Republic of Paraguay

Ex-Post Evaluation of Japanese ODA Loan

Road Improvement Project (II)

External Evaluator: Takeshi Yoshida
Global Group 21 Japan, Inc.

0. Summary

This Project (hereinafter referred to as "the Project") was implemented for the purpose of developing a road transport network capable of accommodating (i) the strong distribution demand for agricultural and livestock products produced by key industries in Paraguay and (ii) the increased transportation demand with the launch of the MERCOSUR[1], etc. by means of improving national and local roads which are the major arterial roads of the country, and thereby contributing to a sustainable development of national economy. The purpose of the Project was consistent not only with the development policies and needs of Paraguay but also with the ODA policy of Japan. As such, the relevance of the Project is high. The target road sections for improvement under the Project now see a traffic volume which is 1.4 times of that originally anticipated at the time of project planning and the travelling time on all roads has been shortened. In the case of the export of grains as one of Paraguay's major export items, the share of river transportation has increased in recent years and the Project is believed to have contributed to the promotion of river transportation through improved road access to river ports. Meanwhile, the smoother physical distribution and passenger transportation in general as a result of the Project has contributed to local development and improved access to social services. As such, the effectiveness of the Project is judged to be high. The implementation of additional work achieved more improvement of roads and bridges than originally planned. While the project cost was mostly as planned, the project period significantly exceeded the original plan, therefore the efficient of the Project is fair. No major problems are observed in regard to the institutional, technical and financial capacity for road maintenance, and the maintenance conditions of the target roads of the Project are reasonably good. Therefore, the sustainability of the Project is judged to be high. Based on the above findings, the Project is evaluated to be highly satisfactory.

[1] MERCOSUR is a common market created by the Treaty of Asuncion agreed among Argentina, Brazil, Paraguay and Uruguay in March 1991 in order to promote free trade and the fluid movement of capital, goods, services, and labor force in the area.

1. Project Description

Project Locations

Road Section 1 (Paraguari-Tebicuary)

1.1 Background

Agriculture and stock raising are the key industries in Paraguay. On the other hand, land transportation was playing a crucial role in the transportation sector. Around 1990, road transportation accounted for 90% of cargo transportation and 99% of passenger transportation, illustrating the extreme importance of road transportation. The east central area consisting of Asuncion, the capital of Paraguay, and 10 surrounding districts is an important economic area with a heavy concentration of population and is located at the heart of the network for physical distribution by land which was expected to gain development momentum with the launch of the MERCOSUR. Road improvement was considered to be an important means of development. The reality at the time was that the transportation of agricultural and livestock products was severely hampered by the lack of proper road maintenance and by the very low paved road ratio of less than 5% nationwide and 12% for trunk roads.

To improve the situation, the Government of Paraguay implemented the Road Improvement Project (I) (Japanese ODA Loan) in 1990 and the Master Plan Study for Transport System Development and Improvement in 1992 with the assistance of the Government of Japan. In 1997, JICA commissioned the Study for the Planning of Trunk Road Improvement in the East Central Area to determine the feasibility of a road improvement project in the area concerned while the Ministry of Public Works and Communications (MOPC) of Paraguay conducted a Feasibility Study (F/S) on the overlay of trunk roads nationwide. Based on the findings of these studies, a loan agreement for the Road Improvement Project (II) (target project of the present ex-post evaluation) was signed.

1.2 Project Outline

The objective of the Project is to develop a road transportation network capable of meeting the demand for the physical distribution of agricultural and livestock products, which are products of the

key domestic industries, and the increased transportation demand resulting from the launch of the MERCOSUR by means of improving the national as well as local trunk roads, thereby contributing to the sustainable economic development of Paraguay.

