

CHAPTER 5 LAND USE AND DEVELOPMENT PLANS

5 LAND USE AND DEVELOPMENT PLAN

5.1 Present Land Use

5.1.1 Background

The study road is the route between San Lorenzo and Caaguazu of the National Road Route 2 and 7 respectively (approximately 169 km). This road runs through 3 departments (Central, Cordillera, Caaguazu). Basic data of the 3 departments is shown in Table 5.1.1.

Table 5.1.1 Basic Data of the 3 Departments

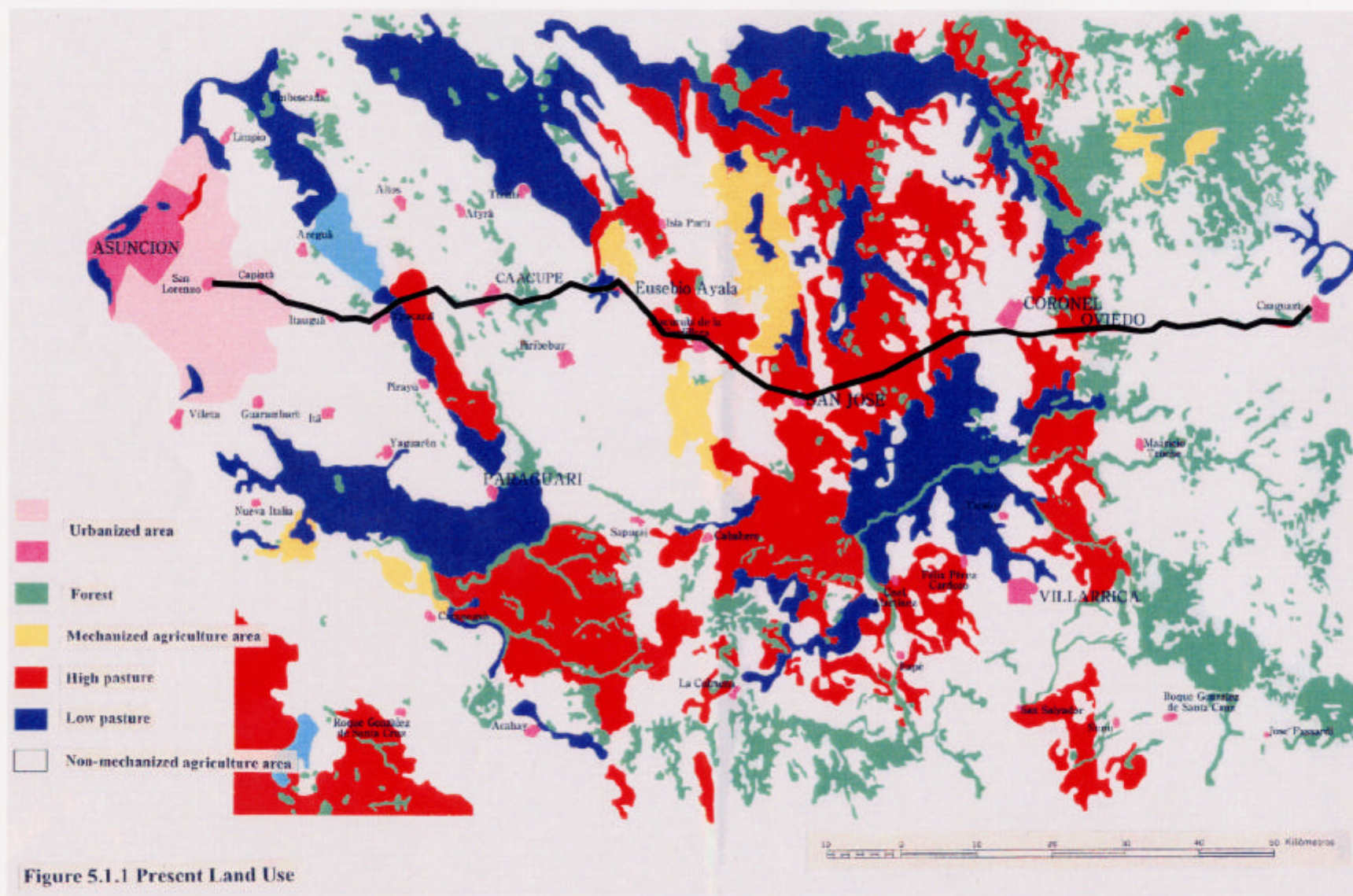
Item	Dept. of Central	Dept. of Cordillera	Dept. of Caaguazu
Related City of National Road Route 2 and 7	- San Lorenzo - Capiata - Itaugua - Ypacarai	- Caacupe - Eusebio Ayala - Itacurubí	- San Jose - Cnel. Oviedo - Caaguazu
Area	258,200 ha	494,800 ha	1,147,400 ha
Population	1,174,212	215,663	442,161
Capital of Dept.	Jurisdiction of Asuncion	Caacupé	Cnel. Oviedo
Climate	Annual Temperature : 22.5° C Annual Rainfall : 1,400 mm	: 22.5° C : 1,400 ~ 1,500 mm	: 22° C : 1,600 mm
Basin	Paraguay River	Paraguay River	Paraguay River Parana River
Land Use	Forest: 5,431 ha (2%) Agriculture: 122,056 ha (47%) Pasture: 116,088 ha (45%) - High 24% - Low 76%	Forest: 25,999 ha (5%) Agriculture: 213,867 ha (43%) Pasture: 252,526 ha (51%) - High 48% - Low 52%	Forest: 234,461 ha (20%) Agriculture: 698,410 ha (61%) Pasture: 182,037 ha (16%) - High 51% - Low 49%

