(2) Past Achievements of Public Investment

Table 26 shows past budgets and achievements of transport-related public investments by sector. In every year, road sector has a dominant share near 90% of total budget, followed by port, air transport and railway sector in this order. The achievement ratio of road sector is around 80% while the average remains slightly higher than 70% as the ratios of other sectors are low.

Table 26 Past Trend of Public Investment by Sector

(1) Execution (Unit: Gs million.)

Sector	1995	1996	1997	1998	1999	95-98
Road (MOPC)	232,281	209,770	239,743	298,361	S.D.	980,155
Rive & Port (ANNP)	27,142	21,891	28,167	23,303	18,664	119,167
Railroad (FCPAL)	1,970	843	1,422	788	S.D.	5,023
Airport (DINAC)	1,066	5,775	1,698	1,351	2,093	11,983
Total	262,459	238,279	271,030	323,803	20,757	1,095,571

(2) Budget (Unit: million Gs.)

Sector	1995	1996	1997	1998	1999	95-98
Road (MOPC)	280,452	263,650	313,618	375,003	380,973	1,232,723
Rive & Port (ANNP)	29,195	47,536	47,912	44,746	28,073	169,389
Railroad (FCPAL)	1,971	2,868	1,743	1,496	159	8,078
Airport (DINAC)	9,008	14,613	16,517	9,760	7,697	49,898
Total	320,626	328,667	379,790	431,005	416,902	1,460,088

(3) Execution Ratio (Unit: %)

Sector	1995	1996	1997	1998	1999	95-98
Road (MOPC)	82.8	79.6	76.4	79.6	-	79.5
Rive & Port (ANNP)	93.0	46.1	58.8	52.1	66.5	70.4
Railroad (FCPAL)	99.9	29.4	81.6	52.7	-	62.2
Airport (DINAC)	11.8	39.5	10.3	13.8	27.2	24.0
Total	81.9	72.5	71.4	75.1	5.0	75.0

Figure 32 shows public investment in road sector dividing construction and maintenance. In 1999, Construction shares about 90% while maintenance is allocated only 10%. In the future, the share of maintenance will increase as road network is developed.

Figure 32 Achievement of Public Investment (Gs. Million)

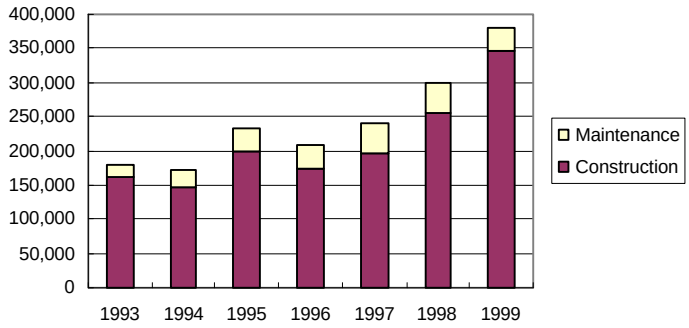
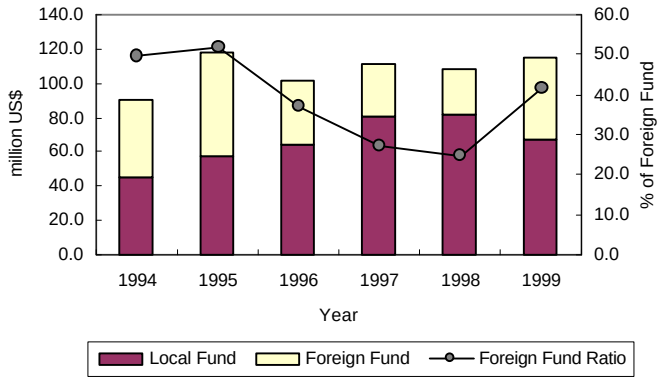


Figure 33 indicates public investment by foreign and local resource. 20 to 50 % of total are financed by foreign borrowings.

Figure 33 Public Investment by Financial Source



1.4 TRANSPORTATION

(1) Transport companies

Transport companies in Paraguay, either of passengers or freight, have as a principle an obligation to register with the Land Transport Bureau (Dirección de Transporte Terrestre) of MOPC every year. Table 27 shows the number of companies and vehicles registered by passenger transport and freight transport companies. Concerning the passenger transport companies providing services in the metropolitan area, they have a big scale, reaching nearly 4 to 5 times the size of other transport companies in Paraguay or of international ones. Domestic companies correspond to about 1/5 of the total freight transport companies.

