20.6 Impacts

20.6.1 Impacts of Trunk Bus

(1) Impacts on Bus Users

The Study Team conducted a State of Preference (SP) Survey, in order to forecast the possible impact of trunk bus on users.

The number in the sample is 100 and the interviews were conducted using a structured interview sheet. Samples were selected at random among those who had been waiting for buses in Micro-Centro. The findings of the survey are shown below.

1) Basic Data of Sample Users

With regard to the sex of samples, 62% are male and 38% are female. Their profession is shown in Fig. 20-6-1.

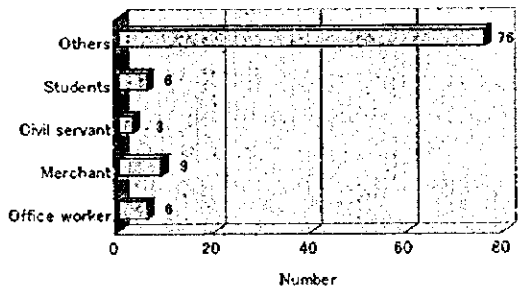

Fig. 20-6-1 Profession of Sample People

Other professions include a great number of self-employed people. As far as their motives of the use for bus are concerned, 85% of the samples responded that they use bus for going to work (Fig. 20-6-2).

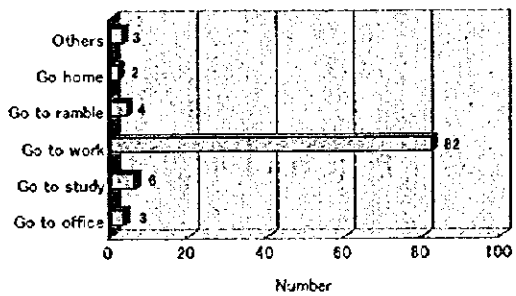

Fig. 20-6-2 Motives of the Use of Bus

2) Average Waiting Time at Bus Stops

The Survey studied the actual average waiting time of sample people at bus stops. The following is the findings. It has revealed that most sample people catch a bus within five minutes.

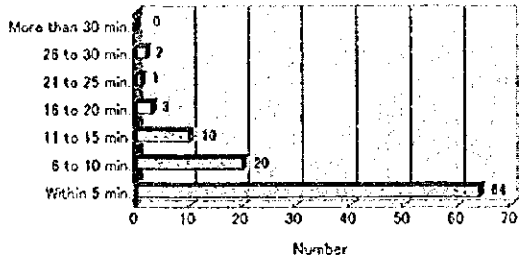

Fig. 20-6-3 Average Waiting Time at Bus Stops

3) Preference for the Use of Trunk Bus

The Study Team explained about the nature of trunk bus and asked if they would like to use it. All the sample people gave a positive response (100% yes).

4) Conditions of the Use of Trunk Bus

However, in order for them to use trunk bus, there are some conditions in terms of trip time from San Lorenzo to Asunción, bus fare and transfer time from other feeder buses.

It is estimated that, in the future, due to heavier traffic congestion, the trip time by bus from San Lorenzo to Asunción will be more than an hour, while it actually takes about 45 minutes. The question was asked by how much time the sample people would like trunk buses to reduce this time in order to encourage them to use them. The findings are shown in Fig. 20-6-4.

According to the findings, most sample people responded that they would use trunk bus, if the trip time from San Lorenzo to Asunción would be reduced from 60 to 20 minutes.

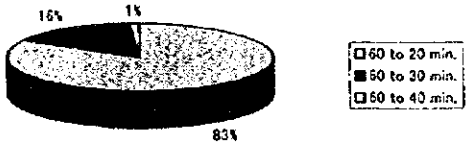

Fig. 20-6-4 Preferred Time Reduced

Fig. 20-6-5 shows preferred tariff for the combination of trunk bus and feeder bus.

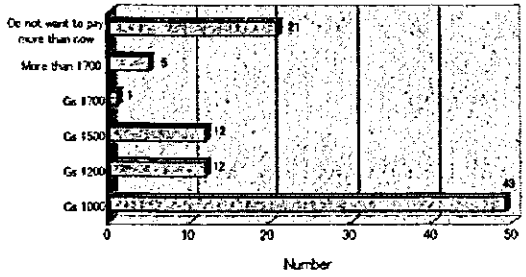

Fig. 20-6-5 Preferred Tariff

The survey has revealed that 49% of sample people responded that they could pay Gs 1000 for the new system. 18% of them responded that they could pay even Gs 1500 or more. On the other hand, 21% of sample people responded that they would not like to pay more than that they pay now.

With regard to the preferred transfer time, their preference is clearly divided into three groups: within 1 minutes, 5 minutes and 10 minutes. Among sample people, four people responded they would not like to transfer at all.

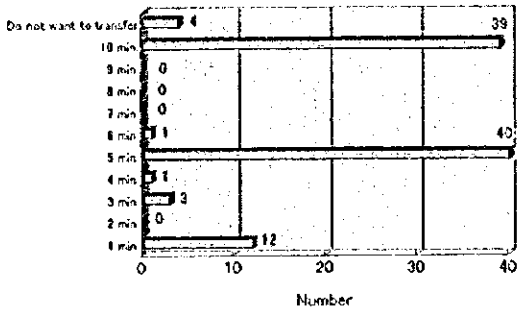

Fig. 20-6-6 Preference of Transfer Time

Among above-mentioned three conditions, the most determinative factor seems to be the reduction of trip time. Fig. 20-6-7 shows the most important factor that encourages them to use trunk bus system.

Fig. 20-6-7 Most Important Factors for the Use of Trunk Bus

According to the forecast, in the year 2010, in case the trunk bus system has been introduced, the trip time from San Lorenzo to Asunción will be reduced by 30% compared with Do-Nothing case. Since the most important factor for the use of trunk bus appears to be the reduction of trip time, it is very likely that bus users will shift from feeder buses to trunk bus, which will significantly contribute to improving an actual supply-driven over-serviced bus transport system and also improving environmental conditions.

A possible negative impact of trunk bus is that some people, especially from the low-income households, could not be benefited by the system since the fare of trunk bus is somewhat costly.

(2) Impacts on Traffic Conditions

1) Impacts on Traffic Congestion

Fig. 20-6-8 shows the comparison of Total Trips in 1998 and 2015, both with project and

without project.

Table 20-6-1 Comparison of Trip End in case of Do Nothing and With Project

	Do nothing		With project	
	Car	Bus	Car	Bus
2015	2,314,000	1,958,000	2,069,000	2,204,000

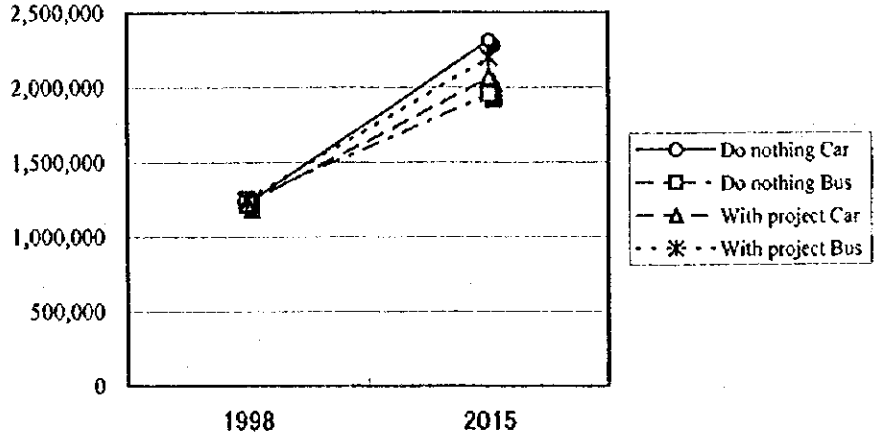

Fig. 20-6-8 Comparison of Trip End in Case of Do Nothing and With Project

As the Table and Figure show, in case there is no project, in 2015, Trip End of car will significantly increase, while with project Trip End of bus will slightly increase. This tendency will be more obvious if one looks at the following table and figure, which shows the proportion of cars and buses.