As Paraguay is well known as an exclusively agricultural country, the 3 departments have been developed into cultivable and pasture areas. Therefore use of land for forest or woodland is very small, especially for the departments of Central and Cordillera. Also the expansion of cultivable and pasture land was executed by clearing forest between 1984 and 1991.

5.1.2 Road Side Land Use on National Road Route 2 and Route 7

Road side land use on National Road Route 2 and Route 7 is shown in Figure 5.1.1. Road side land use for the sections between cities of National Routes 2 and 7 follows:

- 1) San Lorenzo ~ Capiata
This section is the most urbanized sector along Routes 2 and Route 7. San Lorenzo is the biggest city in the 3 departments. Therefore, there are many commercial and business areas along the roadside.
- 2) Capiata ~ Itaugua
This section is located in the Asuncion metropolitan area, and much of the land is cultivated. But, in future, it is considered that the population will increase rapidly.
- 3) Itaugua ~ Ypacarai
Land use is similar to the preceding section. Ypacaraí is the entrance to Lake Ypacaraí, which is a recreation area in Paraguay.
- 4) Ypacarai ~ Caacupe
This section has both pasture and cultivated area. Caacupé is at the limit for commuting from the Asuncion metropolitan area, and is urbanized as a bed town.
- 5) Caacupe ~ Eusebio Ayala
This section is separated into 3 types of land use : forest, cultivated and flat pasture areas.
- 6) Eusebio Ayala ~ Itacurubi
This section approximately passes through cultivated areas and highland pasture areas.
- 7) Itacurubi ~ San Jose
Land use in this section is similar to the preceding section.
- 8) San Jose ~ Cnel. Oviedo
About two thirds of this section is highland pasture area and one third is cultivated area. In the areas surrounding San Jose and Cnel. Oviedo, the former is highland pasture and the latter is cultivated area.
- 9) Cnel. Oviedo ~ Caaguazu
A part of this section passes through highland pasture areas but most of this is cultivated area. Caaguazu is a town that was established as a center for the timber industry , but this has not been developed.



5.2 Future Land Use

In order to consider the future land use of road side on National Road Route 2 and Route 7 it is important to develop a strategy for the growth of the urban activities along the road side in the future.

(1) Activity and Strategy on Asuncion Metropolitan Area

- 1) to be composed by the cluster patterns as nuclear to Asuncion city
- 2) to be executed by strategic development along specific corridor
the specific corridors
 - North Corridor for Transchaco
 - East Corridor for National Road Route 2 and Route 7
 - South Corridor for National Road Route 1
- 3) to create an urban structure by connecting the 3 corridors by a ladder pattern road network

(2) Forecasts for Road Side Areas on National Road Route 2 and Route 7

Future Population	Future Industries (main agricultural prod.) 10 ³ t	Urbanization Tendency for Road Side Area
1997 : 5,085,325 2010 : 6,980,323 (1.37 times) 2020 : 8,570,322 (1.69 times)	1997: 10,210 2010: 13,710 (1.34 times) 2020: 17,090 (1.67 times)	10 cities will expand due to urbanization.

Urban Activity in Road Side Areas in the Future

- All cities will grow, and their present built-up areas will expand in all directions except areas where there are land use problems.
- In order to produce the main agricultural products efficiently, mechanization and cultivated areas will be expanded.