Loan Approved Amount/ Loan Disbursed Amount	¥19,428 million/ ¥18,522 million
Exchange of Notes Date/ Loan Agreement Signing Date	December, 1997/ August, 1998
Terms and Conditions	Interest Rate: 2.7% (2.3% for the Consulting Portion) Repayment Period: 25 years (Grace Period: 7 years) Procurement: General untied
Borrower/Executing Agency	Republic of Paraguay/Ministry of Public Works and Communications
Final Disbursement Date	October, 2010
Main Contractors	・Tecnoedil S.A. Constructora(Paraguay)/Compania de Construcciones Civiles S.A.(Paraguay)/Benito Roggio e Hijos S.A.(Paraguay)/Talavera Ortellado Construcciones S.R.L.(Paraguay) ・E.D.B.Construcciones(Paraguay)/EDB Construcciones S.R.L.(Paraguay)/Concretmix S.A.(Paraguay) ・Tecnoedil S.A. Constructora(Paraguay)/Benito Roggio e Hijos S.A.(Paraguay)/Talavera Ortellado Construcciones S.R.L.(Paraguay) ・CDD Construcciones S.A.(Paraguay) ・Konoike Construction Co.Ltd. (Japan)/Tecnoedil S.A. Constructora(Paraguay)/Benito Roggio e Hijos S.A.(Paraguay)/Talavera Ortellado Construcciones S.R.L.(Paraguay) ・Giagui Terraplenagem e Pavimentacao(Brazil)/Emparsanco S.A.(Brazil)/Compania de Construcciones Civiles S.A.(Paraguay)/Ingenieria Isacio Vallejos(Paraguay)/M&T Construcciones S.R.L.(Paraguay) ・Giagui Terraplenagem e Pavimentacao(Brazil)/Emparsanco S.A.(Brazil)/Ingenieria Isacio Vallejos(Paraguay)/M&T Construcciones S.R.L.(Paraguay)
Main Consultant	Central Consultant Inc. (Japan)
Feasibility Studies, etc.	Study for the Project for Trunk Road Improvement in East Central Area
Related Projects	Road Improvement Project (I) (L/A in 1990)

2. Outline of the Evaluation Study

2.1 External Evaluator

Takeshi Yoshida (Global Group 21 Japan, Inc.)

2.2 Duration of Evaluation Study

The ex-post evaluation study for the Project was conducted over the following period.

Study Period : September, 2012 to July, 2013

Field Survey : 31 October to 24 November, 2012; 20 to 22 May, 2013

3. Results of the Evaluation (Overall Rating: A[2])

3.1 Relevance (Rating: ③[3])

3.1.1 Relevance to the Development Plan of Paraguay

In Socioeconomic Development Plan for 1995 through 1998, the Government of Paraguay adopted the development of economic infrastructure as one of its goals for the purpose of promoting agriculture, which is a key industry, and related industries and also promoting exports as it was fully aware of the potential impact of the MERCOSUR and other development prospects. Particular emphasis was placed on the development of the road network as a key component of the economic infrastructure in view of the efficient and reliable transportation of various products.

The Strategic Socioeconomic Plan for 2008 through 2013 sets forth eight development policies, including the promotion of infrastructure development. In accordance with this plan, the MOPC has identified such goals as the implementation of routine road maintenance by small enterprises, improvement of the operational efficiency of the organizations concerned, participation of both the public and private sectors in road management and improvement of road safety in addition to improvement of the road infrastructure.

In this manner, road improvement has always been a priority issue for Paraguay's development policy throughout the period from ex-ante to ex-post evaluation.

3.1.2 Relevance to the Development Needs of Paraguay

As already described in 1.1 – Background, the smooth distribution of primarily agricultural and livestock products through the improvement of trunk roads was an important challenge at the time of appraisal.

In subsequent years, the significantly increased production volume of grains, a major export item, has meant a considerable increase of the demand for physical distribution.[4] On the other hand, the role of rivers as means for the transportation of goods for export as well as imported goods has grown to account for 60% of export-related transportation and 50% of import-related transportation, while the transportation to the river ports almost relies on roads. Accordingly, the comparative shares of land transportation for exports and imports have declined while the domestic transportation volume by

[2] A: Highly satisfactory, B: Satisfactory, C:Partially satisfactory, D: Unsatisfactory
[3] ③: High , ② Fair ,①: Low
[4] The production volume of soybeans and wheat in Paraguay increased by 2.5 times and 6.1 times respectively between 2000 and 2010.

trucks has actually increased because of the massive increase of the production volume of grains. As a result, there is still a strong need for road improvement.

3.1.3 Relevance to Japan's ODA Policy

At the second consultation meeting between Japan and Paraguay in July, 1992, an agreement was reached that the important areas for Japan's ODA were the promotion of agriculture, development of economic infrastructure, development of the social sector and environmental conservation among others. The Project not only fell in the category of the development of economic infrastructure but was also relevant to the promotion of agriculture.

Based on the above observation, the Project has been highly relevant with the country's development plan, development needs, as well as Japan's ODA policy, therefore its relevance is high.

3.2 Effectiveness[5] (Rating: ③)

3.2.1 Quantitative Effects (Operation and Effect Indicators)

At the time of appraisal neither indicators nor their target values to measure effectiveness were specified. In the present ex-post evaluation, effectiveness of the Project is analysed based on i) increase in traffic volume obtained by comparing the projection in F/S and the results of traffic survey for each road section, and ii) increased in travel speed in the road improvement sections.