Table 20-6-2 Comparison of Vehicle Proportion in Case of Do Nothing and With Project

	Do nothing		With project	
	Car (%)	Bus (%)	Car (%)	Bus (%)
1998	49.4	50.6	49.4	50.6
2015	54.2	45.8	48.4	51.6

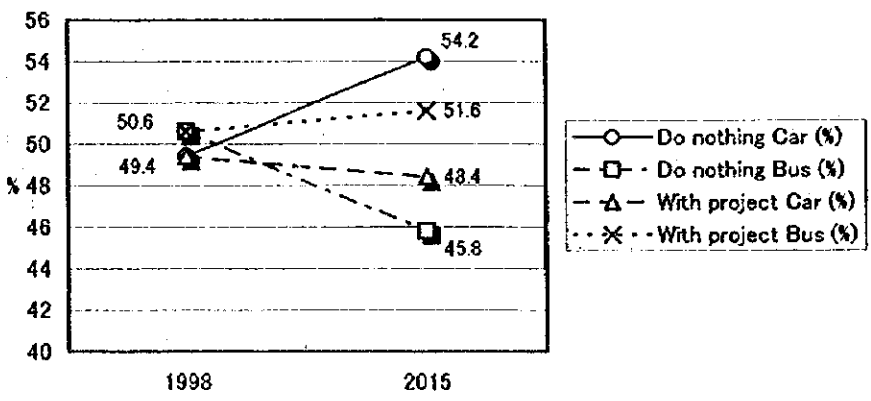

Fig. 20-6-9 Comparison of Vehicle Proportion in Case of Do Nothing and With Project

Consequently it can be said that in case the trunk bus system is introduced on Avenida Eusebio Ayala, it will significantly contribute to decreasing car numbers, which in turn contributes to

easing traffic congestion in the Study Area.

2) Impacts of Change of Direction Regulation

According to the introduction of trunk bus, the regulation of direction between Don Bosco and Brasil will be changed. This change in the regulation of direction might at first cause, confusion among drivers and traffic accidents. In addition to that, some people might experience inconvenience in terms of delays in arriving at their destinations while arriving at their destinations earlier will benefit others.

3) Impacts of Removal of Parking Lots in Trunk Bus Route

Since a trunk bus lane will be set up in Centro, especially along Humaita and a part of Pettirossi, regulated parking lots on the street will be removed. According to the calculation of the Study Team, 304 parking lots will be removed, which will cause some vehicle users inconvenience.

4) Impacts of Longer Distance between Trunk Bus Stops

Bus stops of trunk buses will be set up every 1 km, which is much longer than actual bus stops, which are found at every corner. It may cause inconvenience to some bus users, who have to walk longer to their destinations.

5) Impacts of Alteration of Other Bus Routes and Services

According to the introduction of trunk bus, some existing bus routes would have to be altered. Table 20-6-3 shows the contents of alteration. Some bus lines, which actually have services to Centro via Ayala, will be used as feeder to Ayala, where users are obliged to transfer to trunk buses. Those buses, which actually have services to Centro via San Lorenzo, will terminate their services at the proposed San Lorenzo Bus Terminal and users will have to take trunk buses to Centro. Moreover, some bus lines will be integrated into one line. The impacts of this bus route and lines alteration might cause inconvenience to some users, who have to transfer from feeder to trunk buses.

Table 20-6-3 Alteration of Existing Bus Routes and Services

Line	Distance	Route	Alteration
02-2	50.2	Bo. Sajonia-Lorna Pyta	Feeder bus to Ayala
10-1	39.1	Fe. Mora-Bo. Tacumbu	Feeder bus to Ayala. Access will be also altered.
10-2	39.1	Fe. Mora-Bo. Tacumbu	Feeder bus to Ayala
11-1	63.8	Areguá-Bo. Pettirossi	Feeder bus to Ayala
11-2	61.5	Areguá-Bo. Pettirossi	Feeder bus to San Lorenzo. Connected to Trunk Bus at San Lorenzo Bus Terminal.
15-2	55.9	S. Antonio-Bo. S.Antonio	Feeder bus to Ayala
17-0	47.0	Luque-Bo. Bañado Sur	Feeder bus to Ayala
18-1	47.6	Ñemby-Bo.Dr. Francia	Feeder bus to Ayala
19-1	52.1	San Lorenzo-Lambaré	Feeder bus to San Lorenzo. Connected to Trunk Bus at San Lorenzo Bus Terminal.
20-1	56.6	S. Lorenzo-I.P.Punta	Feeder bus to San Lorenzo. Connected to Trunk Bus at San Lorenzo Bus Terminal.
20-2	47.1	S. Lorenzo-I.P.Punta	Feeder bus to San Lorenzo. Connected to Trunk Bus at San Lorenzo Bus Terminal.
27-0	62.5	Capiata-Bo. Republicano	Feeder bus to San Lorenzo. Connected to Trunk Bus at San Lorenzo Bus Terminal.
29-2	49.3	San Lorenzo- Bo. Sajonia	Feeder bus to San Lorenzo. Connected to Trunk Bus at San Lorenzo Bus Terminal.
33-1	44.0	Fe. Mora-Bo. Obrero	Feeder bus to Centro via Ayala, however, it is integraded with 33-2,3 to be one line.
33-2	48.3	Fe. Mora-Bo. Obrero	Feeder bus to Centro via Ayala, however, it is integraded with 33-1,3 to be one line.
33-3	42.0	Fe. Mora-Bo. Obrero	Feeder bus to Centro via Ayala, however, it is integraded with 33-1,2 to be one line.
43-0	52.8	Capiata-Bo. Pettirossi	Feeder bus to San Lorenzo. Connected to Trunk Bus at San Lorenzo Bus Terminal.
45-0	55.9	San Lorenzo-Tacumbu	Feeder bus to San Lorenzo. Connected to Trunk Bus at San Lorenzo Bus Terminal.
47-0	51.5	Ypane-Bo.Pettirossi	Feeder bus to Ayala
59-0	62.8	Capiata-Bo. I.P.Punta	Feeder bus to San Lorenzo. Connected to Trunk Bus at San Lorenzo Bus Terminal.

(3) Impacts on Air Quality and Noise Level

1) Impact on Air Quality

The Study Team projected the value of NOx in the year 2015 based on the air quality monitoring result, which was conducted by the Team (see Chapter 7).

Based on the monitoring, it was found that there is the following relationship between the value of NOx and traffic volume, heavy vehicle ratio and velocity.

$$Y=0.000000976X+0.000762X2+0.000277X3$$

Y: Value of NOx
X: Coefficient of traffic volume (PCU: passenger car unit)
X2: Coefficient of heavy vehicle ratio
X3: Coefficient of velocity

Table 20-6-4 shows the projection of traffic volume, heavy vehicle ratio and velocity in the year 2015 with and without project at principal intersections on Eusebio Ayala. The projected values of NOx are indicated in Fig. 20-6-10.

