized at the regional level, and the total number of O&M personnel in the five districts (Mymenshingh Circle) covered by the project under evaluation is 211. In addition, surveyors and assistants who are also engaged in maintenance are stationed in all Upazilas. Altogether, a total of 446 persons are involved in the maintenance in the five districts. In view of the rising importance of operation and maintenance, the LGED has promoted the top maintenance manager from the previous position of Superintending Engineer to Additional Chief Engineer, in order to make the overall coordination more effective. The RDEC is maintained by the Building Maintenance Unit (BMU) of the Administration Division of the Headquarters.

In actual practice, officials are assigned even at the Upazila level very close to the

location of the actual work to ensure proper management of the women's groups that perform the routine road maintenance work. The number of personnel in the Mymensingh Circle covering the five districts of the project area was 164 until recently, but the assignment of an engineer to every Upazila as a frontline supervisor (47 engineers in total) is expected to make future maintenance work even more effective.



Source: Prepared from LGED data

Figure 2: Organization Chart of LGED
(simplified for the purpose of its relevance to the project)

3.5.2 Technical Aspects of Operation and Maintenance

LGED offers regular training courses on road maintenance at the RDEC to its engineers at the Headquarters and local offices. In the fiscal year 2008/09, 110 engineers attended a 5-day course entitled "Training on Road Maintenance Management (RMM)." In addition, middle management engineers are dispatched overseas for training, and a variety of training and education programs covering maintenance and other related topics are offered as part of various projects promoted by donor organizations for the benefit of not only LGED officials but also local residents and other related parties concerned. During the 2008/09 fiscal year, a total of 330 training courses were offered by LGED, which were attended by more than 440,000 people around the country.

Pursuant to the Road Asset Management System (RAMS), LGED has established procedures to identify the maintenance needs through surveys of road and traffic

conditions, and to determine the annual priority order of the maintenance work to be done, based on the survey findings. A database has been developed for this purpose called the "Road and Structure Database Management System (RSDMS)."

LGED sees no technical problems with regard to routine maintenance and the on-site survey found no technical problems, either. The technical training is also focused on the capacity building of engineers, as is detailed in the article in the box on the next page.

3.5.3 Financial Aspects of Operation and Maintenance

LGED's road maintenance budget has gradually risen during the 2000s, with a considerable jump in fiscal 2004/05. This was due to the Japan Debt Cancellation Fund (JDCF) out of which an amount of 1.2 billion taka began to be directed to road maintenance. While the maintenance budget of LGED is on the increase, it is less than the required amount[5], failing to meet the increasing demand for maintenance, as is illustrated in Table 7. Moreover, the shortfall is gradually becoming greater.

Table 7: Trend in the Maintenance Budget (LGED total)

(Unit: Million Taka)

Fiscal year (July-June)	Maintenance budget	Required maintenance costs		
		Repairs	Maintenance	Total
2001/02	1,250	No records	3,268	-
2002/03	1,650		3,701	-
2003/04	2,000		3,736	-
2004/05	3,800		5,124	-
2005/06	4,000	4,802	5,546	10,348
2006/07	4,315	5,914	6,961	12,875
2007/08	4,900	7,045	8,273	15,318
2008/09	4,900	8,343	9,778	18,121
2009/10	5,085	9,830	11,501	21,331

Source: Prepared from LGED data

[5] Based on estimates in the Rural Road Master Plan; estimated by assuming the annual inflation rate of 10%

Rural Development Engineering Center Setting-up Project
(JICA Technical Cooperation Project)

Outline/Objectives

The RDEC is the training facility of the LGED that was constructed as a part of the project with the objective of enhancing the technical capacity of the LGED. Following the completion of its construction, a JICA technical cooperation project entitled "Rural Development Engineering Center (RDEC) Setting-up Project" is being implemented as a related project. The RDEC Setting-up Project is promoted in two phases and the following outcomes were achieved during Phase I that extended between 2003 and 2006 (excerpts from the PDM with some additions):

