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## GEOGRAPHIC INTELLIGENCE REPORT

### PARAGUAY

#### PART IV: ANALYSIS OF THE NORTH CENTRAL REGION



CIA/RR GR L-60-3, Part IV

August 1960

**CENTRAL INTELLIGENCE AGENCY**

**OFFICE OF RESEARCH AND REPORTS**

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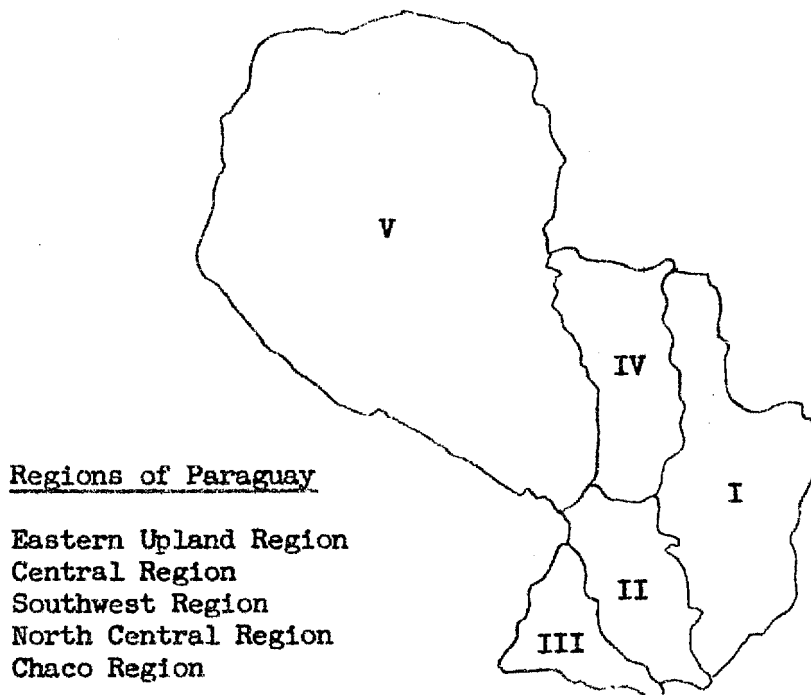
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PARAGUAY

PART IV: ANALYSIS OF THE NORTH CENTRAL REGION\*

I. General Orientation

The North Central Region comprises that section of eastern Paraguay situated between the Paraguay River and the Amambay Hills, and north of 25° south latitude. The region includes nearly all of the Departamentos de Concepción and San Pedro, and a small segment of the Departamento de Amambay. It has a total areal extent of roughly 40,000 square kilometers (15,440 square miles). (See sketch below, and map annex.)\*\*



\* The information in Part IV of this report on Paraguay is based on the best sources available to this Office as of 1 August 1960.  
\*\* The map annex is Part VI of this report.

## II. Physical Environment

### A. Terrain

The North Central Region constitutes an area of low relief. The elevation of the land is generally less than 300 meters (984 feet) -- gradually increasing eastward from 100 meters (328 feet) along the banks of the Paraguay River to 200 and 300 meters (656 and 984 feet) at the western margin of the Amambay Hills. For the most part the surface is flat to undulating, with scattered areas of more rugged relief. Low, sharply eroded hills in which a few ridges rise to elevations of slightly more than 300 meters occur in the northwestern part of the region. These complex hills, localized in a relatively small area, are characterized by steep slopes and narrow ridge lines.

Tributaries of the Paraguay River drain the region and divide the land into a series of broad interfluves. The major streams follow meandering westerly and southwesterly courses through broad floodplains entrenched somewhat below the general surface level of the region. The streams are normally slow and shallow; and they frequently shift their courses, forming numerous depressions, oxbow lakes, and river terraces along the floodplains. The margins of the floodplains are generally steep, and the relative relief -- the difference in elevation between the floodplains and the adjacent interfluves -- increases from west to east. Because large-scale topographic maps of the region are lacking, the relative relief cannot be measured with any accuracy, but it certainly does not exceed 100 meters (328 feet) and probably does not exceed 50 meters (164 feet) in most places. Where the stream network is particularly dense or where floodplains come together, the remnant

interfluves stand out as "islands" above the adjacent floodplains. During periods of high water when the floodplains are inundated, these remnant interfluves become true islands.