Table 20-6-4 NOx Projection in the Year 2015 with and without Project

	Without Project				With Project			
Eusebio Ayala/	Traffic volume	Heavy vehicle ratio	Velocity	NOx	Traffic volume	Heavy vehicle ratio	Velocity	NOx
General Aquino	29,809	41	22.82	0.07	17,174	25	27.79	0.04
General Santos	56,937	69	16.22	0.11	31,134	17	45.25	0.06
Kubitscheck	73,345	51	7.43	0.11	47,166	10	29.79	0.06
Choferes del Chaco	64,752	53	11.15	0.11	50,311	7	26.32	0.06
Republica Argentina	49,483	71	22.85	0.11	51,711	7	24.83	0.06
De la Victoria	65,158	35	10.94	0.09	52,795	6	23.70	0.06
Madame Lynch	135,634	14	3.51	0.14	64,334	10	13.89	0.07
Juan Leopardi	136,463	10	3.43	0.14	61,391	8	15.99	0.07

As shown in the Fig. , it is implied that, with the introduction of trunk bus on Eusebio Ayala, the values of NOx in the year 2015 will be significantly reduced.

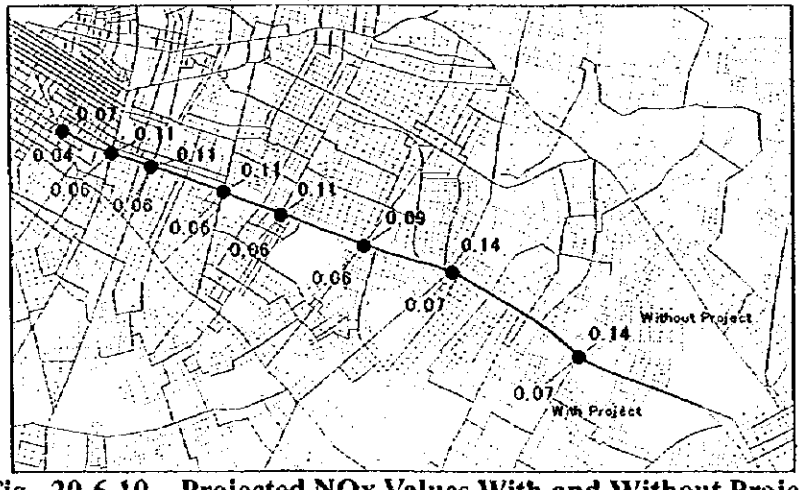

Fig. 20-6-10 Projected NOx Values With and Without Project

In the year 2015, traffic volume will inevitably increase, compared with present, and it is expected that NOx values will also increase. However, the projected NOx values have been decreased. This implies that, with the introduction of the trunk bus system, the proportion of buses, whose NOx emission volume is ten times greater than that of car's, will decrease and, due to the reduced traffic congestion, the velocity of vehicles will also increase, which significantly contributes to reducing NOx emission.

2) Impact on Noise Levels

The Study Team projected noise level (LEQ) at principal intersections on Eusebio Ayala in the year 2015 for with and without project cases. Table 20-6-5 shows the projection.

Table 20-6-5 Value of LEQ in the year 2015 for with and without Project cases

Eusebio Ayala/	LEQ (present)	LEQ (without project)	LEQ (with project)
General Aquino	74.4	76.4	74.0
General Santos	79.8	81.6	79.0
Kubitschek	75.7	78.0	76.1
Choferes del Chaco	80.3	82.2	81.1
Republica Argentina	80.3	80.5	80.6
De la Victoria	78.9	80.7	79.8
Madame Lynch	79.6	83.7	80.4

The present LEQ values are based on the monitoring, which was conducted by the Team. Future values were calculated based on traffic volume forecast in the with- and without-project cases at each intersection.

The increase of value of LEQ was calculated based on the change of traffic volume by the following formula:

$Y=10\log(Q1/Q2)$

Y: Value increased
Q1: Changed traffic volume
Q2: Original traffic volume

The above table implies that, at most intersections, where future traffic volume will increase, the introduction of trunk bus system will contribute to minimizing the increase of noise level.

20.6.2 Impacts of Road Widening and Viaduct and Bus Terminal Construction Activities

(1) Impacts on Existing Infrastructure

1) Impact on Roads Crossing the Proposed Road:

A road such as this Eusebio Ayala would inevitably intersect with a great magnitude of other roads ranging from main streets to minor roads. Current road users of all these crossing roads will be affected by this project, in particular during the construction period and at new viaducts. They have to find alternative ways to cross over.

2) Impact on Medium Tension Power Lines and Telecommunication Lines

There are significant numbers of underground medium tension power lines and telecommunication lines along the proposed route. Cost associated with relocation of these lines is significantly high.

The identified medium tension power lines in the field survey are as follows:

Eusebio Ayala/
- Mariscal Francisco Solano López
- Choferes del Chaco
- Amancio Gonzalez
- Juan del Castillo
- Club Guarani
- Teniente Ettienne

3) Impact on Traffic Congestion during Construction Period

Since during the construction of viaduct and widening period, one side of the road will be controlled, it will cause obvious temporary traffic congestion and affect vehicle users.

(2) Impacts on Air Quality and Noise Level during to Construction Period

1) Impact on Air Quality

Air borne particles generated by construction activities such as quarrying, borrowing, transportation, unloading and stockpiling of materials and vehicle and machinery emissions, all will have an adverse impact on the quality of air in the vicinity of activities. Air borne particles may cause nuisance in nearby areas, too, if carried by strong winds.
Increase in gases such as CO2, CO, NOx and hydrocarbons should be anticipated in the affected area. This could have an adverse impact on human health and ecology during the construction phase.

2) Impact on Noise Levels

If machinery and equipment used in the construction activities are within the international standards, (dB(A)42) the noise level is not expected to increase dB(A)90 level even during the peak period of construction.

However, use of old and unserviced machinery and equipment could produce noise levels above dB(A)90 during peak periods when a number of machines / equipment are operated simultaneously in one location.

(3) Impacts of Formation of Embankments

Construction of Embankments in Centro Bus Terminal site would involve transporting earth, sand and gravel using dump trucks. The volume of earth is estimated to be about 13,000m3. However, since the earth and other aggregates will be transported by ship and the construction site is situated next to the berth, possible damage by earth and aggregate transportation on road will not be anticipated.

Increased emission of dust by the added traffic along the haul roads could cause a nuisance to roadside residents. The increase in road traffic could give rise to congestion on the haul roads.

Machinery to be used in construction activities viz. Concrete mixing and batching plants, asphalt concrete plants, the movement of such machinery and other heavy machinery as JCBs, unloading and stock piling of sand, gravel and aggregate, will cause dust emissions. Further, cut and fill operations along the proposed site and drilling, blasting and loading operations in the quarries and borrow areas will generate dust. However, borrow areas are unlikely to generate as much dust as quarries. The dust emissions may cause health hazards and nuisance to residents, in addition to having a nuisance impact both on residents and their property.

Noise and vibrations from operation of machinery, transportation trucks, drilling, blasting, crushing and loading operations in the quarries and borrow areas may cause adverse impacts in the vicinity. Operation of construction machinery could give rise to pollution by fuel, lubricant and hydraulic fluid spills, spent lubricants and hydraulic fluids, used tires and tubes, used batteries and their components, used filter elements, engine parts, packing cases etc.

(4) Impacts on Safety of Road Users

The nature of the project requires widening of existing roads and the construction of viaducts. Therefore possible interference of construction traffic, with the normal traffic along existing roads is comparatively high during the construction period. Construction traffic coming in and out on the road and at intersections will create traffic hazard situations to the normal road users, unless proper construction traffic control system is adopted. Nighttime accidents can occur if uncompleted construction works on existing roads are not attended properly, giving advance warning to drivers.

On the other hand, once it is in operation, since the system will have adequate infrastructure for the circulation of vehicles and pedestrians - such as viaducts, traffic lights, special circulation roads – the possibility of vehicle-vehicle or vehicle-pedestrian accidents may decrease.