- *The technical knowledge and expertise that the LGED has acquired through previously-implemented projects came to be accumulated in the RDEC and was made ready for common sharing within the LGED.*
- *Information management on technical standards and application methods for rural infrastructure improvements has been improved.*
- *For the full performance of RDEC's functions, traditional training systems have been improved including reinforcement of the insufficient basic technologies and techniques.*
- *The above outcomes are to be used as the basis for the development of future operational plans for the RDEC (Step-up Plan).*

As of this writing, Phase II has been underway since 2007 with a planned duration through 2011 for the purpose of assisting implementation of the Step-up Plan that was formulated during Phase I. The capacity enhancement of engineers is pursued through technical cooperation focused on the planning, design, quality control and maintenance of Geographical Information Systems (GIS) related to the management of project cycles for rural infrastructure improvements.

Photo 4: RDEC, built under the Project

Survey results

In this ex-post evaluation, a questionnaire survey[6] was conducted for the main purpose of confirming that, through the technical cooperation project that had been implemented at the RDEC built as a part of the project under evaluation, the major beneficiary (LGED engineers) had indeed acquired knowledge and techniques and were applying them in their daily work.

Of the trainees on road maintenance and management surveyed, 97% responded that the course was either "very useful" or "useful." All respondents acknowledged that the training deepened their professional knowledge. Asked if the knowledge had been actually applied in their routine activities, 60% responded "fully" and another 39% "partly." It can be concluded that the trainees are generally highly satisfied with the course and are applying the acquired knowledge to the actual work. The courses given at the RDEC were found to be satisfactory by 89% of the respondents and all agreed that the Center was functioning as the nucleus of the LGED's technical capacity enhancement.

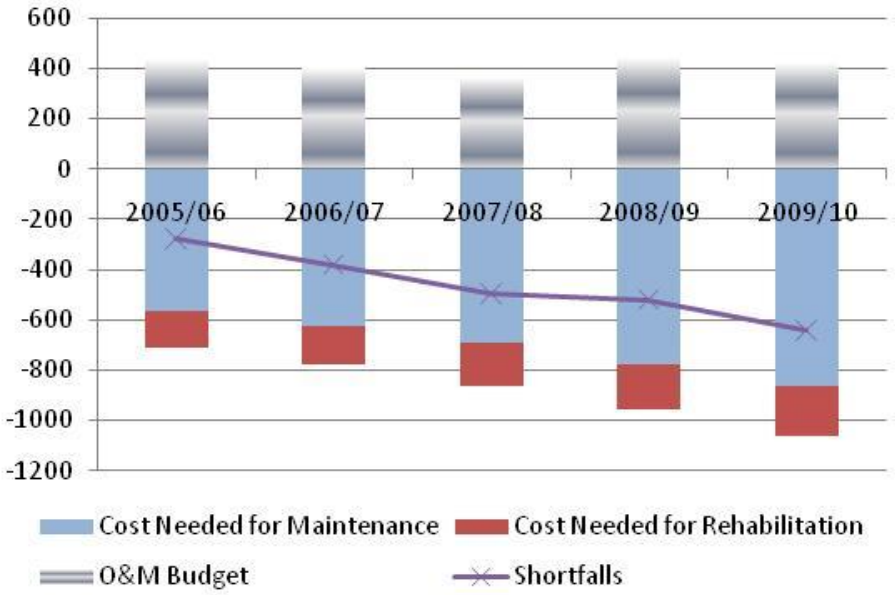
[6] The questionnaire survey was conducted to LGED engineers who attended maintenance and management training courses at the RDEC sometime between 2005 and 2010. There were 108 effective respondents, consisting of 38 Upazila Engineers, 37 Senior Assistant Engineers and 33 Assistant Engineers who report to the Upazila Engineers.

Meanwhile, the frontline engineer respondents considered that the maintenance budget is generally insufficient and felt that one of the challenges was how to apply the knowledge and techniques more often to the actual work.