Along the segment of its course bordering the North Central Region, the Paraguay River meanders southward along a relatively broad floodplain. From the northern limits of the region southward to approximately 23°S the east bank of the river is marked by discontinuous rocky cliffs. Reliable data are not available on the height of these cliffs. Although one source describes them as "several tens of meters high in places," it is doubtful whether they exceed 30 meters (98 feet) in most places. Downstream from 23°S the east bank is composed of alluvium and is seldom more than a few meters high. Along the entire segment bordering the North Central Region, the west bank of the river is generally low and the flooding that occurs during ordinary high water is normally confined to a zone 5 to 10 kilometers (3 to 6 miles) wide along the west side of the river. The average width of the stream is about 650 meters (2,132 feet) and the average depth approximately 8 meters (26 feet). The velocity of the current at normal water level is 3.5 to 4.5 kilometers per hour (2.1 to 2.7 miles per hour), but varies from 2 to 8 kilometers per hour (1.2 to 4.8 miles per hour) between minimum and maximum levels of the river. Numerous bypass and secondary channels divide the flow of the river during all stages.

#### B. Soils

The soils of the North Central Region are derived principally from sandstones and range in texture from sands to loams with all intermediate gradations. Some clay loams derived from limestone occur in a small

area in the extreme northwestern part of the region. In general the soils of the region are well drained or even excessively drained on the interfluves, but are poorly drained in the lower floodplain areas.

Wheeled motor vehicles may have some difficulty in negotiating sandy slopes off established roads. Movement on foot, however, should not be hampered by soil conditions except on the poorly drained floodplains during and after heavy rains. Some depressions and abandoned channels in the floodplains are marshy at all seasons.

C. Flora and Fauna

Much of the North Central Region is forested with mixed stands of tropical and subtropical trees. The forests have been widely exploited for timber and yerba maté, however, and, in many areas, are now merely scattered patches of forest or tracts that have been thinned out. Although dense forests still occur in the eastern and southeastern parts of the region, much of the land adjacent to the Paraguay River and in the basins of its principal tributary streams -- the Jejui Guazú, the Aguaray Guazú, the Ypané and the Aquidabán Rivers -- has been largely cut over and is now grassland. Here "islands" of forest or scrub forest occur on the higher elevations of the interfluves, whereas open grassland, low scrub and brush, or combinations of both appear on the lower slopes and the floodplains. Along a wide belt adjacent to the Paraguay River in the northwestern part of the region a transitional type of vegetation occurs. It has characteristics of both the tropical and subtropical forests of eastern Paraguay and the xerophytic vegetation common to the Chaco of western Paraguay. In the forests on the interfluves of this zone some quebracho and various scrubby trees including



mesquite are intermixed; black palms and grassland are characteristic of the well drained flats; and grassland occupies the poorly drained flats. The black palm is used locally as an all-purpose wood for the construction of houses. Elsewhere within the region the coco palm is more prevalent -- both in the forests and as individual trees dotting the grasslands. Yerbales (forests containing yerba trees in exploitable quantities) are concentrated primarily in the eastern half of the region.

In general the forests provide adequate concealment from both ground and air observation. Although many of the trees are deciduous hardwoods, new leaf growth develops so quickly after the old leaves fall that stands of bare trees are rare at any season. The undergrowth of shrubs and vines in the forests is commonly thick and in some places virtually impenetrable without the aid of a machete. The undergrowth is particularly dense along the margins of forest clearings.

Most of the cleared land in the region is used for pasture. Subsistence agriculture is practiced in various parts of the region, but the few sizable areas of cultivation are confined to the environs of the larger towns. The principal crops are maize, mandioca, bananas, and oranges.

Wild fruits and nuts and wild game are plentiful in the region. (See Part I, p. 7 and 8, for a description of the fauna that is common to all of eastern Paraguay.)

#### D. Climate

The climate of the North Central Region is transitional between the humid subtropical climate of southern Paraguay and the tropical savanna

climate of northern Paraguay. It is characterized by hot summers, mild winters and marked differences in seasonal rainfall.

The average annual temperature for the region is 23°C (73.4°F). At Horqueta (23°24'S-56°53'W), in the central part of the region, the mean maximum temperature for January, the warmest month, is 34.7°C (94.5°F), and the mean minimum temperature for July, the coldest month, is 12.2°C (54°F). Data on absolute maximum and minimum temperatures are not available for Horqueta. The absolute temperatures recorded at Puerto Casado (22°20'S-57°55'W) -- a port on the west bank of the Paraguay River near the northwestern margin of the region -- for the period 1940 to 1950 were as follows: absolute maximum temperature 41.7°C (107.1°F); absolute minimum temperature -2.8°C (27°F).