(5) Impact on Hydrology and Drainage Pattern

The project includes the pluvial drainage in Eusebio Ayala Avenue, especially on the point of chaos on Boggiani Avenue, it is necessary to be the connected to an important collector in the city. The project consequently will improve existing flood problem.

(6) Impact on Land Use

Improvements in mobility and accessibility are a positive impact. However, widening of existing road will be a negative impact on affected buildings.

A major impact of the project on land use is the acquisition of land for the road, resulting in relocation of people and businesses, schools, offices, public utilities etc.

(7) Impact on Resettlement

Disturbances from the construction and widening activities can be reduced through early identification of possible minor changes to the horizontal alignment at the preliminary design stage in order to avoid highly populated areas. Close inspection and public consultation,

concentrated along the route at the start of the preliminary design is important so that the design engineers can seek various measures within the engineering standards to minimize the magnitude of relocation and resettlement.

Table 20-6-6 shows the number of properties to be resettled by widening of Eusebio Ayala. Out of 731 properties along the section for widening of Eusebio Ayala, 157 properties will be resettled or affected and 71% of them are commercial properties.

On the other hand, in terms of San Lorenzo Bus Terminal construction, it is expected that ten shops will be resettled. And for the extension of Humaita Street, 8 shops and buildings are to be affected.

Since most of the properties affected are for commercial purposes, it is extremely important to secure their economic activities by finding for them alternative places, which are convenient for them to continue their businesses.

According to social surveys on road widening of Eusebio Ayala between General Aquino Street and San Lorenzo, in which 150 sample families in total were selected at random, it seems that affected people are reluctant to be resettled. In the detailed design stage, this must be well taken into account.

Table 20-6-6 Number of Properties to be Resettled or Affected by Widening of Eusebio Ayala

Section	Residential	Commercial	Deposit	Community & Institutional	Industries
Perritossi-Santos	1	16	0	0	0
Santos-Kubistcheck	1	9	0	2	0
Kubistcheck-Chofer	1	12	3	2	0
Chofer-Argentina	1	11	3	1	0
Argentina-La Victoria	0	5	1	0	0
La Victoria-Defensores	2	6	1	0	0
Defensores-Leopardi	13	38	5	1	0
Leopardi-San Lorenzo	3	15	4	0	0
Total	22	112	17	6	0

Fig. 20-6-11 shows the opinion of sample people who live along Eusebio Ayala on the widening of the avenue.

General Aquino-Madame Lynch | Fernando de la Mora | San Lorenzo

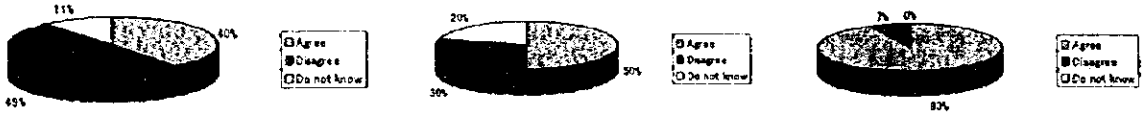

Fig. 20-6-11 Opinion on Widening of Eusebio Ayala

Sample people, in particular, in Fernando de la Mora agreed to the idea of widening of Eusebio

Ayala, however, when it comes to resettlement, many of them are very reluctant (Fig. 20-6-12).

General Aquino-
Madame Lynch

Fernando de la Mora

San Lorenzo

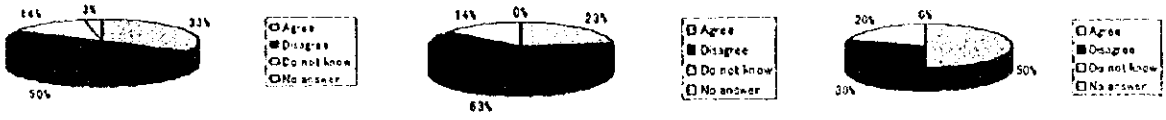

Fig. 20-6-12 Opinion on Resettlement of Eusebio Ayala

There are some people, who answered that they do not know, since the conditions of resettlement compensation will be defined in negotiation at detailed design stage.

(8) Social Impacts

1) Impact on people of the area

There will be some negative as well as positive impacts of the proposed road on the people in the area. The following are both negative and positive impacts that can be expected:

A. Negative impacts:

The magnitude of negative impacts would be high along the whole route, in which population density is very high. As the population density is extremely high in the area these negative impacts are unavoidable. Land fragmentation and small size of holdings etc. increases the seriousness of this negative impact. The properties likely to experience negative impacts are as follows:

- Congested housing, where density of houses is rather high and therefore, constructing a viaduct and road widening in the areas is extremely sensitive. Many of these houses are large and modern and the cost of the properties would be extremely high.

- Those of small land holdings, majority of which are houses and business establishments, are built on small land holdings where there is no adequate space to shift their buildings within the land if they have to do so. On the other hand many residents in these areas have no other land to build their houses on if they are resettled.

- Long-term affiliation to the area, especially businessmen who have been in the area for a long time have developed relations with the community. Their long-term marketing linkages with the customers also will be affected if they are evicted from the existing places.

- The construction of terminals may adversely affect the living in lifestyle characteristics of neighbors, in terms of the increase of traffic, increase of possibilities of accident, the change of land use (from residential to commercial), a decrease of social safety.

- At the terminal sites, there will be overpopulation of salespeople and clients. This will cause some environmental problems such as: high levels of noise pollution, contamination by

garbage, and deterioration of urban scenery.

B. Positive impacts:

- The areas, where traffic congestion is serious, will benefit more from the road widening and viaduct construction.
- Transport facilities to Centro will be significantly improved and this will save time wasted in traveling between San Lorenzo and Centro.
- Value of properties such as land price will increase.
- The construction of terminals will create various service facilities and, as a consequence, an immediate "Urban Development" in the surroundings will happen.
- The implementation of the project will create jobs, since it will require qualified and unqualified labor. It will also attract informal sellers of different articles and it will generate income for different social strata.

2) Sociological and anthropological impacts

Significant negative sociological impacts other than those mentioned above cannot be expected in the area. The communities in urban areas are not so cohesive and lack the sense of belonging together, observed in many rural types of societies in the country. A serious problem that may be faced by the urban communities is loss of business relations with their customers and non-availability of similar livelihood opportunities in other locations if they are relocated. The migrated people who have settled down in the urban areas too will be affected, due more to economic reasons rather than to social ones. If they are to be resettled, it will be a serious problem for them to find suitable places for them to build new houses and settle down. Psychologically they will be seriously affected

If there would be no damages to the existing houses and other buildings, there will be significant positive impacts on the community. Development of the area and increase of sland value are some positive impacts that would help to create positive attitudes in the mind of the people.

3) Impact on cultural ties and other cultural aspects

The proposed development project will not require complete evacuation of communities. Only some families may have to be completely resettled or in many cases on-site resettlement may be possible. Therefore, the cultural ties developed over time in the area may not be seriously affected.

4) Impact on landscape and landmark

The Study Team has not identified any significant places, which will be affected in terms of landscape and landmark, since the area is already an highly populated urban area. However, the construction of four viaducts at four major intersections on Eusebio Ayala will significantly alter the landscape of surrounding area.

20.7 Mitigation Measures

20.7.1 Introduction of Trunk Bus

In order to mitigate the adverse impacts of trunk bus system introduction, the following measures could be adopted:

- Adopt public awareness programs through radio, newspapers and televisions, etc. in order to make people fully understand the nature of trunk buses, change of direction on Don Bosco and Brasil, removal of some regulated parking lot on Humaita and Pettirossi and alteration of some feeder bus services

- Use of proper warning signs and advance direction boards on streets, whose direction will be changed

- Provide alternative parking lots for users of present regulated parking spaces, which will be removed

- Provide complementary transport system to trunk bus users, such as microbuses, in Centro in order to improve the inconvenience of longer distance between trunk bus stops

- Examine the introduction of policies and/or systems such as discount ticket for people from low income households, who will use trunk buses

20.7.2 Impacts on Air Quality and Noise Level

As vehicular traffic in the proposed route will emit gaseous pollutants to the atmosphere mitigation of air pollution requires national, regional and local policy and its enforcement. Mitigation of excessive noise levels at the source also requires policy and enforcement at the above level.