5.3 Development Plan

5.3.1 Economic Development Plan

President González Macchi officially started his administration in March 1999. On June 15, the Diet approved the Economic Development Program (proposal of policies for the nationally-unified government action program) which had been planned by the Paraguay Planning Agency in the era of the former president and for which approval had been delayed. A main part of the proposal is shown below.

(1) Outline of Economy and Environment

The average rate of economic growth was 2.2% in the period from 1994 to 1998. The highest rate in that period was 4.7% (1995) and the lowest was 0.5% (1998). The causes of the slow growth in the above period are mainly attributed to the agricultural sector, the unstable political situation, the sluggish industrial sector, the financial system (which is burdened with serious troubles) and problems that have hindered economic innovation, in addition to indigenous factors related to the region.

Compared to the GDP, the internal gross capital generation ratio has changed little for the past several years, which provoked a serious stagnation in economic capitalization. Moreover, fueled by the constant growth of the labor force, this has adversely affected the labor market, pushing the unemployment rate up to 14.3% in 1998.

Records of trading with MERCOSUR countries from 1994 through 1998 show an annual increase of 24.7% in exports and a rise of 49.2% in imports. Among these countries, Brazil had the highest level of trade with Paraguay.

The balance of official foreign debts increased by an average of 5.1% during the investigation period and amounted to US\$1,583 million in 1998. The amount of debt corresponds to 15.7% of the GDP, and is borne by the central government, public enterprises and financial institutions in a ratio of 54%, 32% and 14%, respectively.

The central bank of Paraguay (BCP) has adopted a policy regarding the monetary-fiscal sector of aiming to maintain additional capital in the range set forth in the currency project, which resulted in maintaining a ratio of currency issuance at an average of 14%.

(2) Social Development

In recent years, Paraguay achieved critical developments in its society, which are backed up by growth in social indicators. However, considering the present situation of public services and essential daily goods, it is clear that development is still insufficient in both quality and quantity.

Furthermore, the structure of national incomes is characterized by unbalanced distribution, which causes great differences in income between classes of society. 6.2% of the total population are desperately poor and 19.1% are estimated to be very poor. In agricultural areas, 8.8% of the population are in poverty.

The educational situation is still a problem. Illiteracy amounts to 9% of the nation and the rate for finishing school, education is very low. (The ratio of graduation is 62% from 1992

to 1997 and the attendance ratio for pupils from 7 to 12 is 91%)

The educational situation in agricultural areas has become worse. There are many educational facilities that do not have the legally required number of students (22%). Also, in the rural areas, a considerable number of unqualified teachers are in charge of education (48%).

With regard to health conditions in Paraguay, infectious diseases that are indigenous to developing countries are found. Diseases seen in advanced countries such as immunity disorders, infectious diseases, parasitic diseases and diarrhea are having an impact.

A fundamental survey of the social security system was carried out to make innovations to the system with the support of the IDB. The survey revealed some important points for innovation. The most pertinent ones are the low coverage ratio of social security (19% of the population), the inefficient management system, unfair planning and lack of an adequate legal framework.

Regarding the housing environment, it was estimated that there was a shortage of about 300,000 housing units as of 1989. On the other hand, about 15,000 housing units are needed every year. Since CONAVI cannot afford to supply the number of housing units needed, the current shortage is said to amount to 30% of overall domestic housing. Rebuilding or renovation of existing housing is called for.

(3) Environment

The following are typical examples of the critically deteriorating environment.

- Forests are now being destroyed at a rate of 400,000 hectares annually.
- 90% of the land used for production of yearly crops is being eroded away by water.
- Pollution and depletion of water resources are progressing
- Constant diminution of native flora and fauna
- Collapse of soil
- Diminished number of protected land and forest areas
- Loss of biodiversity
- Deterioration of air and water quality
- Increase in domestic and industrial wastes
- Weak and inadequate levels of controls and systems
- Shortage of public or private investment in areas with critical environmental situations

(4) Comprehensive Strategy

Continuing strategies center on the following:

- 1) Making more investments that are more competitive and more profitable, upgrading productivity and quality, diversifying products and exports and encouraging the private sector to progressively participate in projects by creating opportunities for profit-earning employment.
- 2) Legally ensuring the safety of citizens and their economic activity, stipulating clear-cut regulations on organizations that can maintain stability and have the

financial ability to engage in economic activity, and establishing an effective public sector that can plan and maintain national development as well as consistent economic strategies that take the future into account.