(1) Increased Traffic Volume

Comparison between the pre-project traffic volume and the forecast based on F/S (in 1997) conducted by the JICA and MOPC and the traffic volume at the time of the ex-post evaluation shows that the current traffic volume exceeds the forecast at five road sections out of seven road sections included in the Project.[6] The average traffic volume for the seven road sections has increased by 3.3 times between 1997 and 2012 which is 1.4 times the forecast[7]. As shown in Table 2, trucks account for some 20% of the overall traffic volume.

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

[6] Improvement, overlay and widening of bridges were implemented at seven road sections by the Project according to the original plan. Moreover, overlay and bridge improvement were made at three additional sections, which are located at the same routes of the original seven sections. As part of the ex-post evaluation, a questionnaire survey on origin-destination, loaded goods, etc. was conducted with 5,849 drivers along with a 12 hour long traffic volume survey at the seven road sections included in the Project at the time of appraisal.

[7] According to MOPC, it is believed that the less-than-projected traffic volume in 2012 at the Section No. 3 was due to a decrease of timber export to Brazil which was using this section.

Truck for Sugar Cane (Road Section 2)

Track for Grains (Road Section 4)

Table 1 Changes of the Actual Daily Traffic Volume in Each Road Section and Comparison with the Forecast

(Vehicles/day)

Road Section		Before the Project (1997)	Actual (2012)	Forecast (2012)	Actual/ Forecast
1	Paraguari-Villarica	412	3,676	3,205	115%
2	La Colmena -Tecuary	60	2,344	737	318%
3	Yby Yau-P.J.Caballero	1,433	2,024	2,735	74%
4	Bell Vista Sur-Km148	1,472	3,599	2,825	127%
5	S.J.Bautista-Encarnacion	1,272	4,603	2,584	178%
6	Cnl.Oviedo-S. Estanislao	2,133	3,916	4,235	92%
7	Rotonda-Km 71	3,340	13,171	7,106	185%
Average		1,446	4,762	3,347	142%

Source: Feasibility study by the JICA and MOPC; traffic survey as part of the ex-post evaluation

Table 2 Traffic Volume Share by Type of Vehicle

Road Section		Passenger Car	Bus	Truck
1	Paraguari-Villarica	86%	3%	11%
2	La Colmena -Tecuary	80%	2%	18%
3	Yby Yau-P.J.Caballero	78%	5%	18%
4	Bell Vista Sur-Km148	68%	4%	27%
5	S.J.Bautista-Encarnacion	72%	2%	26%
6	Cnl.Oviedo-S. Estanislao	76%	2%	22%
7	Rotonda-Km 71	76%	2%	22%
Average		76%	3%	21%

