

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)
TECHNICAL SECRETARIAT OF PLANNING, PARAGUAY

**THE STUDY
ON
THE ECONOMIC DEVELOPMENT
OF
THE REPUBLIC OF PARAGUAY

FINAL REPORT
TRANSPORT INFRASTRUCTURE : MAIN REPORT

VOLUME 4**

November 2000

**DAIWA INSTITUTE OF RESEARCH LTD.
PACIFIC CONSULTANTS INTERNATIONAL**

PREFACE

In response to a request from the Government of the Republic of Paraguay, the Government of Japan agreed to conduct a Study on the Economic Development of the Republic of Paraguay, and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA organized a study team composed of Daiwa Institute of Research Ltd. and Pacific Consultants International. The team, headed by Mr. Hidesuke KOTAJIMA of Daiwa Institute of Research Ltd., visited the Republic of Paraguay five times between October 1998 and September 2000. In addition, JICA set up an advisory committee headed by Professor Akio HOSONO, of the Research Institute for Economics and Business Administration, Kobe University, which examined the study from technical points of view.

The team held discussions and conducted joint field research with the Paraguayan counterpart team, which was headed by the Technical Secretariat of Planning and composed of officials from relevant ministries. Based on these joint efforts, the team prepared the Draft Final Report and presented it to the Government of the Republic of Paraguay in August 2000. After returning to Japan, the team conducted further studies and compiled the final results found in this report.

I hope this report will contribute to forming an appropriate Development Strategy for the Paraguayan economy. I also hope it enhances the friendly relations between the two countries.

I wish to express my sincere appreciation to the Paraguayan counterpart team and others concerned for their close cooperation throughout the study.

November 2000



Kunihiko Saito

President

Japan International Cooperation Agency

November 2000

Mr. Kunihiro Saito
President,
Japan International Cooperation Agency

Dear Mr. Saito,

Letter of Transmittal

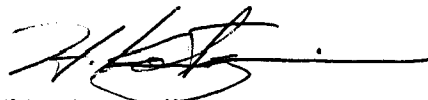
We, hereby, have the pleasure of submitting the "Study on the Economic Development of the Republic of Paraguay." The report describes the results of the Study conducted by Daiwa Institute of Research Ltd. and Pacific Consultants International, in accordance with the contract entered into with the Japan International Cooperation Agency (JICA).

Our Study Team carried out five field surveys between October 1998 and September 2000. While in Paraguay, the Team conducted a joint study with the Paraguayan counterpart team, composed of different ministry officials, to formulate development strategies along with projects for implementation, in order to enhance the economic competitiveness. In the process, skills and technology were also transferred to Paraguay. Based on results of the field surveys in Paraguay and study activities in Japan, the team prepared this report, in cooperation with the Paraguayan side.

In view of the urgency of strengthening the economic competitiveness and the socio-economic development of the Republic of Paraguay as a whole, we recommend that the Paraguayan government implement these suggestions without delay.

We wish to take this opportunity to express our sincere gratitude to the Technical Secretariat of Planning and other authorities concerned in the Republic of Paraguay for the kind cooperation and warm hospitality they extended to our Team. We also wish to express our deep gratitude to your Agency, the Ministry of Foreign Affairs, the Japanese Embassy in Paraguay, and the JICA Paraguay office.

Very truly yours,



Hidesuke Kotajima
Team Leader,
The Study on the Economic Development of the
Republic of Paraguay

ABBREVIATIONS & ACRONYMS

	English	Spanish
ABASTO	Central Market of Asuncion City	Mercado Central de Abasto de la Municipalidad de Asunción
ABP	Paraguayan Banks Association	Asociación de Bancos del Paraguay
ACEPAR	Paraguayan Steel Company	Aceros del Paraguay S.A.
ANTELCO	National Telecommunications Company	Administración Nacional de Telecomunicaciones
APAL	Alcohol monopoly corporation	
APC	Paraguayan Quality Association	
ARP	Rural Association of Paraguay	Asociación Rural del Paraguay
ASEAN	Association of South East Asian Nations	
BCP	Central Bank of Paraguay	Banco Central del Paraguay
BID(IDB)	Inter-American Development Bank	Banco Interamericano de Desarrollo
BIS	Bank for International Settlements	
BNF	National Development Bank	Banco Nacional de Fomento
BOD	Biochemical Oxygen Demand	
BVPASA	Stock Exchange and Products of Asunción S.A.	Bolsa de Valores y Productos de Asunción S.A.
CADEP		Centro de Analisis y Difusión de Economía Paraguaya
CAH		Crédito Agrícola de Habilitación
CAP		Cámara de Anunciadores del Paraguay
CAPECO	Chamber of Paraguayan Cereals and Oleaginous	Cámara Paraguaya de Exportadores de Cereales y Oleaginosas
CBC		Cámara y Bolsa de Comercio
CCM	Council of Common Market	
CECTEC		Centro de Educación, Capacitación y Tecnología Campesina
CEDIAL		Cooperación Empresarial y Desarrollo Industrial
CEPAE		Centro de Apoyo a la Empresa
CERNECO		Centro de Regulación, Normas y Estudios de la Comunicación
CET	Common External Tariff	Tarifa Externa Común
CETAPAR	Comprehensive Agriculture Experimental Center	Centro Tecnológico Agropecuario en Paraguay
CI	Competitive Index	Indice Competitivo
CNV	National Securities Commission	Comisión Nacional de Valores
CIP		Centro de Importadores del Paraguay
COD	Chemical Oxygen Demand	Demanda Química de Oxígeno
CODEX	The Joint FAO/WHO Foods Standards Program	
CRIA		Centro de Investigación Agrícola
DGEEC	Statistics and Census Bureau, STP	Dirección General de Estadísticas Encuestas y Censos, STP
ECLAC (CEPAL)	Economic Commission for Latin America and the Caribbean	Comisión Económica para América Latina y el Caribe