Table 27 Registered Transport Companies

	Service	Company		Vehicle		
		NO.	(%)	NO.	%	Average
Passengers	Metropolitan Area	51	24.2	2,630	57.6	51.6
	Intra-Municipality	129	61.1	1,625	35.6	12.6
	International	31	14.7	314	6.9	10.1
	Total	211	100.0	4,569	100.0	21.7
Cargos	Paraguay	171	20.9	3,707		21.7
	Brasil	150	18.3	-		
	Argentina	193	23.6	-		
	Chile	268	32.8	-		
	Uruguay	36	4.4	-		
	Total	818	100.0	-		

(2) Regular bus networks

There are three categories of regular bus networks in Paraguay: international routes, routes between cities, and metropolitan networks. There are many international bus routes leaving border cities like Encarnación, Ciudad del Este, and Salto del Guairá, and also from the capital Asunción, or Concepción and Villarrica. Destinations are countries of MERCOSUR such as Argentina, Brazil, or Uruguay, Chile and Bolivia, and Peru. The most frequent destinations are Argentina and Brazil. The routes with relatively long distance and with frequency higher than 10 departures per week are shown below.

Table 28 Main International Bus Routes

ROUTE		FREQUENCY	
Asunción	Buenos Aires	43	Argentina
	Clorinda	28	
	Corrientes	14	
	Residencia	14	
Asunción	Campo Grande	14	Brazil
	Foz de Yguazu/Cataratas	28	
	San Pablo	14	
Concepción	Campo Grande	28	

(3) Freight transport tariff

Tables 30-31 show freight charges between the main places, based on interviews with transport companies.

Regarding transport by road, the main destinations are Santos and Paranaguá in Brazil, Buenos Aires in Argentina, Montevideo in Uruguay, and Valparaíso in Chile. Today, there is little transport going over the Andes to Antofagasta or Iquique in Chile. As for water transport, the majority uses Paraná River to go to Nueva Palmira in Argentina, where the cargo is transshipped to North America, Europe, or Asia. The transport charge is cheaper, in general, for water transport than for truck. Compared with the transport cost in 1992, when the master plan was elaborated, water transport charges have decreased significantly, due to the increase in cargo volume.

Overhead costs for export procedures, insurance, port charges at the destination; transshipment, etc. are added to the freight cost. These overhead costs have a small variation depending on the transport modes, and by destination. Table 29 shows the calculation of the total transportation cost including all expenses, using as a sample case the transportation of grain.

Overhead costs for transportation are around US$ 15-16 in the case of truck and railroad, and US$ 11 in the case of water transport (cost per 1 ton, in all cases). The overhead expenses are, in a sense, fixed

costs, so their relative value decreases as the net freight cost increases. Nevertheless, they correspond to about 1.5-1.9 times of the net transport costs, having a significant weight in transportation within MERCOSUR.

Table 29 Breakdown of Transportation Cost including Overhead Charges

Origen	C.D.E	San Antonio	Encarnación	C.D.E	Encarnación
Destination	Paranaguá	Nva.Palmira	Rosario	Rosario	Rio Grande
Main Transport	By Road	By River	By River	By River	By Railway
Ocean Port Cost	9.50	4.50	4.50	4.50	7.00
Local Port Cost		4.00	4.00	4.00	2.50
Road Freight	22.00				
River Freight		12.00	14.00	16.00	
Railway Freight					29.00
Transporting Commission	3.00				
Dispatch and Others (Transshipment)	1.00				3.00
Quality Control PY	0.25	0.25	0.25	0.25	0.25
Parking Fee PY/BR	0.84				
Others (License)	0.15				
Waste	0.30	2.00	2.00	2.00	3.00
Total US$	37.04	22.75	24.75	26.75	44.75

Table 30 Transport Costs to/from the Major Export Hubs of Paraguay (1)

			Transport Mode	Cost (US$/ton)		
				Grain	Container	Others
1	Asunción	- Santos	Truck	42.00	65.00	52.00
2	Asunción	- Paranagua	Truck	29.00	57.50	48.00
3	Asunción	- Valparaiso	Truck		93.75	75.00
4	Ciudad del E.	- Santos	Truck	35.00	50.00	40.00
5	Ciudad del E.	- Paranagua	Truck	22.00	42.50	36.00
6	Ciudad del E.	- Valparaiso	Truck		109.00	87.00
7	Encarnación	- Santos	Truck	42.00	65.00	52.00
8	Encarnación	- Paranagua	Truck	29.00	57.50	48.00
9	Encarnación	- Valparaiso	Truck		93.75	75.00
10	Pto.Jose F.	- Valparaiso	Truck		93.75	75.00
11	Pto.Jose F.	- Buenos Aires	Truck		65.00	52.00
12	Pto.Jose F.	- Montevideo	Truck		75.00	60.00
13	P.J.Caballero	- Santos	Truck	42.00	65.00	52.00
14	P.J.Caballero	- Paranagua	Truck	29.00	57.50	48.00
15	P.J.Caballero	- Asunción	Truck	11.00	20.00	16.00
16	Salto del G.	- Santos	Truck	42.00	65.00	52.00
17	Salto del G.	- Paranagua	Truck	29.00	57.50	48.00
18	Salto del G.	- Asunción	Truck	11.00	20.00	16.00