Source: The traffic survey as part of the ex-post evaluation

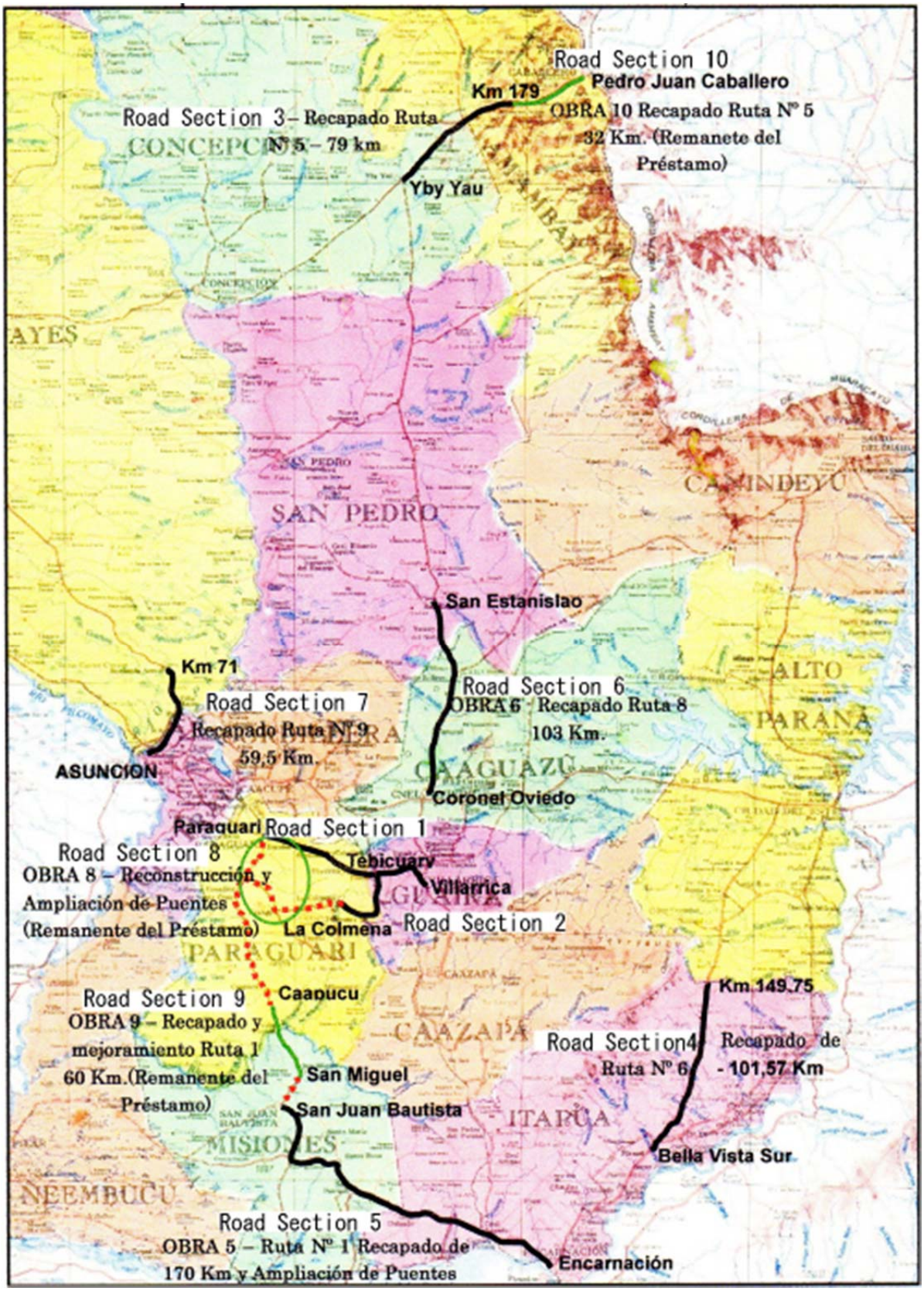

Figure 1 Road Sections of the Road Improvement Project (II)

(2) Shortening of the Travelling Time

According to local people living along the target road sections, the travelling time has become much shorter in Road Sections 1 and 2 where the improvement work was conducted.[8] For example, the travelling time between Paraguari and Caballero (section between Paraguari and Tebicuari) in Road Section 1 has been shortened from one and a half hours prior to the project to 30 minutes. While this section used to be impassable at the time of rain, it is passable in all weather conditions since the implementation of the Project. Meanwhile, the travelling time between La Colmera and Villarrica in Road Section 2 is now only one hour compared to three to four hours before the Project.

3.2.2 Qualitative Effects

The findings of an interview survey and transport survey indicate the following road usage situation by road sections.

Road Section 1: This is a local trunk road connecting Villarrica, the departmental capital, with Route 1 stretching to Asuncion. It is used for the shipment of vegetables to Asuncion and the delivery of soybeans to Port Villeta (the Paraguay River). It provides a detour for Route 2 which is congested and subject to strict weight regulations.

Road Section 2: This is a local trunk road connecting Villarrica, the departmental capital, with La Colmera which is a Japanese settlement area and is popular for the transportation of agricultural products.

Road Sections 3 and 10: These lots have a high ratio of truck transportation involving construction materials and consumer goods, contributing to the border trade with Brazil (Route 5).

Road Section 4: This lot has a high ratio of truck transportation. As a trunk road for the transportation of such agricultural products as soybeans and grains, it is used to transport these products to a port on the Paraná River (Route 6).

Road Sections 5, 8 and 9: These lots also have a high ratio of truck transportation as they are part of Route 1 connecting Asuncion with Encarnacion, the third largest city in Paraguay. As areas along Route 1 are popular stock raising areas, they are used for the transportation of livestock products.

[8] As part of the ex-post evaluation, workshops involving local people living along the target road sections under the Project were held eight times in addition to interview surveys with eight local governments, 10 bus companies and 10 transport agencies.

Road Section 6: This is the only national route (Route 8) running north-south in Paraguay and is used for multiple purposes.

Road Section 7: This lot has a high ratio of truck transportation involving construction materials, consumer goods and livestock products as it is the only trunk road (Route 9) linking western Paraguay (Chaco Region) with Asuncion.