Transport Infrastructure: Main Report

Volume 4

Table of Contents

PREFACE

LETTER OF TRANSMITTAL

ABBREVIATIONS & ACRONYMS

1. CURRENT SITUATION.....	1
1.1 TRANSPORTATION NETWORK	1
1.2 TRAFFIC MOVEMENT	6
1.3 ADMINISTRATION OF TRANSPORTATION AND TRANSPORT INFRASTRUCTURE....	27
1.4 TRANSPORTATION.....	30
1.5 EXISTING PLANS	35
1.6 PROBLEMS AND TASKS IN CURRENT TRANSPORT INFRASTRUCTURE.....	40
2. TRANSPORT INFRASTRUCTURE DEVELOPMENT CONCEPT	45
2.1 INFRASTRUCTURE FOR ENHANCEMENT OF EXPORT CORRIDOR.....	45
2.2 INFRASTRUCTURE FOR PRODUCTION SUPPORT	46
3. TRANSPORT INFRASTRUCTURE DEVELOPMENT STRATEGY.....	49
3.1 DEMAND PROSPECTS	49
3.2 TRANSPORT INFRASTRUCTURE REPAIR STRATEGY	62
3.3 COST ESTIMATION OF THE MAIN PROJECTS.....	78
3.4 PROPOSAL ON ORGANIZATION AND SYSTEM	86
APPENDIX	90

Figures

Figure 1	Distribution of Paved Roads	2
Figure 2	Variation in Extent of Paved Roads.....	2
Figure 3	Distribution of Bridges.....	3
Figure 4	Distribution of the Main Domestic Ports.....	4
Figure 5	Variations of River Water Level.....	5
Figure 6	Railroad Map.....	6
Figure 7	Growth of Economy and Transport Demand.....	7
Figure 8	Changes in Export/Import Volume.....	8
Figure 9	Passenger Movement by Car and Bus (1997).....	9
Figure 10	Variations in Average Daily Traffic Volume	10
Figure 11	Number of Vehicles Registered and Ownership Rate.....	11
Figure 12	Number of Registered Cars by Department.....	11
Figure 13	Variations in the Export Mode	15
Figure 14	Variations in the Import mode.....	15
Figure 15	Physical Distribution of Soybean-related Items (1997).....	17
Figure 16	Variations in Percentage of Soybean Export Modes.....	17
Figure 17	Physical Distribution of Wheat (1997).....	18
Figure 18	Physical Distribution of Maize (1997)	19
Figure 19	Physical Distribution of Cotton (1997)	20
Figure 20	Variations in Percentage of Raw Cotton Export Modes	20
Figure 21	Physical Distribution of Sugar Cane (1997)	21
Figure 22	Physical Distribution of Crude Oil, Petroleum (1997)	21
Figure 23	Physical Distribution of Fertilizer (1997).....	22
Figure 24	Variations in Percentage of Fertilizer Import Modes.....	23
Figure 25	Physical Distribution of Beverages (1997).....	23
Figure 26	Physical Distribution of Iron Ore, Steel Products, etc.	24
Figure 27	Variations in Steel Products Export Modes.....	25
Figure 28	Physical Distribution of Construction Material (1997)	25
Figure 29	Physical Distribution of Wood (1997).....	26
Figure 30	Variations in Wood Export Modes	26
Figure 31	Organization Chart – Ministry of Public Works and Communications	28
Figure 32	Achievement of Public Investment	29
Figure 33	Public Investment by Financial Source	30
Figure 34	Major Truck Transport Routes for Export	33
Figure 35	Major Barge Transport Routes for Export.....	34
Figure 36	Main Road Repair Plan (2000-2003)	36