- 3) Promoting the stabilization of the macro-level economy by adjusting inflation levels according to development needs, by maintaining a stable financial and external position and by stabilizing financial markets to gain the trust of investors.
- 4) Renovating domestic markets, including modernization of the public sector, and implementing structural reforms for the purpose of entering international markets competitively in the course of sustainable development.
- 5) Providing a fair and proper distribution of profits arising from economic development through reinforcement of social investments, prioritization of measures against poverty, providing public services and improving their quality, unification and organization of society and encouraging participation in society, alleviation of discrimination against females and reinforcement of systems for social development.

5.3.2 Related Plan for MERCOSUR

Inter-America Development Bank has advanced projects in the transportation field that link the Atlantic and Pacific oceans. The route alternatives are shown in Figure 5.3.1

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| <p>Alternative 1 : Brazil ~ Bolivia ~ Chile</p> <p>Alternative 2 : Brazil ~ Paraguay ~ Bolivia ~ Chile</p> <p>Alternative 3 : Brazil ~ Argentine ~ Chile</p> |
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Source: Inter-America Development Bank

Figure 5.3.1 Alternatives for Route between Atlantic Ocean and Pacific Ocean

5.3.3 Development Plan for Road Side Area on National Roads Route 2 & 7

There are ten cities along the National Roads Route 2 and 7 included in this survey section. These cities have planned infrastructure development mainly for maintenance and repair, pavement, lighting of existing streets and access roads in urban areas, bridge construction and water works. In fact, they have no large-scale development plans that may particularly impact urban structures.

(1) Ypacaraí

Ypacaraí's future zoning of strategic land use is proposed as shown in Figure 5.3.2. This indicates that the urban area will extend to the south and the north, neighboring on the existing urban area, and to the east of the city, into a wide area based on National Road Route 2. Route 2 and the San Bernardino feeder are placed as an international trunk line and the Luque – Ypacaraí and Ypacaraí – Pirayú feeders as a regional trunk line. In addition, the current Asuncion – Ypacaraí railway is considered to be a tourist corridor. It is planned to improve the tourist infrastructure by extending this railroad to Sapucaí.

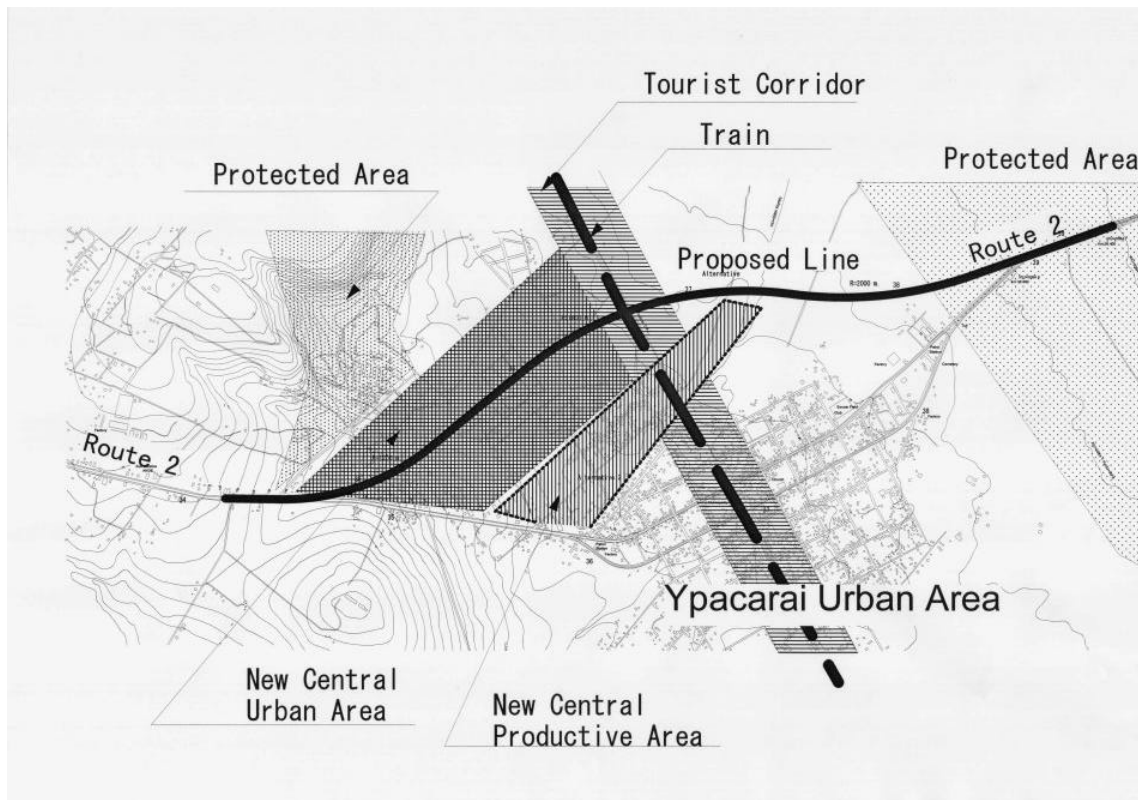


Figure 5.3.2 Zoning of Land Use in the Future

(2) Caacupé

It is assumed that the city of Caacupé will expand built-up areas in the future as shown in Figure 5.3.3.