Figure 34 Major Truck Transport Routes for Export

Table 31 Transport Costs to/from the Major Export Hubs of Paraguay(2)

			Transport Mode	Cost (US$/ton)		
				Grain	Container	Others
1	Asunción	- Rosario RA	Barge	12.00	17.50	18.00
2	Asunción	- N.Palmira	Barge	12.00	17.50	18.00
3	Asunción	- Orient	Barge	60.00	125.00	125.00
4	Asunción	- Europe	Barge	48.00	80.00	80.00
5	Asunción	- U.S.A.	Barge		100.00	100.00
6	Ciudad del E.	- Rosario RA	Barge	16.00	20.00	20.00
7	Ciudad del E.	- N.Palmira	Barge	16.00	20.00	20.00
8	Ciudad del E.	- Orient	Barge	67.00	140.00	140.00
9	Ciudad del E.	- Europe	Barge	54.00	95.00	95.00
10	Ciudad del E.	- U.S.A.	Barge		115.00	115.00
11	Encarnación	- Rosario RA	Barge	14.00	20.00	18.00
12	Encarnación	- N.Palmira	Barge	14.00	20.00	18.00
13	Encarnación	- Orient	Barge	65.00	140.00	140.00
14	Encarnación	- Europe	Barge	52.00	95.00	95.00
15	Encarnación	- U.S.A.	Barge		115.00	115.00
16	Villeta	- Rosario RA	Barge	12.00	17.50	18.00
17	Villeta	- N.Palmira	Barge	12.00	17.50	18.00
18	Villeta	- Orient	Barge	60.00	125.00	125.00
19	Villeta	- Europe	Barge	48.00	80.00	80.00
20	Villeta	- U.S.A.	Barge		100.00	100.00
21	Concepción	- Rosario RA	Barge	14.00		22.00
22	Concepción	- Santos	Barge	14.00		22.00
23	Encarnación	- Rio Grande	Rail	29.00		

Figure 35 Major Barge Transport Routes for Export

1.5 EXISTING PLANS

(1) Basic policies regarding transportation infrastructure in the 5-year National Development Plan

The existing 5-year Plan (1998-2002) has three basic policies:

a) Expansion of transportation infrastructure
b) Enhancing participation by the private sector
c) Promoting improvement of freight and passenger transport

The following 14 items are proposed as actions to be taken by the government (Acciones gubernamentales):

a. To accommodate the juridical framework in public works matters, Contemplating the private sector.
b. Fasten the execution of public works.
c. To restore and to pave North-South, East-West and Bi-oceans export corridors.
d. To restore and adequate the access ways and inter-connections for multi-mode transport.
e. To integrate the 1999-2003 Road Investment Plan to the programs of regional development.
f. To improve the application of Environmental Impact Evaluation Law of public works.
g. To construct and improve the neighbor roads in productive areas.
h. To improve transportation capacity and security of paved roads
i. To reactivate and adequate grains terminals and international free trade ports.
j. To improve the conditions of navigation in the whole trail-way
k. To optimize the efforts of ports and airports installation.
l. To improve the control and use of ports and airports installations.
m. To promote the expansion of barges fleet.
n. To analyze the possibility to restore the railway net.

The items especially important for the expansion of investment and promotion of exports, which are the subjects of this research, are items c, d, g, i, j, and m. Taking into consideration the increasing importance of water transport, items k and l will also be important.

The policies and action plan put emphasis on infrastructure investments by the private sector. However, attention must be paid to the fact that, in the case of roads, the largest sub-sector for investment, few roads have enough traffic to attract investment by the private sector.

(2) Road Reform Plan

1) Plan on main road net

Figure 36 shows the reform plan for main roads scheduled through 2003. The total extent is 2,794 km, and the total expense of the project is estimated to be 1 billion dollars. Taking into consideration that MOPC's yearly budget for road repairs is about 100 million dollars, the project corresponds to road repairs for 10 years, and a lack of financial resources will certainly occur

Figure 36 Main Roads Repair Plan (2000-2003)