Commercial and industrial facilities such as distribution warehouses, repair workshops, etc. along the service roads (Road Section 10)

Evaluation workshop with the residents along the road (Road Section 2)

3.3 Impacts

3.3.1 Intended Impacts

From 2000 to 2012, both imports and exports have recorded an increasing trend with an increase of the export volume in particular. This is probably because of the increasing international demand for grains which constitute a leading export item for Paraguay. During this period, the trade volume with MERCOSUR countries (Argentina, Brazil, Uruguay and Venezuela) grew by nearly 50% even though its share in Paraguay's global trade volume declined as shown in Table 3.

Table 3 Import and Export Volumes of Paraguay

(Unit: tons)

	2000		2012	
	Global	MERCOSUR	Global	MERCOSUR
Imports	2,633	2,112 (80%)	5,655	3,449 (61%)
Exports	3,413	2,481 (73%)	9,724	3,499 (36%)
Total	6,146	4,596 (75%)	15,379	6,948 (42%)

Source: Central Bank of Paraguay

According to data of the Central Bank of Paraguay, river transportation is used for 95% of exported soybeans as of 2010.[9] The Paraguay River and the Parana River account for 71% and 24% of soybean exports respectively, indicating the dominant position of the Paraguay River for the export of soybeans from Paraguay. In 2004, the corresponding figures were 35% for the Paraguay River and 37% for the Parana River. The growing prominence of the Paraguay River is presumably attributable to the improved road access to export ports on the Paraguay River. The work in Road Sections 1, 2, 4, 5 and 8 under the Project has contributed to improving the access to ports on the Paraguay River.

3.3.2 Other Impacts

An interview survey with local residents, local public authorities and transport companies found the following impacts along the routes of the target roads of the Project.

- In areas near Road Sections 1 and 2, vegetable cultivation has increased due to the improved logistics to reach urban areas. The production of soybeans has also increased. The impacts are particularly strong in Japanese settlements at La Colmena and access to schools and hospitals has much improved in addition to an increase of the processing of agricultural products.

- In Road Section 4, there has been much impact on Japanese settlers in Pirapo, including the increased shipment of agricultural products and better access to schools and hospitals in Encarnacion, the department capital.

- The area around Road Section 7 which was subject to road widening has seen rapid development with the advance of large commercial facilities and distribution facilities, exploiting the area's proximity to Asuncion, the capital. In addition to the three-time increase of the through traffic, the volume of shopping traffic and physical distribution traffic to and from commercial facilities has much increased.

- The areas near Colonel Oviedo in Road Section 6 and Pedro Juan Caballero in Road Section 10 have seen asphalt overlay as well as the introduction of local service roads on both sides of the trunk road, improving the convenience for local traffic. As a result, many new stores and factories are located in these areas, contributing to local development. Moreover, land prices have increased to boost the tax revenue of the relevant municipalities.

As for the Road Sections 1 and 2 that included some widening and new construction, the construction works were conducted after obtaining environmental licence and permission from the Environmental

[9] Based on data quoted in the Preparatory Survey on the Eastern Region Export Corridor Improvement Project in the Republic of Paraguay (JICA, 2011)

Department. Environmental monitoring, river protection works as well as tree plantations were implemented as well. For the two sections, land acquisition was made in line with the provisions of domestic law and some 370 households were compensated[10]. No serious environmental impact has been reported and neither land acquisition nor resettlement were made in other road sections where overlay and/or bridge improvement were made on existing roads.

As a result of the Project, the traffic volume is double the original forecast and the travelling time has been much shortened. Apart from its contribution to the promotion of agriculture, the Project has contributed to local development and improved access to social services by means of making physical distribution and passenger transportation in general much smoother. Based on such observation results confirming the manifestation of positive effects of the Project, the effectiveness of the Project is judged to be high.

3.4 Efficiency (Rating: ②)

3.4.1 Project Outputs

The planned and actual outputs of the Project are shown in Table 4. Following the redesign of the Project based on the findings of the detailed design study, the total length of the subject road sections and numbers of target bridges were revised. At the time of appraisal, the Project involved seven work lots. Three more work lots (Road Sections 8 – 10) were subsequently added, mainly because of the fall of the unit construction cost due to the fluctuation of exchange rate. All of the additional work lots were either on the original list of candidate sections compiled at the time of appraisal or an extension of a selected route (originally selected work lot). They included sections which had been omitted at the time of appraisal (in 1997) but for which overlay became necessary with the passing of time and bridges of which the construction, rehabilitation or improvement was considered to be necessary.[11]

[10] No information was obtained from MOPC on relocation nor concrete number of the households compensated.
[11] The decisions on the additional work lots were taken in 2006 and 2007.