Urbanized Area	Current	Future
Scale	6 km ²	36 km ²
Population	12,000	60,000 - 80,000
Applications	complex area/housing area	complex area/housing area

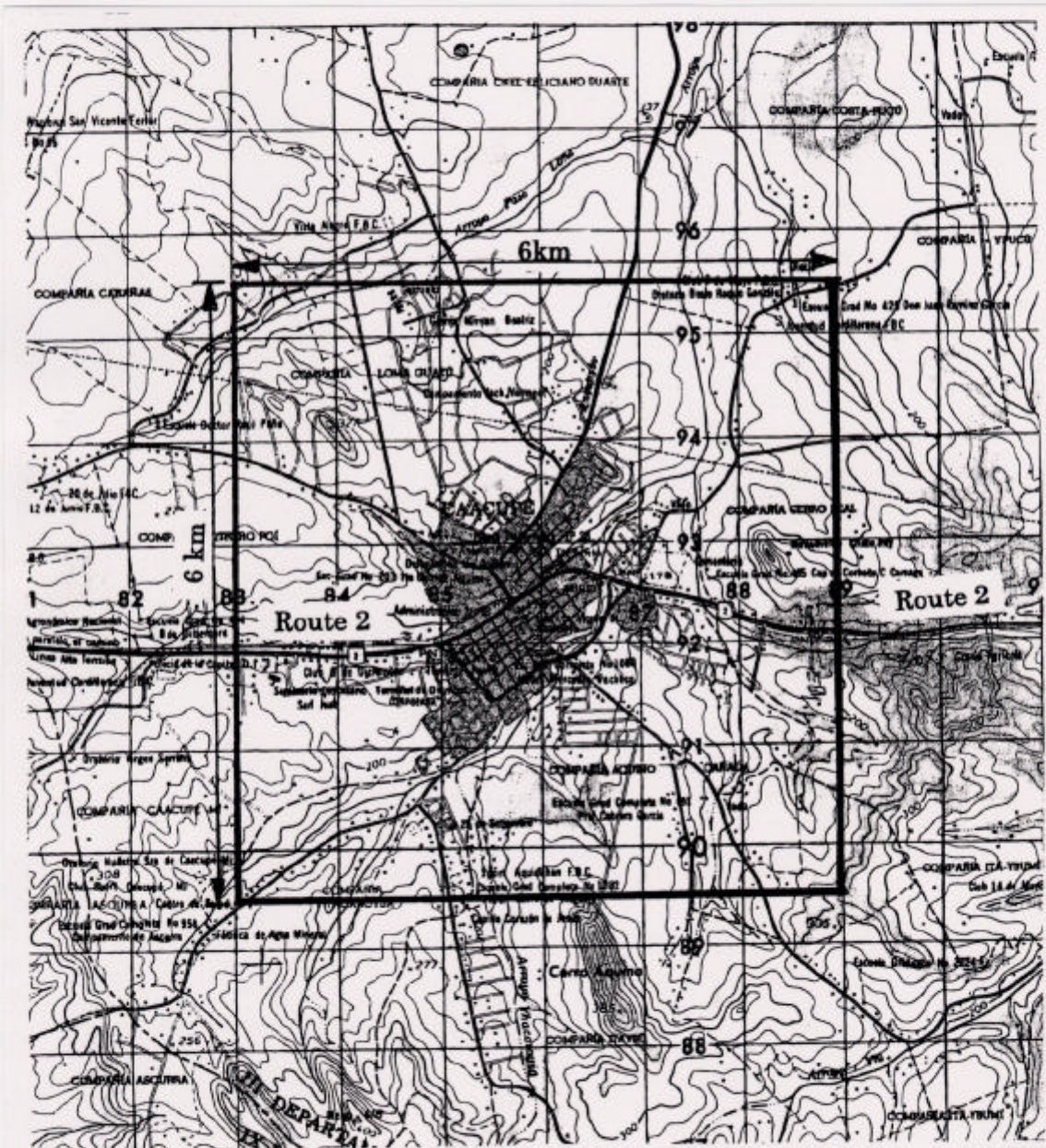


Figure 5.3.3 Expansion of Built-up Area

(3) Eusebio Ayala

The city of Eusebio Ayala has already experienced by-pass construction for National Road Route 2. The construction contributed to expansion of built-up areas while commercial activities on the old route (sales of corn cake, candies, and meat) experienced an abrupt slowdown. This explains the need to include facilities with service area-like functions in new by-pass construction programs.