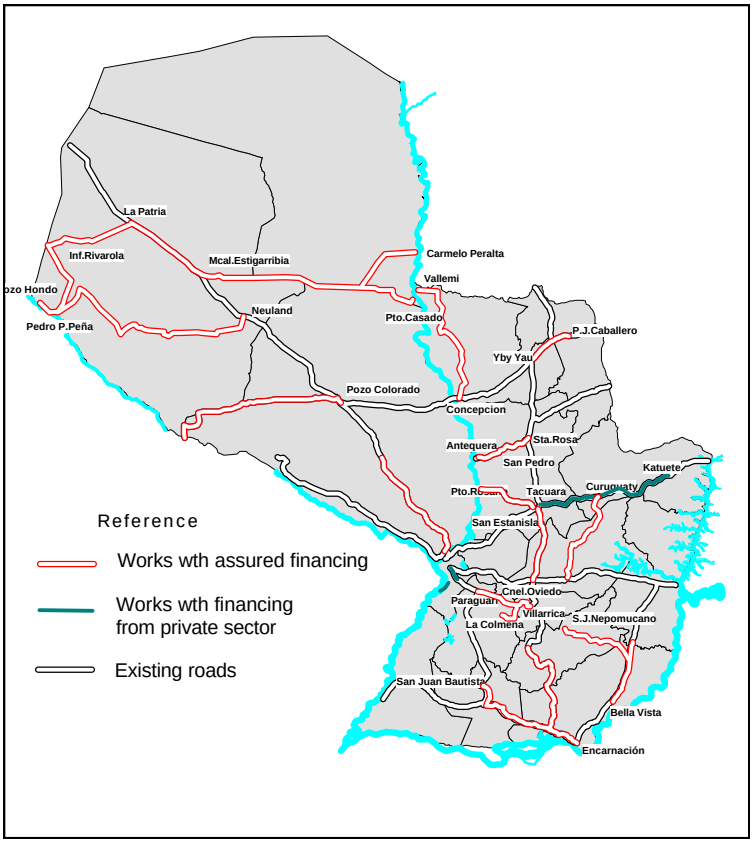


Table 32 Main Roads Repair Plan (2000-2003)

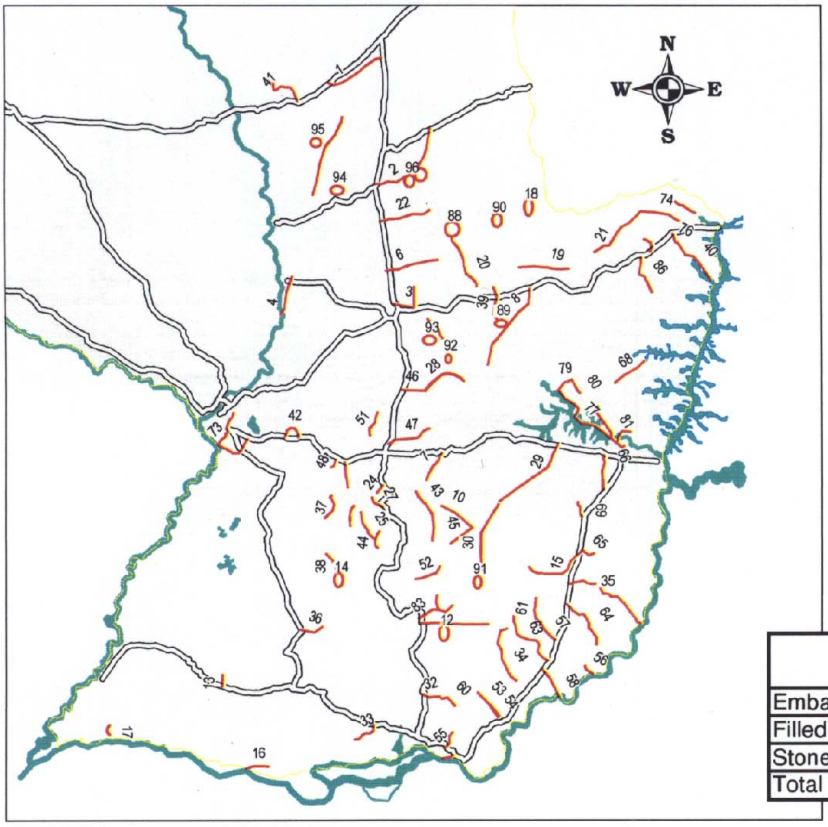
No.	Description	Total Length km.	Total Cost	
			Dollars	Guaranies
1	Works with assured financing	1463.10	432,731,524.00	
2	Work with private financing on offer's application of BID	180.00	90,000,000.00	
3	Local financing fund	180.00		30,900,000,000
4	Work with private financing on offer's application	971.29	450,674,000.00	
5	Work with self-financing according Law 1302		34,070,000.00	
	Total	2,794.39	1,007,475,524.00	30,900,000,000

Source: MOPC

2) Local roads repair plan

The repair of local roads has the objective of maintaining the roads from agricultural centers to the main roads. Maintenance standards for local roads are established by area, based on indexes such as agricultural production level and density of roads. Local road repair with a total extent of 3,500 km is scheduled to be executed from 2000 to 2004, at a cost of about 300 million dollars.