Table 4 Planned and Actual Project Outputs

Road Section (Work Lot)		Route	Road Section	Planned	Actual
Improvement of Unpaved Road	1	Local	Paraguarí-Tebicuary	58.50 km	56.25 km
	2	Local	Tebicuary-Villarrica	24.50 km	25.00 km
		Local	La Colmena-Tebicuary	38.10 km	36.20 km
Overlay	3	Route 5	Yby Yau-P. J. Caballero Km.179	70.00 km	70.00 km
Overlay	4	Route 6	Bella Vista Sur-Km. 148	106.00 km	101.57 km
Overlay	5	Route 1	S J. Bautista Mnes.-Encarnación	170.00 km	170.00 km
Widening of Bridge	5	Route 1 Local	Paraguari-S. J. Bautista-Encarnacion Carapeguá-Acahay-La Colmena	Widening of 83 bridges	Widening of 177 bridges
Overlay	6	Route 8	Cnel. Oviedo-San Estanislao	100.00 km	103.00 km
Overlay	7	Route 9	Rotonda-Km.71	50.00 km	59.50 km
Bridge	8	Route 1 Local	Paraguari-S. J. Bautista Carapeguá- Acahay-La Colmena	(not included in the original plan)	New: 1 Rebuilding: 5 Widening: 3 Repair: 4
Overlay	9	Route 1	Caapucu-S. J. Bautista		55.0 km
Overlay	10	Route 5	Km. 179-P. J. Caballero		32.0 km
Total				617.10 km 83 bridges	708.52 km 190 bridges

Source: Reference materials at the time of appraisal and those provided by the PCR.

3.4.2 Project Inputs

3.4.2.1 Project Cost

The total project cost was ¥26,425 million which was 102% of the originally planned cost of ¥25,904 million. The actual amount of Japanese ODA loan disbursed was ¥18,480 million which was 95% of the planned loan amount of ¥19,428 million. Although the actual project cost slightly exceeded the planned cost, the efficiency of the Project is judged to be high because of the more than planned outputs, in turn resulting from the additional work[12].

Table 5 Project Cost (Original and Actual)

(Unit: ¥ million)

Item	Original			Actual		
	JICA	Paraguay	Total	JICA	Paraguay	Total
Civil Engineering	15,724	3,502	19,226	15,037	5,318	20,355
Consulting Service	2,132	-	2,132	3,466	464	3,930
Contingency	1,572	351	1,932	0	0	0
Land Acquisition Cost	-	268	268	0	82	82
Taxes	-	2,355	2,355	0	2,081	2,081
Services	0	(4,845)	(4,845)	19	0	19
Grand Total	19,428	6,476	25,904	18,522	7,945	26,467

Source: Prepared by the evaluator using the reference materials at the time of appraisal and other reference materials provided by JICA

Foreign exchange rates:

(At the time of appraisal) 1 US$ = 2,128 Gs.= ¥118

(Actual) 1 US$ = 5,398Gs.= ¥112 (weighted average for the project period)

[12] Total cost excluding the additional works was 95% (24,686 million Yen) of the total planned cost.

3.4.2.2 Project Period

The Project was originally planned to be implemented in 64 months from August, 1998 to December, 2003. In reality, 158 months from August, 1998 to October, 2011 were required to complete the Project. The actual project period was 247% of the original plan and the efficiency in terms of the project period is judged to be low even if the increased outputs are taken into consideration.

The main reasons for the initial delay of the Project implementation were the slow progress of land acquisition for the planned road widening sections and the delay of the construction work due to persistent rain caused by El Nino, etc. Additional factors for the delay were the delays of the selection process for the consultancy service provider and contractor, stagnation and confusion surrounding the execution of various procedures due to two changes of the government and subsequent replacement of the minister and difficulty of securing the construction materials.

The slow progress of land acquisition in particular was the largest factor which adversely affected the implementation of the Project. While the land expropriation work was implemented in accordance with the Public Procurement Act in Paraguay, the complexity of the procedure set forth by the Act and the ambiguity surrounding land ownership or absence of a title document in the case of most of the households involved made ascertaining land ownership, determination of the compensation amount and commencement of the work a lengthy process.[13]

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

According to the feasibility study featuring Road Sections 1 and 2 where road improvement work was conducted, the average Economic Internal Rate of Return (EIRR) for these two sections was estimated to be 25.6%. In the ex-post evaluation, the EIRR was recalculated for Road Sections 1, 3, 4, 6 and 7 based on the following assumptions.[14] The recalculation results show generally high EIRR values as shown in Table 6, indicating that the target roads of the Project offer a sufficiently high EIRR in general.