(4) Itacurubí

Itacurubí is a small city with a population of about 8,000. National Road Route 2 runs from east to west through its central part. There is a tourist recreation area called “Garden of Cordillera” 0.5 – 1 km north of the route. The area contains the Yhaguy River and a forest district neighboring it, where some 50,000 visitors from Paraguay, Brazil, Argentina, and the neighboring countries enjoy swimming/boating and taking hikes in the forest. The recreation area and its development planning area for expansion are shown in Figure 5.3.4. A forestation plan is being developed by JICA.

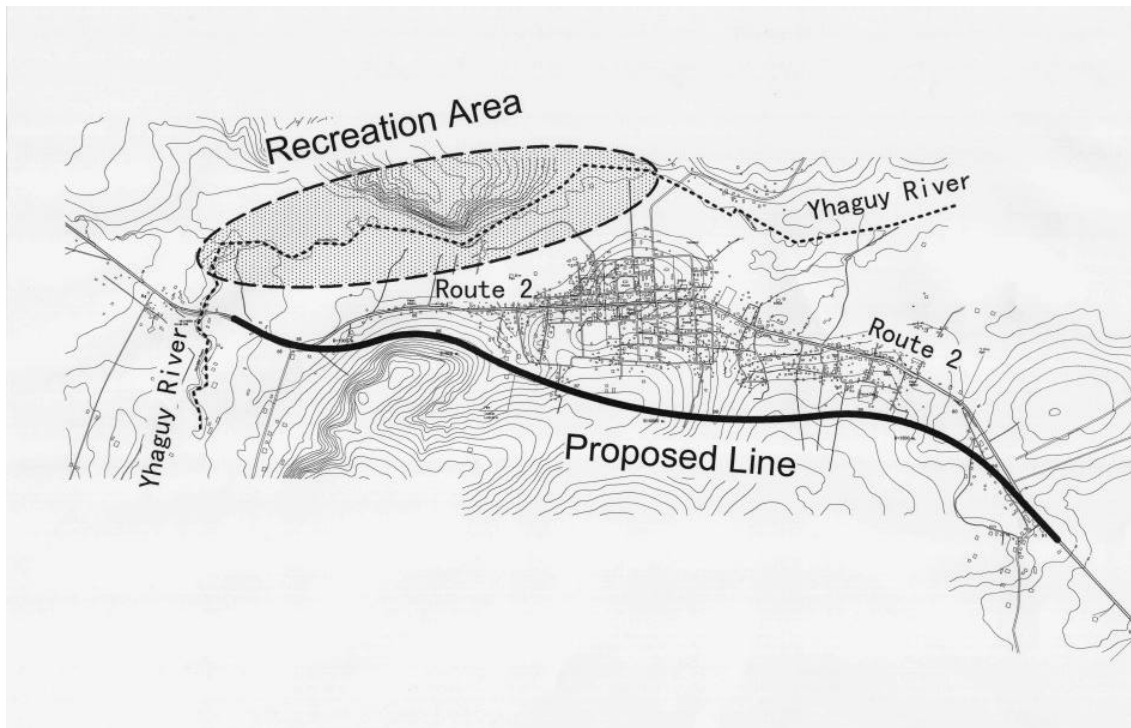


Figure 5.3.4 Recreation Area and its Development Area

(5) San Jose

The city of San Jose now has the following three plans. The MOPC has already begun constructing an axle-weight control center for National Road Route 2 as another development program. The respective development areas are shown in Figure 5.3.5.