Figure 37 Local Road Repair Plan (2000-2004)



	Long. (km)	Cost (1000US$)
Embankment	831.00	66,480.00
Filled with rubble	1,848.90	146,972.50
Stone paving	816.00	97,920.00
Total	3,495.90	311,372.50

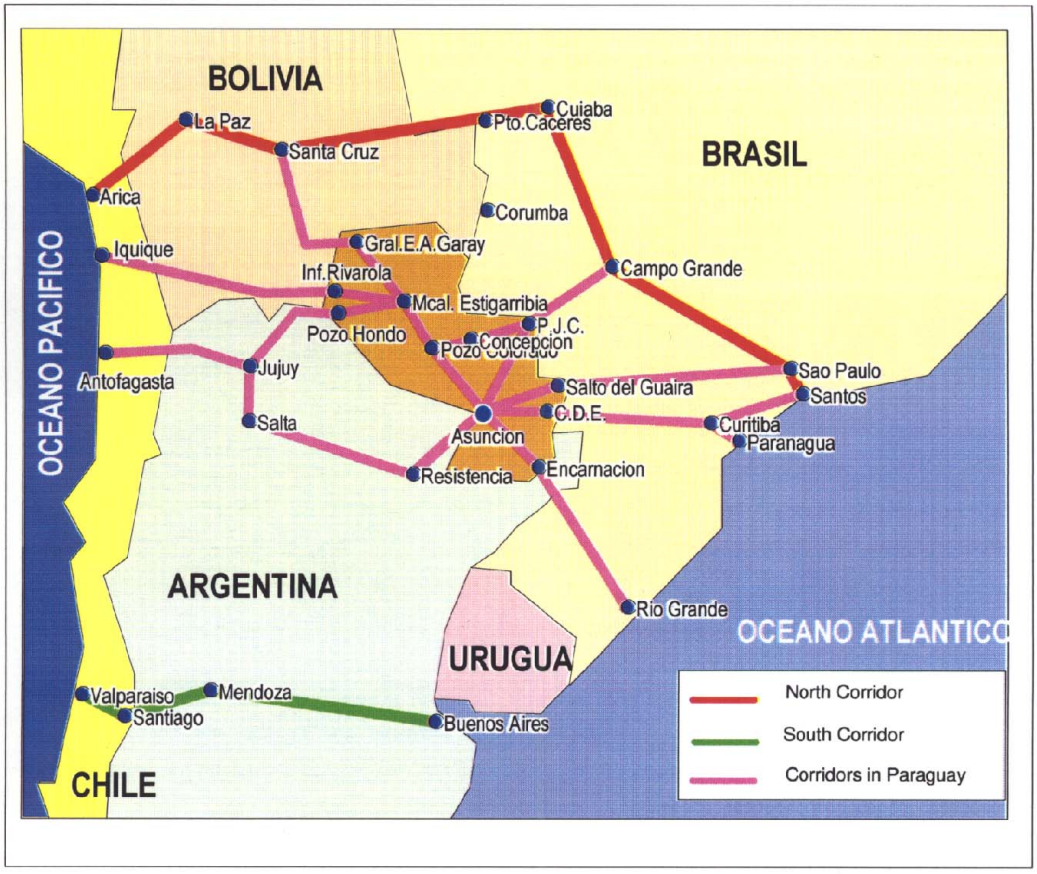
3) MERCOSUR road net plan

There is a plan in South America to construct a road connecting the Atlantic and Pacific oceans. As for its route, many ideas are being studied. They can be roughly classified in three categories (refer to Figure 38): i) a North Route connecting Brazil (São Paulo) – Bolivia (La Paz) – Chile (Arica), and passing north of Paraguay; ii) a South Route connecting Argentina (Buenos Aires) – Chile (Santiago), and passing south of Paraguay; and iii) a Central Route passing through Paraguay. Among these three routes, the South is well maintained for almost all the route and is now used for freight transport. Bolivia is giving priority to the North Route, and the World Bank is conducting a feasibility study. Chile is preparing a road connecting Antofagasta and Jujuy.