- Project life : 20 years
- Benefit : Reduction of the vehicle operation cost after the completion of the Project
- Cost : Road repair and maintenance cost

[13] Having learned from such experiences, road improvement/construction projects in Paraguay in recent years legislate a specific land acquisition and compensation procedure for each project as a measure to substantially shorten the period required to complete the procedure and period required to reach the stage of work commencement.

[14] Recalculation was not conducted for other road sections because different types of works have been conducted in a same road section and vital information was not obtained for cost-benefit calculation.

Table 6 EIRR Recalculation Results

Road Section	EIRR
1	34%
3	35%
4	30%
6	30%
7	46%

Source: Prepared by the evaluator using the results of the traffic survey conducted as part of the ex-post evaluation and materials provided by the executing agency.

While the total project cost was almost as planned, the project period significantly exceeded the original plan, therefore the overall efficiency of the project is fair.

3.5 Sustainability (Rating:③)

3.5.1 Institutional Aspects of Operation and Maintenance

Road maintenance in Paraguay is the responsibility of the Directorate General of Roads under the Deputy Minister of Public Works and Communication of the MOPC. The maintenance of national routes is mainly conducted through long-term contracts under Gestión y Mantenimiento por Niveles de Servicio (hereinafter referred to as "GMANS"); Operation and Maintenance by Service Levels, and the actual maintenance work is conducted by contractors under the supervision of the Directorate General of Roads. Operation and maintenance by GMANS contract was introduced in 2006 utilizing a loan project by the World Bank[15]. Funding by the Inter-American Development Bank (IDB) is also utilized. Local roads and some national routes which are not included in GMANS contracts are directly maintained by the Road Maintenance Department and local offices of the Directorate General of Roads.

Of the road sections of the project, Road Sections 3, 4, 6, 10 and the national route section of Road Section 8 are maintained by the GMANS contracts while local) road sections, i.e. Road Sections 5, 7 and part of 8, are directly maintained by the MOPC. In the case of Road Sections 1 and 2, as they were still in the defect liability period, they were maintained by the contractor. Even though these sections have not yet been upgraded to national road status, they are scheduled to become targets for the GMANS contract in the future.

[15] National routes totalling some 2,000 km nationwide are covered by seven GMANS contracts. Each contract lasts for five years with the first year focusing on rehabilitation and the remaining years dealing with the repair and maintenance needs. GMANS contracts set forth the standards for the paved road surface conditions and other relevant aspects of roads and the Director General of Roads regularly checks the state of attainment of the required standards. Of the seven contracts, four began with World Bank loans and three with IDB loans. While planning to rely on foreign loans to continue GMANS contracts, the MOPC has begun its search for alternative funding sources to enable road maintenance work with its own funds in the future.

As the overloading of trucks is a major cause of road damage, 13 weigh stations are located nationwide along national routes. These weigh stations are controlled by the Deputy Minister for Finance of the MOPC.

3.5.2 Technical Aspects of Operation and Maintenance

Road maintenance work under GMANS contract is conducted by contractors and the field visit by the present evaluator found no technical problems. As for those roads directly maintained by the MOPC, maintenance works were conducted based on an established standards and procedures, and no major technical issues were found by the field observations.

The MOPC sends its staff members the technical training on road maintenance organized by donors etc. During the project period, some staff members participated in the training organized by JICA on road sector[16].

3.5.3 Financial Aspects of Operation and Maintenance

The annual budget size of the MOPC has been around 1 trillion Gs. to 1.5 trillion Gs. for the last 10 years, of which nearly 90% goes to the Office of the Vice-Minister of Public Works for which road maintenance is one of its important work assignments. The size of the actual budget for road maintenance has increased almost five-fold in the last 10 years and it does not appear that road maintenance is significantly hindered by an insufficient budget.

Table 7 Annual Budget Size of the MOPC

(Unit: million Gs.)

	2001	2004	2007	2010
MOPC	1,026,478	1,503,447	1,190,942	1,586,663
Office of the Public Works Vice-Minister	899,395	1,398,156	1,058,359	1,394,541
Road Maintenance Work	64,778	36,415	136,768	309,158

Source: MOPC

Note: The amounts include the budget for GMANS contracts.

[16] 18 staff members of the MOPC participated in training in Japan (in such fields as road and civil engineering administration, financing system for road construction and maintenance, road and transport planning, environmental and social consideration, construction work management and others) from FY 1998 to FY 2010.

Weigh station (Road Section 7)

Asphalt Plant of MOPC local office

3.5.4 Current Status of Operation and Maintenance

The field observations found no special problems in regard to the road maintenance of the national route sections of Road Sections 3, 4, 6 and 10 which are maintained under the GMANS contracts.