- Environmental Conservation Plan for LAGUNA (lagoon)
- Sugar Refining Factory Construction Plan
- Traffic Signal Installation Plan (at two access points of National Road Route 2 to built-up areas)

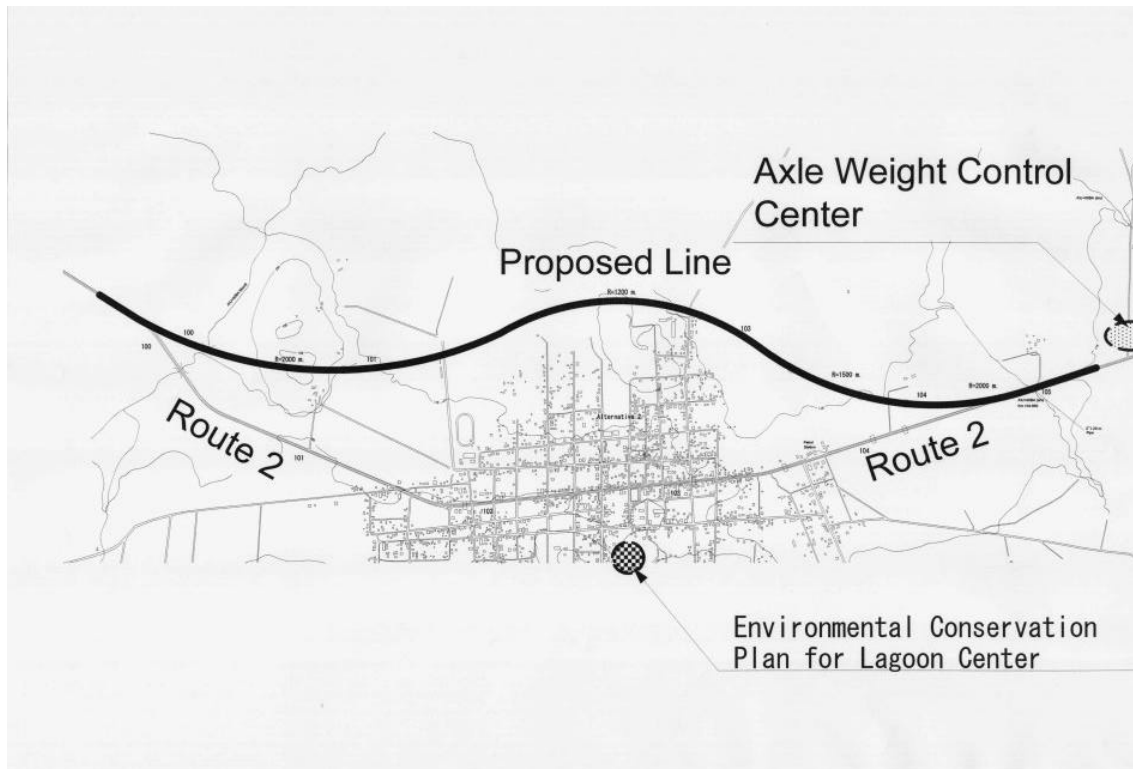


Figure 5.3.5 Construction Area of Vehicle Restriction and Planning Area

The city of Coronel Oviedo is the capital of Caaguazú Province. The city's road network is comprised by two trunk lines, National Road Routes 2 and 7 (east-west direction) and 8 (north-south direction). The network runs through Routes 2 and 7 and the built-up areas. The traffic volume per day in Route 8 is over 10,000 vehicles, more than that of Routes 2 and 7. A road improvement plan is currently being developed with the help of BID to alleviate the heavy congestion, because daily life activities are affected by it on route 8 in the urban areas. There are four alternatives (A to D) for road planning, as shown in Figure 5.3.6. The combination of the B and C alternatives is in the execution phase. Bidding for alternative B has already been completed by the MOPC.