Relevance to the project

The RDEC was constructed as part of the project, and a technical cooperation project is subsequently ongoing as a related project, using the Center as the site of program development. Thus, a firm base for training was established on which numerous programs are being executed. As a result, the capacity for rural infrastructure improvements and maintenance has been solidly enhanced. It is fair to say that this integrated strategy of Center construction and the setting up of a training system built into the counterpart's organization has been quite effective in enhancing the long-term maintenance capacity. The integrated combination of an ODA loan project and a technical cooperation project as in this case is feasible and effective if the counterpart has a high level of ownership and is well-organized and disciplined like the LGED.

(Unit: Million Taka)



Source: Prepared from LGED data

Figure 3 Trends in the Maintenance Budget and Required Costs for the Five Districts Covered by the Project

About one-tenth of LGED's total maintenance budget, or 400 million Taka, is allocated to the five districts covered by the project (See Fig.3). Since road conditions in the area have been more or less improved by the project, the allotted share of the total LGED budget is declining. As in other areas of the country, the increase in the budget allocated to the five districts falls short of the increases in the required maintenance costs.

The allocation from the Japan Debt Cancellation Fund (JDCF) is valid only for a period of ten years. Accordingly, a major challenge is to secure a stable source of a sufficiently

large maintenance budget. The Bangladesh government looked into various options including the creation of a road maintenance fund and the introduction of an performance-based maintenance program. But there were doubts about their feasibility and no measures have been materialized. Even though no concrete prospects with regard to post-JDCF funding crediting are yet in sight, there is reportedly an increasing awareness in the government on the importance of road maintenance. However, no specific policies have been determined, and it is not clear how effectively the increasing maintenance needs will be addressed.

3.5.4 Current Status of Operation and Maintenance

Operation and maintenance of the road involve all the LGED officials who are working at the Headquarters, District Offices or Upazila Offices. The operation is planned and scheduled according to the results of road condition studies and maintenance cost estimates.

Because the roads, bridges and culverts were constructed relatively recently, they are generally well-maintained although insufficient maintenance work (surface repairs and the like) was detected at a few locations. As mentioned earlier, the road shoulders are constantly maintained by the groups of low-income female workers who were organized for the purpose. Their work helps protect the slopes and prevent flood damage.

Since 2006, LGED uses an internationally-accepted indicator for road roughness, the International Roughness Index (IRI) to measure and record the road conditions. The segments of road that were developed and improved by the project were generally in good condition upon project completion. Some sections that have suffered subsequent damage were reportedly repaired by the LGED in the 2009/10 fiscal year.

Table 8: Trend in the International Roughness Index (IRI)

District	Road Section	2006 (Completion)	2007	2009	Post-project repair (FY2009/10)
Jamalpur	Bakshiganj – Jabbergonj	7.30	6.80	10.30	Yes
Sherpur	Nakla – Tarakanda – Nalitabari	5.00	6.00	9.00	Yes
Mymensingh	Nandail – Bakchanda	5.30	5.20	5.28	Yes
	Shambugonj – Ambikagonji	6.90	5.00	6.60	No
Netrokona	Kalmakanda – Nazipur	6.00	-	5.90	Yes
Kishoreganj	Karimganj – Gundhar	4.70	5.10	7.60	Yes

Note: The LGED rates the IRI; below 6 as “Good”, 6-8 as “Fair”, 8-10 as “Slightly poor” and over 10 as “Poor.”

Source: LGED data

Machinery and equipment for monitoring and maintenance are reported to be not suffering from a shortage of funds, causing no inconvenience in routine work. Patrolling services by the LGED engineers is rendered frequently even though on an irregular basis, and the local residents living along the roads are fully aware of their services.

Some problems have been observed in terms of financial aspects; therefore sustainability of the project is fair.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

Rural development has constantly been a priority national goal in Bangladesh, a country characterized by a high farm population ratio. The project, which has contributed to the development of the rural road infrastructure, has very high relevance. Reflecting the high project execution capacity of the LGED, the project was in effect completed by the planned date and the effective project costs were kept within the budget. In terms of effectiveness, the traffic increased, the average speed of travel went up, and transportation costs were saved. Furthermore, access to commercial activities along the road and to social services has been ameliorated. The project can be said to have fully achieved its objectives. No problems exist over the structural and technical aspects of the LGED. There is, however, one concern over the availability of a sufficient budget for future operation and maintenance, as the difference between the available budget and the required maintenance costs continues to widen.