Taking into consideration these plans, Paraguay is studying four routes. The proposals for alternatives

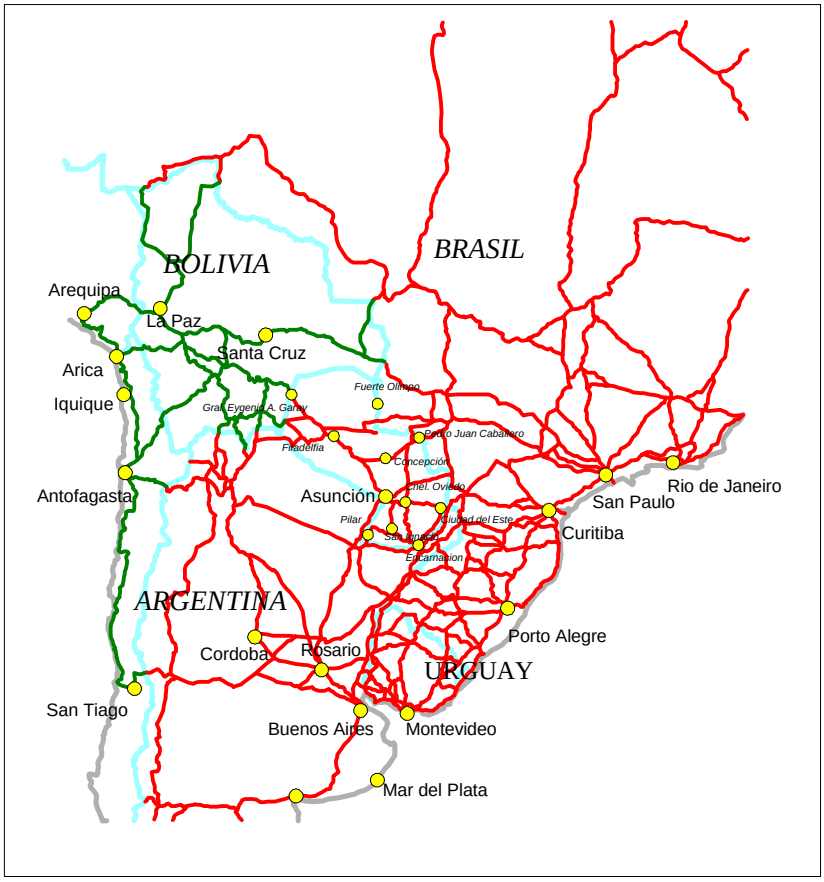
are established according to access to the Chilean side, as shown in Figure 38. The route with the highest ratio of roads already prepared is the one in the south, passing from Asunción to Resistencia and Salta in Argentina, until Antofagasta. However, the remaining three routes also are worth considering, from the viewpoint of promoting development of the Chaco area.

Figure 38 Bioceanic Road Plan



Regular study meetings have been held since 1995, to analyze a unified road network for MERCOSUR. Figure 39 shows the main roads network in MERCOSUR; as for Paraguay, a route connecting Mariscal Estigarribia and Bolivia or Brazil is being suggested, taking into consideration the above-explained Bioceanic Road Plan.

Figure 39 MERCOSUR Main Roads Network



(3) Railroad repair plan

Since the elaboration of the ETNA master plan in 1992, renewal (compensation by the Dam Construction Corporation) of the General Artigas – Encarnación section, which has been scheduled for submergence with the construction of Yacyreta Dam has been planned but was not executed yet. Rehabilitation plans are now being suggested by countries including Spain and Switzerland, but their analysis on profitability or fund raising are not adequate and will require further studies. In addition, Paraguay has a plan to privatize the railroads, and it is believed that necessary steps will be taken together with the privatization in other areas.

(4) Waterway repair plan

The International Committee on Paraguay/Paraná River and MOPC has suggested repair plans for the ports of Ayolas, Villeta, Concepción, and Pilar (refer to Table 33).

Table 33 Port Repair Plans

	AYOLAS	VILLETA	CONCEPCION	PILAR
Infrastructure	5,750,000	4,910,000	3,530,000	975,000
Super-structure	2,050,000	610,000	1,450,000	540,000
Installation and equipment	3,500,000	9,700,000	4,500,000	1,385,000
Total	11,300,000	15,220,000	9,480,000	2,900,000
Source	1)	1)	1)	2)

Source:1) "NECESIDADES DE LOS PUERTOS DE LA HIDOROVIA PARAGUAY-PARANA",COMITE INTERGUBERNAMIENTAL DE LA HIDROVIA PARAGUAY-PARANA, JULIO-1998
2) "PROYECTO PARA LA CONSTRUCCION DE UNA TERMINAL MULTIPROPOSITO EN LA CIUDAD DE PILAR", MOPC, MARZO-2000

1.6 PROBLEMS AND TASKS IN CURRENT TRANSPORT INFRASTRUCTURE

(1) General

JICA elaborated in 1992 General Transport Plan (ETNA Plan 2010), and the repair of infrastructure has been taking place in Paraguay based on this plan, showing progress especially in the roads. As for ports, Villeta and Concepción have been repaired, and private ports along Paraná River were also repaired. However, almost no progress has been seen with regards to the railroad, which is operated only in a limited section.