20.7.3 Impact on Resettlement:

- Explain and inform sufficiently to the people, who will be resettled, about the nature and necessity of the project and gain consensus

- Conduct detailed household survey at detailed design stage in order to understand the exact magnitude of impact of resettlement

- Based on the above survey, prepare a detailed resettlement or expropriation plan and laws, which will minimize adverse impact of resettlement

- Based on the expropriation plan, appropriate amount of compensation will be paid to the relocated people

20.7.4 Social Impacts

It is difficult to propose specific mitigation measures to prepare mitigation implementation plans. This is due to the inability to identify the exact properties that would be affected by the proposed project. Therefore, at this stage the mitigation measures are proposed to address the

generally identified negative environmental impacts.

It is proposed that project developers should make attempt to avoid as much as possible resettlement. All the properties affected should be properly compensated. It is worthwhile to mention that the compensation plan should be well designed and implemented to satisfy the affected community.

Mitigation measures should be implemented with the full participation of the affected communities. The community members also will be knowledgeable to provide inputs to plan and design such measures.

Resettlement should be considered as the last resort. It is strongly recommended for on-site resettlement. This will help to mitigate the likely negative social impacts. If people are to be relocated, they should be resettled in the vicinity of their present residences so that they can live in the environment with which they are more familiar.

20.8 Monitoring Plan

20.8.1 Environmental Monitoring

Representatives from the Directorate of Environmental Ordinance (DOA), Ministry of Agriculture and Livestock, Asunción Municipality Government, Ministry of Public Works and Communications and other organizations concerned including NGOs active in environmental issues shall be included in the Monitoring Committee that will be established to monitor the implementation of environmental safe guards for the project.

The committee may co-opt specialists from the Universities for advice on specific issues as required.

The committee should monitor whether the project is carried out in accordance with the recommendations made in the section on mitigation measures.

An officer should be assigned to ensure that proper disposal of debris is carried out. He/she should submit a biweekly report to the Monitoring Committee.

Monitoring Committee should frequently visit the project sites to ensure that machinery is properly maintained and construction materials are properly managed in order to prevent pollution to the surrounding land and aquatic environment by oil, asphalt, cement etc.

Monitoring Committee should also ensure that plantation of trees on the road side in other areas is carried out without delay.

The DOA, with the help of relevant authorities, should ensure that the industrial, residential and commercial activities do not encroach into the project site.

Regular Air Water and Noise level testing, after ascertaining the base line before construction, would indicate the adequacy of the mitigation action recommended. Thus, it is necessary that the Monitoring Committee facilitate this testing with the assistance of the Asunción Municipality Government.

20.8.2 Monitoring Plan for Socioeconomic Aspects

It is proposed to set up a three-tier committee system to monitor the planning and implementation process of the mitigation measures with respect to social issues, in particular, resettlement. The different levels of the proposed committee system and details of its membership are shown in Table 20-8-1.

Table 20-8-1 Monitoring Committee of Socioeconomic Aspects

Level	Member-ship
Lower level- at community level (Comiciones Vecinales)	Community representatives, representing the interest of residents, businessmen, industries etc.
Middle level committee- at municipal level	Officer in-charge of land in municipalities (Asunción, Fernando de la Mora, San Lorenzo) Social Service Officer in municipalities Representative from Asunción Municipal Government Representative from Ministry of Public Works and Communications, Environmental Department Representative from DOA NGOs
Top level committee, at Asunción Municipal Government head office level	The project Director of Asunción Municipal Government as the chairman. Representative from DOA Representative from construction agency if a private party is involved. Representative from consulting firm, if such arrangement are made. Other representatives from organizations concerned including NGOs

The above mentioned committee system should function during the planning and construction stage of the project. The members of the committees, whose roles are not directly related to road development and environmental aspects of the country, should be paid cash incentives for their involvement in the activities of the committees. The basic functions of the different committees with regard to monitoring are mentioned in tables as follows.

(1) Functions of the Community Level Committee

During planning the committee should meet with the parties of the project development and provide inputs for them to plan the social mitigation activities effectively. The nature of inputs would include:

- Review of the mitigation measures proposed by the consultants
- Propose their views and discuss them at the committee
- Prepare a document indicating their views and submit it to the municipal level committee
- Obtain the responses of the municipal level committee to their suggestions and views
- During implementation stage the committee should monitor how the project implementers address the environmental concerns they raised at the planning stage. In this regard the

committee should carryout the following functions

- Inspect the project activities within the jurisdiction of *Comicion Vecinal*
- Discuss with affected people and prepare periodical reports
- Submit such reports to the committee functioning at municipal level
- Review the responses of the municipal level committee to their complaints
- Provide feedback to the affected parties

(2) Functions of the Municipal Level Committee

1) Planning stage

This committee should review the mitigation plans proposed by the consultants and offer their views.

The views expressed by the community level committees on the mitigation plans should be synthesized into one document for review at the committee. It should forward a copy of the synthesized document to the top-level committee at Asunción Municipal Government.

The reports prepared by the community level committees should be reviewed and whatever comments on those reports should be reported to the respective communities within the municipality.

A summary report of the issues at municipalities should be forwarded to the Asunción Municipal Government level committee.

2) During implementation

The frequent reports sent by the community level committees should be reviewed and reported back to the particular community level committee within the municipalities.

The problems that cannot be handled at the municipal level should be forwarded to the Asunción Municipal Government level committee.

When necessary the field visits should be made to oversee the implementation of mitigation plans.

(3) Functions of Asunción Municipal Level Committee

This should function as an apex body of the municipal level committee. The Asunción Municipal Government does not have authority to direct the other municipalities but the nature of this committee does not require any authority because this will function as a process management body. The Asunción Municipal Government and the other municipalities can implement activities falling within their authority. The Asunción Municipal Government level committee can function as the main body responsible for maintaining overall projects related information.

This committee reviews the mitigation measures proposed by the consultants and also compares such measures with the views of the respective municipal level committee.

During implementation stage, the periodical reports sent by the municipal level committees should be synthesized into a single document. The problems that require the attention of the top-level committee should be attended to at this committee.

Chapter 21 Economic and Financial Evaluation of Priority Projects and Programs

21.1 Implementation Plan of Priority Projects and Programs

Projects with high priorities are described below. It is urgent to implement them before 2005.

Projects on Av. E. Ayala and Mcal. Estigarribia, widening, and the introduction of the trunk bus system, are regarded as the first priority projects and will be completed in five years. Construction of flyovers accompanying the widening is particularly urgent and thus will be executed in three years, for the intersections of Av. Rca. de Argentina and Av. Kubitschek are already saturated. In the first three years, moreover, drainage improvements on Av. E. Ayala and surface drainage improvements on Mcal. López will be implemented. The bus terminals in Centro and San Lorenzo will be completed in 2004, as the facilities will be necessary to start the trunk bus operation.

Road networks will be developed in response to increasing traffic demands from the north and south. In particular, as ring roads that supplement major radial trunk roads, Gral. Santos and Chof. del Chaco will be widened and utilized to make stronger connections between Av. España, Mcal López, and Av. Fdo. de la Mora. Projects of these four roads will be carried out in three years after 2002.

As policy and planning measures to support the projects mentioned above, traffic management projects, particularly the traffic signal system, will be completed by 2005. Table 20-1-1 shows short-term priority projects and programs that will be finished before 2005.