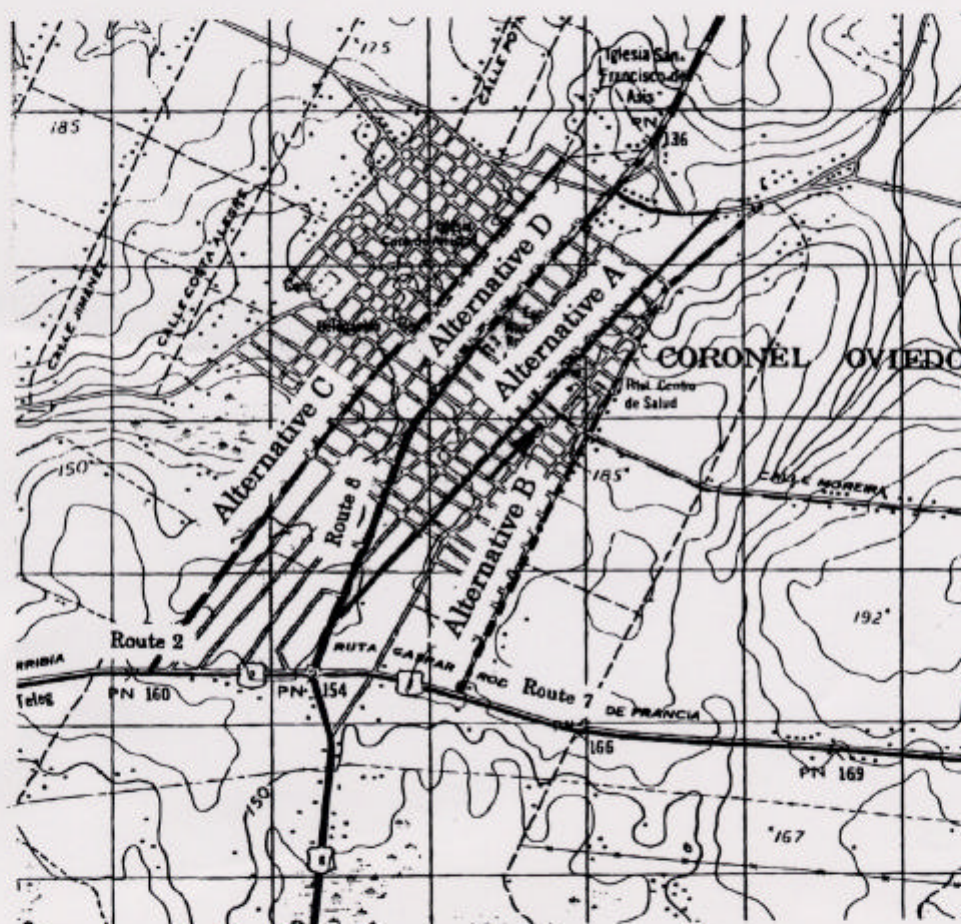


Figure 5.3.6 Road Planning Alternatives

(7) Caaguazú

The city of Caaguazú was founded to promote the forestry and lumbering business. National Road Route 7 runs from east to west north of the city's central part. There are development plans for a bus terminal, access roads, and other linked roads in the north area. The design plan of this project has already been finished with the help of BID. Figure 5.3.7 shows the location of the bus terminal development plan that needs to be considered in implementing this survey.

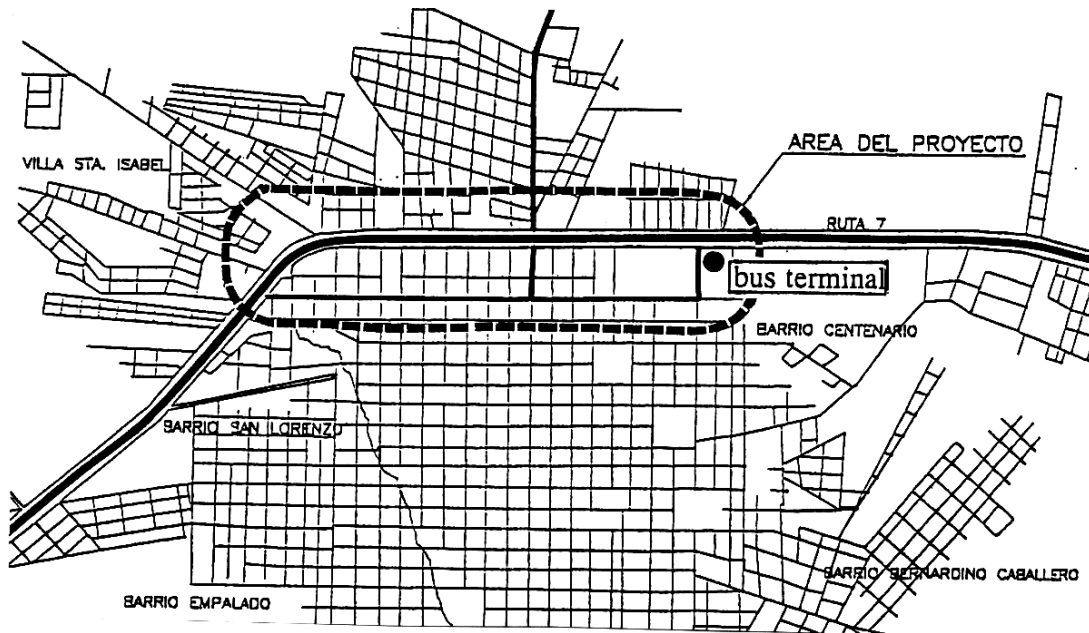


Figure 5.3.7 Project Area and Location of Bus Terminal