On the other hand, drastic changes of traffic movement were observed since the last master plan. Table 34 shows a comparison between the estimation of the ETNA Plan 2010 and actual figures of agricultural production. Production volume of soybeans has exceeded the estimation, but the remaining items show actual figures far below the estimation. The difference is drastic for cotton, the production of which suffered from drought in 1997. Consequently, an increase was observed in waterway transport, which is the main transport method for soybeans, and the repair of ports and waterways is gaining importance.

Table 34 Transition of Agricultural Production Volume

Year	Actual volume (Ton)				Estimation in ETNA (1,000 Ton)			Difference
	94	95	96	97 (A)	1990	2000	1997 (B)	(A)/(B)
Wheat	375,679	208,617	543,435	400,189	453	1,171	956	0.419
Maize	461,664	816,167	654,074	1,055,661	1,081	1,909	1,661	0.636
Soybean	1,795,792	2,212,109	2,394,794	2,670,003	1,497	2,279	2,044	1.306
Sugar cane	2,799,318	2,576,000	2,736,000	2,795,000	3,284	4,844	4,376	0.639
Cotton	379,877	461,239	329,751	139,096	539	885	781	0.178

When studying repair of the transport infrastructure in Paraguay, it's necessary to think not only of "hard" infrastructure, but also "soft" infrastructure, such as the management of each transportation organ and financing methods. Together, considerable reinvestment is needed to repair the facilities. Paraguay's infrastructure repair has been delayed, even when compared with other countries in South

America, and it's necessary to actively promote repair in order for Paraguay to keep its position within MERCOSUR. In order to achieve this purpose, it's important to make clear the roles assigned to the central and local governments, and public and private sectors, and to proceed with effective repair works.

(2) Roads

Significant efforts are being made to repair the roads, but they have not yet achieved a satisfactory level, in quantity or quality. The following are existing problems related to roads:

- The pavement rate is low.
- The functional classification of roads is not clear.
- The repair of roads to Bolivia has been delayed.
- Maintenance is not satisfactory.

It is obvious that a big portion of these problems is due to the lack of funds. Though the cost of maintenance/repair varies according to the type of road and contents of the maintenance/repair, the following is a simulation using the unit cost assumed by MOPC, indicating that the appropriate cost for maintenance/repair shall be US$66 million per year. However, the actual budget amount for 1999 is about US$10 million, which is less than one sixths of the amount needed.

National roads (paved)	2,585km x US$3,000/km/year =	US$7,755,000
National roads (not paved)	1,905km x US$2,000/km/year =	US$3,810,000
Departmental roads (paved)	788km x US$2,000/km/year =	US$1,576,000
Departmental roads (not paved)	4,439km x US$1,500/km/year =	US$6,658,500
Rural roads (paved)	137km x US$1,500/km/year =	US$205,500
Rural roads (not paved)	46,020km x US$1,000/km/year =	US$46,020,000
Total		US$66,025,000

(3) Port/waterway

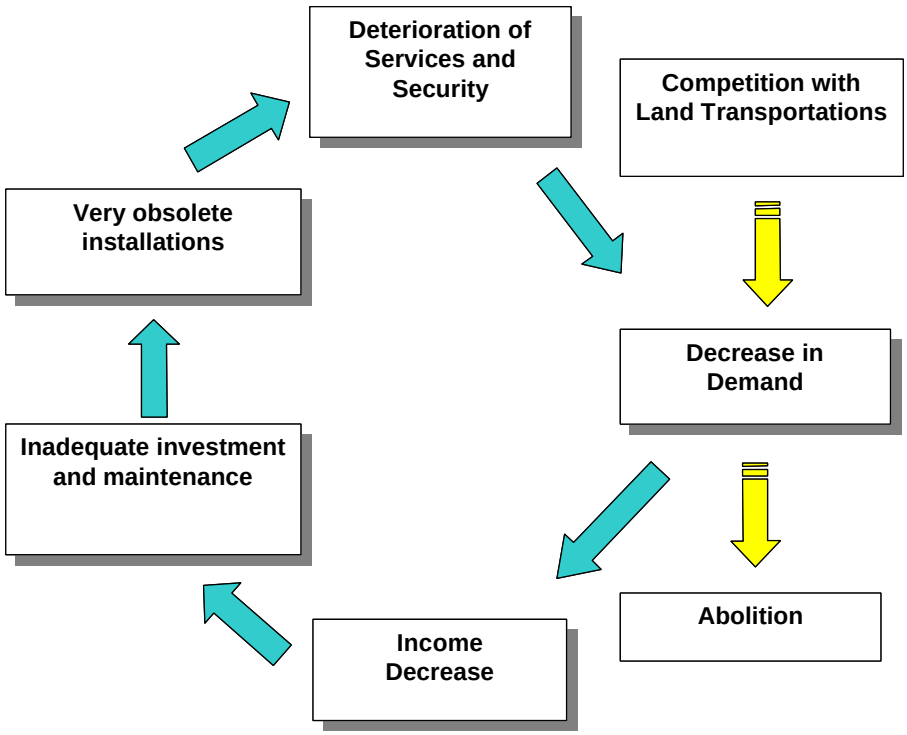
As already explained, waterway transport is increasing in importance together with the expansion of soybean exports. However, in Paraguay River, the fleet needs to be dismantled due to lack of depth and width, and a bad sailing route configuration, resulting in extra days of travel and a reduction in loading capacity during the dry season, thus hindering efficient services. The lack of depth is also due to a lack of dredgers, which are leased from Argentina, but the quantity is still insufficient.