Table 21-1-1 List of Short-term Priority Projects

	Number	Name		Lanes	Length	Cost (1000US$)							
						Construction	Land	-2005	2000	1	2	3	4
AV. E. AYALA	103	Av.Eusebio Ayala(General Aquino-Calle Ultima)	Widening	6	6.45	29,370	3,338	32,708	6,542	6,542	6,542	6,542	6,540
	104	Av.Eusebio Ayala(Calle Ultima-San Lorenzo)	Widening	6	4.54	20,672	4,842	25,514	5,103	5,103	5,103	5,103	5,102
From the South	113	Av.Itá Ybaté	Pavement	4	3.22	2,613		2,613		1,307	1,306		
From the North	121	Gral. Rafael Franco	Widening	4	2.04	2,986	984	3,970			1,323	1,323	1,324
	122	Julio Corréa	Widening	4	1.61	2,356	1,020	3,376			1,125	1,125	1,126
	123	Tte.2do M.Pino Gonzalez	Widening	4	0.99	1,448	628	2,076			692	692	692
Circulation	109	Av.Gral. Santos	Widening	4	2.41	2,855	2,147	5,002			1,667	1,667	1,668
	110	Av. Chef. del Chaco	Widening	4	2.09	3,412	244	3,656			1,219	1,219	1,218
Traffic control	701	Traffic signal system				2,497		2,497				1,249	1,248
	702	Sign posting				218		218				109	109
Intersection	401	Av.Eusebio Ayala / Av. Rca. Argentina(bridge)		6x4(2)		1,699	357	2,056	685	685	686		
	402	Av.Eusebio Ayala / Av. Chef. del Chaco(Bridge)		6x4(2)		1,633	473	2,106			702	702	702
	403	Av.Eusebio Ayala / De La Victoria(Bridge)		6x4(2)		2,018	580	2,598			866	866	866
	404	Av.Eusebio Ayala / Bartolome de las Casas(kubitsheck bridge)		6x4(2)		1,234	608	1,842	614	614	614		
	405	Av.Mcal. López / Av. Chef del Chaco		4x4		71		71			24	24	23
	408	Av.Mcal. López / Av. Gral. Santos		4x4		71		71			24	24	23
	504	Av.Eusebio Ayala(General Aquino-San Lorenzo)		6	10.99	11,548		11,548	3,849	3,849	3,850		
	505	Av.Mcal. López / Sta.Rosa		4x2		1,338		1,338	446	446	446		
	506	Av.Mcal. López / Av.Chef. Del Chaco		4x4		1,337		1,337	446	446	445		
Drainage	507	Av.Mcal. López / Gnal. Garay		4x2		716		716	239	239	238		
	508	Av.Mcal. López / Av. San Martin		4x4		2,130		2,130	710	710	710		
	509	Av.Mcal. López / Bernardino Caballero		4x2		3,328		3,328	1,109	1,109	1,110		
Transport facility	602	Terminal de omnibus / San Lorenzo				3,156	1,265	4,421	884	884	884	884	885
	603	Terminal de omnibus / Centro				942	723	1,665	333	333	333	333	333
	604	Estacionamiento para Omnibus Troncal				715	449	1,164				582	582
						100,363	17,658	118,021	20,960	22,267	29,909	22,444	22,441

21.2 Economic Evaluation of Priority Projects

21.2.1 Economic Cost

Project costs estimated in Chapter 17 to 19 are expressed in the financial price and they are converted into economic cost, taking the process shown in Fig. 21-2-1.

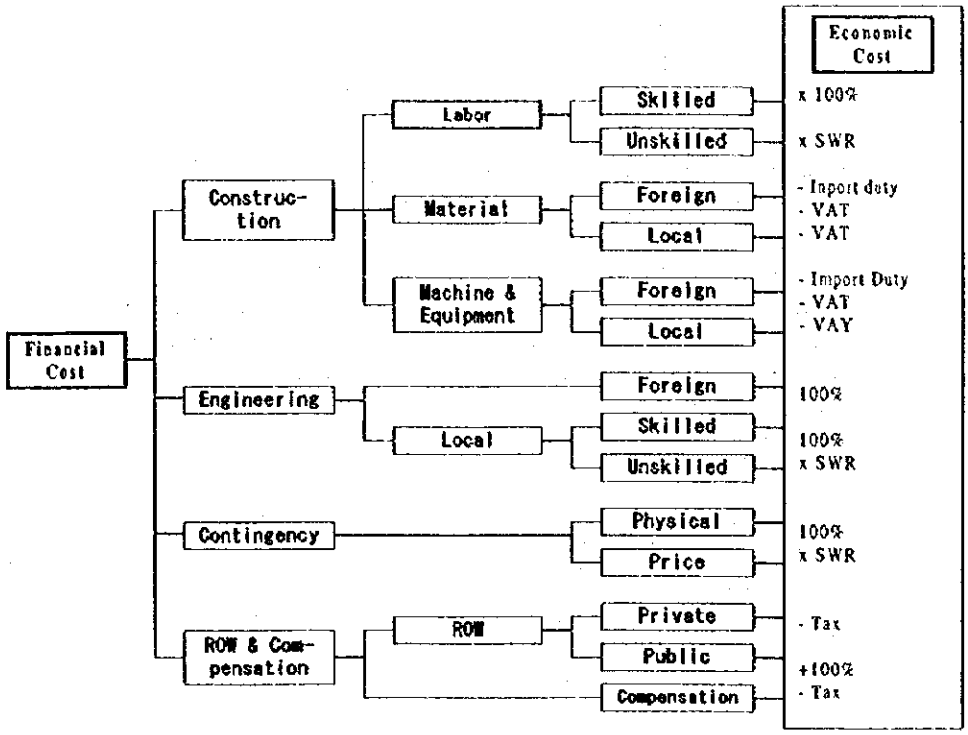

Fig. 21-2-1 Conversion from Financial to Economic Cost

The points of this conversion procedure are as follows.

- Construction cost is broken down into three cost items: material cost, equipment cost and labor cost.
- From the material and equipment cost, import duties and value-added tax are deducted. The tax rate is in the range of 16 to 25%. It is assumed that an average rate is 25% for the goods to be imported, and 22% for domestic goods.
- Assuming 60 to 80% of labor cost is for unskilled labor, a shadow wage rate (SWR) is applied. According to data of Central Bank of Paraguay (BCP), unemployment rate in Paraguay has been in the range of 7-11% (Fig. 21-1-2). Assuming 10% of the rate in average for the long term up to 2015, the SWR is estimated at 75% according to Haveman's formula:

  SWR = (Wage rate in market) x (1.25 – Unemployment Rate / 0.2)
  = (Wage Rate in market) x 0.75

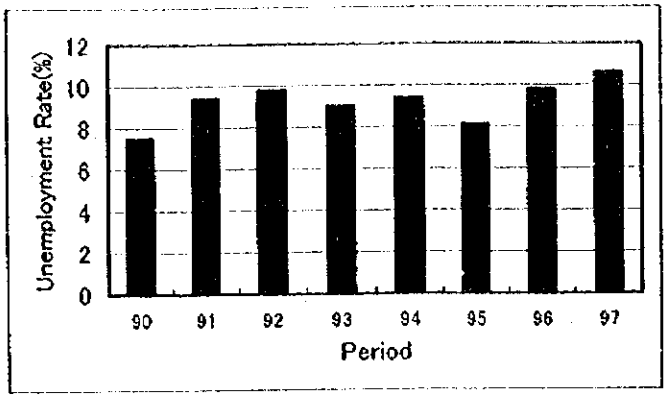

Fig. 21-2-2 Unemployment Rate in Paraguay

21.2.2 Economic Evaluation of Priority Projects

As the cost-benefit cash flow of the project is shown in Table 21-2-1, the economic viability of the project is quite high, showing 29.3% of EIRR and US$53 million of NPV. One of the reasons for this high EIRR is that the trunk bus system project implies a so-called software component of rationalization of bus route.