Figure 37 Local Road Repair Plan (2000-2004).....	37
Figure 38 Bioceanic Road Plan	38
Figure 39 MERCOSUR Main Roads Network.....	39
Figure 40 Vicious Circle in the Operation of FCPCAL	42
Figure 41 Policy System for Transport Infrastructure.....	48
Figure 42 Change of Population and Figure 43 Distribution Rate of Population	50
Figure 44 Change in Number of Passenger Cars.....	52
Figure 45 Inter-Departmental Flow of Car and Bus Traffic (2010)	53
Figure 46 Forecast of Transport Demand by Commodity Item.....	54
Figure 47 Distribution of Freight Flow in Year 1997.....	58
Figure 48 Distribution of Freight Flow in Year 2010.....	58
Figure 49 Production Volume and Export Route of Main Grain	60
Figure 50 Necessary Road Extension by Department-----	63
Figure 51 Main Road Network throughout the Country (year 2010).....	65
Figure 52 Reduction of Time Needed from Asunción	66
Figure 53 Port/waterway project	67
Figure 54 Distance between Asunción and Concepción by Road and River	68
Figure 55 Correlation between Average Seat Occupancy and Internal Rate of Return (IRR)	71
Figure 56 Creation of New Financial Resources for Transport Infrastructure Development	74
Figure 57 Railway Improvement Plan	75
Figure 58 Difference in Rail Track Gauge	77
Figure 59 Locations for Export Corridor Project (1)	79
Figure 60 Locations for Export Corridor Project (2)	80
Figure 61 Bioceanic Road Plan	81
Figure 62 Proposed Main Road Network.....	82
Figure 63 Sites Proposed for Truck Terminals	83
Figure 64 Required Investment Amount and Investment Plan	85

Tables

Table 1	Extent of paved roads by category.....	1
Table 2	Current Status of Bridges (1999).....	3
Table 3	Changes in Traffic Transport Volume	7
Table 4	Passenger Movement between Departments.....	9
Table 5	Variations in Traffic Volume by Vehicle Type (Source: MOPC)	10
Table 6	Number of Arrivals and Departures of Commercial and Military Flights at Silvio Pettirossi International Airport	12
Table 7	Number of Arrivals and Departures of Commercial Flights at Guaraní International Airport.....	12
Table 8	Number of Commercial Airline Passengers Arriving and Departing at Silvio Pettirossi International Airport	12
Table 9	Number of Commercial Airline Passengers Arriving and Departing at Guaraní International Airport	12
Table 10	Volume of Imports and Exports at Silvio Pettirossi International Airport (Tons)	13
Table 11	Volume of Imports at Guaraní International Airport (Tons)	13
Table 12	Export/import Volume, Based on BCP and OCIT Data	13
Table 13	Changes in the Top 15 Export/Import Items by Category (ton basis).....	14
Table 14	Items Subject to Study	16
Table 15	Soybean Export - Destination and Modes.....	17
Table 16	Wheat Export – Destination and Modes	18
Table 17	Maize Export – Destination and Modes.....	19
Table 18	Raw Cotton Export – Destination and Modes	20
Table 19	Crude Oil Import – Origin and Modes.....	22
Table 20	Petroleum Import – Origin and Modes	22
Table 21	Fertilizer Import – Origin and Modes	23
Table 22	Beverage Import – Origin and Modes.....	24
Table 23	Export of Steel Products – Destination and Modes	24
Table 24	Wood Export – Destination and Modes	26
Table 25	Road Administration Agencies in MOPC by Road Category.....	27
Table 26	Past Trend of Public Investment by Sector.....	29
Table 27	Registered Transport Companies.....	30
Table 28	Main International Bus Routes	31
Table 29	Breakdown of Transportation Cost including Overhead Charges.....	32
Table 30	Transport Costs to/from the Major Export Hubs of Paraguay (1).....	33
Table 31	Transport Costs to/from the Major Export Hubs of Paraguay(2).....	34
Table 32	Main Roads Repair Plan (2000-2003)	36
Table 33	Port Repair Plans.....	40

Table 34	Transition of Agricultural Production Volume.....	40
Table 35	Population Projection by Department.....	49
Table 36	Urban and Rural Population Forecast	50
Table 37	Future Economic Growth for Planning Basis.....	51
Table 38	Projection of Future Car Ownership.....	51
Table 39	Inter-Departmental Passengers Trips	53
Table 40	Forecast of Production, Consumption, Export, and Import Volume by Commodity Item.....	55
Table 41	Export Destination and Import Origin	59
Table 42	Trade Volume with Asia and Oceania (1997).....	61
Table 43	Transport Method for Trade with Asia and Oceania	62
Table 44	Target Figures for Road Repair	63
Table 45	Necessary Road Extension by Department	64
Table 46	Estimated Volume of Freight by Each Port.....	67
Table 47	Potential Demand for Express River Bus.....	68
Table 48	Operation Cost of the River Bus.....	70
Table 49	Road Function and Administrative Body	72
Table 50	Creation of New Financial Resources for Transport Infrastructure Development.....	74
Table 51	Potential Demand Forecast of Existing Route.....	75
Table 52	Inter-departmental Bus Passengers in 2010	76
Table 53	Necessary Improvement in Main Road Network.....	82
Table 54	Unit Estimation Costs for Road Improvement	83
Table 55	Improvement Cost of Ports Based on Existing Data.....	84
Table 56	Cost of Railway Rehabilitation Project.....	84
Table 57	Result of Calculation for Necessary Investment Amount and Investment Plan.....	86
Table 58	Principal Statistic Data Related to Transport that Shall be Maintained (Tentative)	88
Table 59	Proposed Institutional Programs/projects on Organization and System.....	89