In the case of Road Sections 5, 7, 8 and 9 which are directly maintained by the MOPC, some side ditches and slopes appear to require repair although these defects do not affect the functionality of the relevant sections. While these lots subject to direct maintenance by the MOPC are maintained along with other roads, the available number of road maintenance equipment is insufficient in the face of the total length of the subject roads, resulting in a rather long wait for repair.

Road Sections 1 and 2 were still in the defect liability period at the time of field visit. Although no weigh station is located in Road Section 1, which has the status of a local road, the road acts as a bypass for Route 2 which is under the strict load control. The resulting heavy traffic of over-loaded vehicles that deviate from Route 2 made in necessary to conduct repair work at Road Section 1 within one year of its opening.[17]

No major road problems are observed in regard to the institutional, technical and financial capacity for road maintenance and the maintenance conditions of the target road sections of the Project are reasonably good. Therefore, the sustainability of the project is high.

4. Conclusion, Recommendations and Lessons Learned

4.1 Conclusion

This Project was implemented for the purpose of developing a road transport network capable of accommodating (i) the strong distribution demand for agricultural and livestock products produced by

[17] This repair work was conducted by the contractor because the defect liability period was still effective.

key industries in Paraguay and (ii) the increased transportation demand with the launch of the MERCOSUR, etc. by means of improving national and local roads which are the major arterial roads of the country, and thereby contributing to a sustainable development of national economy. The purpose of the Project was consistent not only with the development policies and needs of Paraguay but also with the ODA policy of Japan. As such, the relevance of the Project is high. The target road sections for improvement under the Project now see a traffic volume which is 1.4 times of that originally anticipated at the time of project planning and the travelling time on all roads has been shortened. In the case of the export of grains as one of Paraguay's major export items, the share of river transportation has increased in recent years and the Project is believed to have contributed to the promotion of river transportation through improved road access to river ports. Meanwhile, the smoother physical distribution and passenger transportation in general as a result of the Project has contributed to local development and improved access to social services. As such, the effectiveness of the Project is judged to be high. The implementation of additional work achieved more improvement of roads and bridges than originally planned. While the project cost was mostly as planned, the project period significantly exceeded the original plan, therefore the efficient of the Project is fair. No major problems are observed in regard to the institutional, technical and financial capacity for road maintenance, and the maintenance conditions of the target roads of the Project are reasonably good. Therefore, the sustainability of the Project is judged to be high. Based on the above findings, the Project is evaluated to be highly satisfactory.

4.2 Recommendations

4.2.1 Recommendations to the MOPC

It is necessary to establish a weigh station in Road Section 1 and 2 to control the traffic of over-loaded vehicles. Particularly in Road Section 1 which appears to be used by over-loaded vehicles as a detour to avoid weight inspection on Route 2, the introduction of a weigh station is urgently required. In view of the necessity for weigh stations to be established along with the opening of improved roads, it is highly desirable for the Directorate General of Roads to review its organizational structure or work procedure so that the feasibility of establishing a weigh station is examined as part of the planning of a road improvement project.

4.2.2 Recommendations to the JICA

None

4.3 Lessons Learned

- For any road improvement or road construction project, it is important to examine in advance (i) the likelihood of traffic involving over-loaded vehicles, including those detouring from other roads, and (ii) the necessity for the introduction of a weight regulation regime so that effective traffic control with a weigh station and other means is in place at the time of the opening of a road if necessary.

- When land acquisition is required as part of public works, the commencement of the work may be greatly hindered not only by the complexity of the procedure involved but also by the emergence of a situation where the unclear land ownership of the subject persons for compensation makes the finalisation of the subject persons for compensation and calculation of the precise compensation amount difficult. When the emergence of such a situation is anticipated, it is important to consider as much simplification of the procedure as appropriate so that the revised procedure allows commencement of the work prior to the completion of the calculation and payment of the compensation as long as the status of the land in question has been finalized as subject land for compensation.

Comparison Between the Original Plan and the Actual Results

Item	Components	Original Plan	Actual Results
Outputs	• Road improvement • Overlay • Widening of bridge • Consulting service	121.1km 496.0km 83 sites Consulting service	117.5km 591.1km 190 sites As planned
Project Period		August,1998 to December, 2003 (64months)	August, 1998 to October, 2011 (158 months)
Project Cost	• Japanese ODA Loan Portion • Executing Agency • Total Exchange Rate	¥19,428 million ¥6,476 million ¥25,904 million US$ 1= ¥118 (as of January 1997)	¥18,522 million ¥7,945 million ¥26,467 million US$ 1 = ¥112 (weighted average between 1998 to 2011)