Table 21-2-1 Cash Flow of Priority Project

Year	COST				BENEFIT				B-C
	Construction	Residual Value	Maintenance	Total	VOC (Distance)	VOC (Time)	TTC	Total	
2000	19,912.0		995.6	20,907.6	0.0	0.0	0.0	0.0	-20,907.6
2001	21,153.7		2,053.3	23,207.0	441.0	2,106.7	999.3	3,547.0	-19,660.0
2002	28,413.6		3,474.0	31,887.6	882.0	4,213.4	1,998.6	7,094.0	-24,793.6
2003	21,321.8		4,540.1	25,861.9	1,323.1	6,320.0	2,997.8	10,640.9	-15,221.0
2004	21,319.0		5,606.0	26,925.0	3,528.2	16,853.4	7,994.2	28,375.8	1,450.8
2005			5,606.0	5,606.0	4,410.2	21,066.8	9,992.8	35,469.8	29,863.8
2006			5,606.0	5,606.0	5,292.2	25,280.2	11,991.4	42,563.8	36,957.8
2007			5,606.0	5,606.0	6,174.3	29,493.5	13,989.9	49,657.7	44,051.7
2008			5,606.0	5,606.0	7,056.3	33,706.9	15,988.5	56,751.7	51,145.7
2009			5,606.0	5,606.0	7,938.4	37,920.2	17,987.0	63,845.6	58,239.6
2010			5,606.0	5,606.0	8,820.4	42,133.6	19,985.6	70,939.6	65,333.6
2011			5,606.0	5,606.0	9,702.4	46,347.0	21,984.2	78,033.6	72,427.6
2012			5,606.0	5,606.0	10,584.5	50,560.3	23,982.7	85,127.5	79,521.5
2013			5,606.0	5,606.0	11,466.5	54,773.7	25,981.3	92,221.5	86,615.5
2014			5,606.0	5,606.0	12,348.6	58,987.0	27,979.8	99,315.4	93,709.4
2015		49,452.1	5,606.0	-43,846.1	13,230.6	63,200.4	29,978.4	106,409.4	150,255.5
Total	107,107.0	49,452.1	78,335.0	141,003.0	103,198.7	492,963.1	233,831.5	829,993.3	688,990.3

EIRR	29.3%
B/C (r=12%)	2.38
NPV (r=12%)	157,860 Gs million

Note: VOC: Vehicle operating cost
TTC: Travel time cost

By looking at individual projects, it has been found that the trunk bus project on Av. E. Ayala yields much greater benefit than all the other projects. The other projects also produce relatively large benefits with low costs, each of which is thus proved to be economically feasible.

The conversion of auto uses into buses brought about by the introduction of the trunk bus should generate significant benefits, and thus policies for encouraging mode conversion are the

key to the success of the project. It is therefore critical to combine various policy measures such as parking fees in Centro, gasoline taxes, taxes on car ownership in order to generate the maximum benefits.

Table 21-2-2 Economic Evaluation of Priority Projects

Projects	EIRR	NPV (1,000US$)	B/C
All Projects	29.3	157,949	2.38
AyalaTrunk Bus Project	42.3	558,767	8.36
Road Improvement from the North	63.1	93,317	11.72
Circulation Roads	49.7	48,338	7.04
Pavement Project	40.6	10,864	4.76

21.2.3 Sensitivity Analysis

Sensitivity analysis has also been conducted to examine effects on EIRR when costs and benefits change. The economic viability is quite stable even against changes in the stream of costs or benefits. When the benefit decreases by more than 80%, and when benefits decrease by 60% and costs increase by over 20%, the viability of the project is jeopardized. The conversion of auto uses to bus brought about by the introduction of the trunk bus should generate significant benefits, and thus policies for encouraging mode conversion are the key to the success of the project. It is therefore critical to combine various policy measures such as parking fees in Centro, gasoline taxes, taxes on car ownership in order to generate the maximum benefits.

Table 21-2-3 Sensitivity Analysis of Cost and Benefit Change

Benefit Decrease	Cost Increase				
	Base Case	20%up	40%up	60%up	80%up
Base Case	29.3	25.0	21.7	19.0	16.8
20%down	24.1	20.3	17.3	14.9	12.9
40%down	18.2	14.9	12.3	10.2	8.4
60%down	11.2	8.4	6.3	4.5	3.0
80%down	1.8	0.2	-1.7	-3.0	-4.0

21.3 Financial Evaluation

The financial evaluation of the trunk bus project, which is only one project with income, has been already discussed in Chapter 17. Therefore, the financial resources for the implementation of the priority projects are mainly examined in this chapter.

21.3.1 Financial Situation of Public Sector

(1) Municipality Budget

According to the budget of the Municipality in 1998, the administrative revenues account for 90% of the total revenue of Gs.219,000 million (approximately US$73 million), and among them the tax revenues account for 45% of the total revenue. The property tax of Gs63,000 million is the main source of the municipality's income and accounts for 66% of the tax revenue. On the other hand, the expenditure on personnel services amounts to 40% of the total expenditure, and the physical expenditures share just 29 % of the total expenditure.

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(2) Budget of Central Government

The budget of the central government in 1999 amounts to Gs.13.2 billions and is divided into 6.9 billion for the current expenditure and 6.3 billion for the capital expenditure. The budget of the Ministry of Public Works and Communications (MOPC) is Gs.627,991 million including Gs.487,180 million for the capital expenditure. Within the total expenditure of MOPC's budget, the item for construction is one of the main items and amounts to Gs 272,504 million (approximately US$90 million). The expenditure related to the dept is Gs.185,439 millions including Gs.101,839 million for amortization.

(3) Other Local Associations

In Asunción metropolitan area, two related organizations exist; Association of Autonomous Government (AGA) and Association of Municipalities of Metropolitan Area (AMUAM). They receive an allocation of budget from the Central provincial government and the municipalities. The amount of the budget in 1998 of AGA was Gs.6,493,333, and that of AMUAM was Gs.136,300 million.

21.3.2 Necessary Funds

The total amount of construction costs of the priority projects excluding the purchase of the trunk buses and feeder buses reaches US$100 million, and in addition to this, the land acquisition costs US$18 million. The average annual investment cost during five years from 2,000 to 2,004 is US$23.6 million. These amounts of funds should be prepared by the public sector.

21.3.3 Funding Sources

Usually the infrastructure development fund comes from the general budget of the government. The construction and improvement projects of the streets in the urban area have many related sub-projects such as intersection improvement or access street improvement and it is difficult to define a project scope like a rural toll road. Therefore this kind of project may not apply to BOT scheme. PFI scheme needs well-developed institutional arrangement, banking support systems and preparatory experiences. At present the fund for the priority projects is to be prepared by the public sectors.

(1) Principles of Financial Sources

Objectives of the project are to attract people to public transport and to limit the use of private cars. One of the principal financial sources will be to require private car users to make a contribution to the project. Another financial source will be to ask beneficiaries of the development of the project such as commercial companies along the trunk bus way to contribute.

(2) Alternatives of Financial Sources

The following alternatives are considered as financial sources of the project.

For private car users:
a) Creation of road pricing on the arterial of the screen line.

b) New rate of parking charges in Centro
c) New rate of the penalty charges for violation of the traffic regulation especially illegal parking.