(4) Railroads

The Carlos Antonio Lopez railroad (FCPCAL: Ferrocarril Presidente Carlos Antonio Lopez), connecting the capital Asunción with Encarnación, was opened in 1861. Locomotives, passenger cars, freight cars, rails, etc. were renewed in the 1910s, but investments for modernization have been neglected since then. The installations thus became obsolete, competition with truck transportation became impossible, and the demand kept on decreasing. In the early nineties, part of the railroad was compensated for submergence due to construction of Yacyreta Dam, giving a chance for renewal of the rails and installation, but this was not realized, and the transport of cargo was discontinued along the whole route. Now there is only one service per week for tourist passengers between Asunción and Ypacaraí. There is an idea to reactivate the operation by privatization, but it seems they missed a chance.

The reason why FCPCAL decayed is that they didn't make efforts to keep share in transport by competing with trucks, deteriorating the service quality (low transport speed, frequent accidents) and further reducing the demand, thereby forming the vicious circle shown in Figure 40. In order to end off this vicious circle and restore railway transport, drastic plans and investments detached from the current organization and installation shall be required.

Figure 40 Vicious Circle in the Operation of FCPCAL



The basic idea to restore railway transport shall be to invest for modernization of sections where stable demand can be expected and to provide high-quality service. The first step shall be to cope with the

demand for urban transport between Asunción and Luque (or Ypacaraí), and restore the section as an urban railway. There is a big possibility from the viewpoint of demand, but locomotives and passenger cars shall need to be purchased in sufficient quantity for transportation at the peak time, and crossings with overpasses or underpasses shall be needed to avoid blocking main roads. Therefore, significant investment shall be required.

With regard to the urban railway between Asunción and Concepción, neither passenger nor freight conveyance has sufficient demand for railway transport. Sufficient demand by passengers can be expected only between Asunción and Ciudad del Este. The current railway route does not coincide geographically with the flow of the main export grain. Therefore, the railway section in Paraguay is now standing at a crossroads: whether to make revisions of routes, which will require construction on a large scale, or to discontinue the existing routes.

(5) Organizations and system

Organizations related to transport and issues regarding their operation can be summarized in four points.

1) Lack of public investment

The development of social capital in Paraguay is delayed because of the low level of public investment. Improvement of social capital has an important effect in bringing a comfortable life to people and providing a base for the economy. As its funding source is taxes, growth of the economy results in an increasing social capital standard, and improvement of social capital leads to growth of the economy. Therefore, funds for the repair of transportation infrastructure shall be brought from sources other than existing taxes. Based on the benefit principle, a system to collect funds from the users of the transport system shall be prepared.

2) Concentration in road administration

Roads in Paraguay are under the administration of MOPC, with few exceptions. It is obvious that local governments with a small financing scale cannot take care of everything, but it’s also impossible for MOPC to do so. This situation has resulted in the delay of road repairs in rural regions. It’s necessary to make clear the distinction among National Roads, Departmental Roads, Rural Roads, and Farm Roads, and to enrich the road plans/administering organizations in local governments, enabling the decentralization of power.

3) Insufficient control (planning) standards

Expansion in the transport infrastructure, especially in road extension, results in increase of the cost and time required for maintenance and administration. In Paraguay, the design standards for roads are basically those of Brazil. Moreover, those standards are applied only for national and equivalent roads, and there is no consideration for local roads. It's necessary to prepare planning/design standards for each type of road, and to make clear the standards for maintenance and administration.

4) Delay of data control

In order to elaborate the transportation plan, it's necessary to grasp the current situation of installations and usage. However, as the control of data is not centralized, there are cases in which the data are fragmented or inconsistent. It's required to collect necessary data periodically, and to review the organization from the viewpoint of data control.