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

4.2 Recommendations

4.2.1 Recommendations to the Executing Agency

Securing of maintenance budget and cost reductions

Road maintenance is expected to be increasingly important in the years ahead. It is recommended that a sufficient budget be secured for this purpose and that the possibilities for contracting some of the pavement repair work to private companies be explored depending on the size of the work required, with a view to reducing maintenance costs. Such contracting might contribute to nurturing local industries in this area.

4.2.2 Recommendations to JICA

In the face of the rising financial needs for maintenance, Japan has cooperated mainly

through the JDCF in recent years. It is felt important that Japan together with ADB and other donor organizations encourages the Bangladesh government to put a stronger focus on more fundamental solutions for road repair and maintenance.

4.3 Lessons Learned

(1) Organizing Women's Groups

The scheme of road maintenance operations through the organization of the groups of local low-income female workers who otherwise have few opportunities to earn cash income is judged to be an effective tool for rural infrastructure improvements in Bangladesh. In fact, similar moves to organize groups are proceeding in other parts of the country. A major reason for the success is believed to be the active involvement of LGED in assigning engineers even to the Upazila level and extending direct guidance to the farmers in the road maintenance work. This road maintenance scheme may well be replicable and applicable to similar projects in other countries as a model for rural road maintenance.

(2) Coordination of Yen Loan and Technical Cooperation Projects

The combination of the loan project and the ensuing technical cooperation project was a major characteristic of this project, and there was a clear synergy that was triggered by the project. The construction of the RDEC in this project represented the establishment of a permanent and well-equipped training facility and the possibility of executing a multi-year technical cooperation projects that are oriented towards technical capacity enhancement and the in-house development of training programs for LGED officials. The capacity development efforts for all classes of LGED engineers, backed by sustained training programs, lead to the extension of the road improvement and maintenance technologies and techniques to many other projects. One reason for the success was the strong commitment and active participation of the LGED Chief Engineer and his associates who led the LGED efforts to enhance the organization's overall capacity as a responsible project leader of the loan project and a counterpart of a technical cooperation project.

In this project, the training facility was constructed as a part of the loan project, and it is fully utilized to enhance the capacity of counterpart officials through the execution of a following technical cooperation project. It is worth noting for the future consideration of similar projects that this project has been characterized by the strong ownership of the executing agency and the organic coordination of facilities construction and technical cooperation with a view to realizing overall project effectiveness between the two projects.

Original/Actual Comparison of Major Project Parameters

Item	Original	Actual
(1) Outputs	Development of Road Network Feeder Road B: 652 km Bridges and Culverts: 2,340 m	Development of Road Network Feeder Road B: 617 km Bridges and Culverts: 3,664 m
	Establishment of Rural Development Engineering Center Construction of Center (6 stories) Procurement of Equipment Consulting Services	Establishment of Rural Development Engineering Center Construction of Center (15 stories) Procurement of Equipment Consulting Services
	Emergency Flood Protection (Rehabilitation of Roads, etc.) [1998 Flood] Road: 160 km Bridges and Culverts: 650 m	Emergency Flood Protection (Rehabilitation of Roads, etc.) [1998 Flood] Road: 117 km Bridges and Culverts: 648 m [2004 Flood] Road: 142 km Bridges and Culverts: 174 m
(2) Period	July 1999 – December 2005 (78 months)	July 1999 – March 2006 (81 months)
(3) Project Cost Amount paid in foreign currency	141 million yen	0 million yen
Amount paid in local currency	6,452 million yen (2,491 million Taka)	6,304 million yen (3,150 million Taka)
Total (JICA's portion out of the total co-financed amount)	6,593 million yen	6,304 million yen
Exchange Rate	1 Taka = 2.59 yen (As of November 1998)	1 Taka = 2.00 yen (July 1999 – March 2006)