For development beneficiaries:
d) New rate of property tax along the trunk bus way
e) Creation of an urban infrastructure development tax

(3) Examination of Application of New Sources

a) Road Pricing System

According to the traffic survey in 1998 conducted by Study Team, the total traffic volume of 14 hours at the cordon line on Asunción city border was 128,000 vehicles. If a half of the number of entering cars can be caught, the number is 32,000 vehicles. If the toll is put at US$1.00 the same as the toll of the Remanso Bridge, the municipality can collect US$6.4 million per year. This amount could cover 27% of the required annual investment cost.

However, it is not easy to introduce this measure, and thus long-term preparation, such as opinion surveys and trials, are necessary.

b) Parking Charge

CEA (Control de Estacionamiento de Asunción) manages the parking in Micro-Centro. A certain part of income goes to the Municipality. This year, Gs.2.3 billion (US$764,000) is expected as an income from CEA. If the current rate of parking charge is raised threefold, and part of the increase goes directly to the Municipality, an additional amount of Gs.12 billion (US$4 million) per year can be collected, accounting for 17% of the required annual investment cost.

c) Fines

The number of traffic accidents was 8,000 in 1997. Assuming that the number of traffic regulation violations and illegal parking is 20,000 per year, and that the penalty charge is US$80, US$1.6 million per year can be collected.

d) Property Tax

When the trunk bus project commences its operation, more than 200,000 people use this route, and great business opportunities will come to companies, shops and residents along the route, and the land value will also increase. Some part of these benefits should be paid to the builder. The average land price of the area along Av. E. Ayala is valued at around US$100/m2. If the land value increases by twice along the trunk bus route inside the Asunción city and a tax rate of 5% is charged on the increased land value, US$5.8 million will go to the Municipality.

e) Infrastructure Development Tax

The development of urban infrastructure produces economic impact on urban activities, such as industrial development, commercial sales, business activities, and the living standard of individuals. The tax revenue of the central government owes much to IVA (Additional Value

Tax). Beneficiaries who enjoy indirect benefit for the infrastructure development should pay some kind of tax. If the share of GRDP of the Asunción metropolitan area is 45% of GDP, GRDP can be estimated as US$3,800 million in 1998. If 0.2 % of GRDP can be charged as the infrastructure development tax, US$7.6 million can be transferred to the local government.

The alternatives mentioned above should be examined more carefully for implementation to formulate laws and regulations. However if such kind of taxes are accumulated, US$32.2 million will be collected, and it will meet the required annual investment cost.

(4) International Fund

Even if the local governments can collect their own fund as a portion of the necessary funding, it is not easy to find the foreign currency portion. The foreign currency portion of the trunk bus infrastructure development amounts to US$36 million. It is recommended to obtain foreign loans with favorable conditions from the World Bank, the Inter-American Development Bank, and bilateral aid funds.

Chapter22 Conclusions and Recommendations

1. Need for Public Transport Priority Policy

During the 14 years after CETA84, the population concentration in the metropolitan area has increased more rapidly than projected, and low-density urban sprawl has taken place. Population has been growing in suburban cities more rapidly than in Asunción. This phenomenon seems to have a correlation with the recent trend of rapid motorization where shares of transport modes of the residents have changed, and the use of private modes surged from 39% in 1984 to 50% in 1998. If this tendency is left untouched, urban sprawl continues, and the metropolitan area accelerates its dependence on private vehicles. It is evident that trunk roads and Centro will be even more congested, and that environmental deterioration will further progress.

Without policies that limit the use of private vehicles and prioritize public transport, travel speed of vehicles on trunk roads will be as slow as walking during peak hours in 2015, which inhibits efficient urban activities. Therefore, it is imperative to make a decision on these transport policies now.

2. Implementation of Master Plan

One of the reasons for rapid motorization in the metropolitan area is that political and economic problems in Paraguay since 1989 impeded the implementation of major projects proposed in the 1984 Master Plan. The Master Plan of this Study emphasizes priority policies for public transport and proposes important programs and projects that will determine the destiny of the metropolitan area. They are worth implementing because not only will they produce significant economic impact on the area but bring about positive social impact such as the prevention of environmental degradation. Accordingly, it is strongly recommended that this Master Plan be adopted as a guideline, and that its proposed projects be carried out as scheduled.

3. Early Implementation of Trunk Bus Project

The trunk bus project on Av. E. Ayala is the most important among the priority projects and should be executed promptly to show that the city is striving for public transport priority policies. Since the execution requires, among other things, to secure funding sources, revise institutions, and acquire right-of-ways, as described later, the decision needs to be made first now. In addition, it is necessary for the public sector and bus operators together to establish a commission or task force to examine the introduction of the trunk bus project on Av. E. Ayala and examine various measures to actually implement the project.

4. Provision of Infrastructure Supporting Trunk Bus Project

For the trunk bus project to be successful, it is indispensable to carry out required works on Av. E. Ayala, such as widening and construction of viaducts. In the meantime, however, as measures to support public transport priority policies and manage road traffic in an orderly fashion, it is necessary to carry out other priority projects such as installing a centralized traffic signal control system.

5. Traffic Demand Management

It is possible to impose restrictions on the use of vehicles, especially in particular districts, as they are carried out in Europe. In Micro Centro of Asunción, parking fees and fines for illegal parking should be raised by substantial amounts. Traffic control measures should be carried out with clear and specific purposes and strong determination and, if necessary, modified through many trials. It is recommended that stricter restrictions on vehicles driving into Centro, such as area pricing, be introduced eventually.

6. Funding Sources

With the scale of municipal budgets in the metropolitan area, it is difficult to implement large-scale transport infrastructure projects. Each city, therefore, needs to secure its own fund from such sources as an increase in inspection fees by strengthening the inspection system and a raise in parking fees in order to provide transport facilities. In order to collect enough funds in a short period of time, it is also necessary to obtain grants and loans from international and bilateral assistance organizations that impose low interest rates. This requires the central government to promote this scheme and guarantee the repayment of loans. Furthermore, some projects need to consider private financing schemes such as BOT and PFI.

7. Institutional Reform

The introduction of the trunk bus system requires revisions of the existing institutions, such as relevant laws and organizations. First, it is necessary to establish an organization that plans, promotes, regulates, and oversees projects. The surface transportation act currently under discussion in the parliament needs to be passed soon to promote this institutional reform. This act is aimed at establishing a committee that consists of MOPC, municipalities, and private enterprises to resolve various problems associated with bus transport from a comprehensive point of view. It also attempts to consolidate authorities to give permissions for bus operation, which are currently held separately by MOPC and the municipalities. The committee needs to clarify roles of the public and private sectors, respectively, and propose institutional reforms to secure funding sources. Finally, it is necessary to establish an organization that can plan, implement, and monitor urban transportation, including private transport, in the metropolitan area from a comprehensive standpoint and at the same time provide education and training on transport.

8. Understanding and Cooperation of Citizens

Restructuring of the bus lines and a new ticket system introduced along the new trunk bus system will cause some confusion and questions among citizens. It is necessary, if such things occur, to help them understand that the benefits of the project and ask for their cooperation. Deeper understandings among citizens require periodic disclosure of information and public hearings where they can express their opinions.

9. Further Study

CETA98 has examined how the future urban transport system should be in the Asunción metropolitan area. It has also proposed an urban transport master plan for the target year of 2015 and priority projects necessary to be implemented before 2005. The implementation of

the priority projects requires further considerations. They include:

1) Establishment of an operating body of the trunk bus and restructuring of bus lines
2) Bus ticket systems in the metropolitan area
3) Methods of securing funding sources
4) Establishment, form, and authority of an organization that deals with urban transport problems
5) Concrete measures of traffic demand management

When the Paraguayan economy recovers from the current recession, the Franja Costera project may launch soon, and if so, further studies and planning are required on coastal roads.

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