Average annual rainfall increases from west to east -- ranging from approximately 1,100 millimeters (44 inches) along the western margin of the region to 1,400 millimeters (56 inches) along the eastern. Marked wet and dry seasons occur, with maximum rainfall in the summer and a decided minimum rainfall in the period from June through September. An important aspect of the rainfall regime is its undependability; it varies considerably from the norm from month to month and from year to year. For example, Puerto Casado recorded no rainfall for three separate months during the decade 1940-50. Most of the rain falls in heavy showers of an inch or more, usually accompanying thunder storms. Long cloudy periods are rare, although heavy rains occasionally last several days. After torrential rains, flooding along the streams is common. The annual rise of the Paraguay River normally begins in the latter part of January or early February and continues until June. The river reaches its lowest ebb in late September or early October.

The relative humidity is fairly high throughout the year, with monthly averages at Horqueta ranging from 65 percent in August to 79 percent in June. The period from February through July is slightly more humid than the rest of the year. (See Table, below.)

Light breezes normally blow during the day -- rising in the morning, diminishing gradually during the afternoon, and falling at sunset. The dominant winds are from the north, the northeast, and the south. Winds from the northeast-southeast quadrant generally are the rain-bearing winds.

Table

Characteristics of Climate  
at Horqueta, Paraguay, 1940-50

Month	Temperature (Degrees Fahrenheit)			Rainfall (Inches)	Relative Humidity (Percent)
	Mean	Max	Min		
	Average				
Jan	94.5	71.2	82.8	4.8	73.1
Feb	93.0	72.0	82.4	5.1	76.0
Mar	90.9	69.3	80.1	5.1	75.7
Apr	86.4	63.7	75.0	5.2	75.9
May	82.4	59.4	70.9	5.6	77.7
Jun	77.9	57.2	67.5	2.9	79.3
Jul	78.6	54.0	66.2	2.4	74.2
Aug	84.6	57.6	70.9	1.4	65.1
Sep	87.8	62.2	75.0	3.4	68.7
Oct	87.4	64.9	76.1	6.5	73.8
Nov	89.4	67.1	78.3	5.7	73.4
Dec	93.2	69.3	81.1	4.2	70.4

E. Water Supply

With the exception of very small arroyos that are dry part of the time, the streams in this region carry water throughout the year, but the water level is normally very low during the winter dry season.

Because the streams generally are sluggish and sanitation is very primitive in the region, all drinking water should be purified as a precautionary measure.

### III. Population

#### A. Distribution

The North Central Region is sparsely populated. The rural population density is less than 5 persons per square kilometer (13 persons per square mile) for about 95 percent of the area. Exceptions are two small distritos in the Departamento de Concepción (Distritos de Belén and Loreto) and one distrito in the Departamento de San Pedro (Distrito de General Aquino) in which the rural population density is, respectively, 15, 8, and 19 persons per square kilometer (39, 21, and 49 persons per square mile).

The urban population of the region, as enumerated in the 1950 census, is very small. Concepción (23°25'S-57°17'W), with a population of 14,640 persons, was the only city in the region having more than 5,000 inhabitants. Eight towns had from 1,000 to 5,000 inhabitants; 4 towns, from 500 to 1,000; and 5 towns had fewer than 500. All but three of the towns are located in the southern two-thirds of the region, and most are located in the western half. Several agricultural colonies, tiny yerba villages, and small Paraguay River ports that were not classified as urban population centers in the 1950 census are located at widely scattered points within the region.

#### B. Ethnic Groups

The principal racial element in the region is the Paraguayan -- a Guaraní-Spanish mixture. About 3 percent of the total regional population

of roughly 130,000 was classified as "foreigners" in the 1950 census enumeration. Of these foreigners the most significant groups were some 2,698 European colonists in the Departamento de San Pedro and small numbers of Brazilian settlers in the Departamentos de Concepción and Amambay. The nationality of the European colonists was not stated in the census; presumably, the majority are of German origin.

The language most commonly spoken within the region is Guaraní. The population is almost equally divided between those who speak Guaraní only, and those who speak both Guaraní and Spanish. Those who speak Guaraní only generally live in the more remote sections of the region.

#### C. Sanitation and Health

As elsewhere in Paraguay only the most primitive sanitation practices are observed in this region, and few doctors or medical facilities are available. The most prevalent diseases include hookworm, venereal diseases, tuberculosis, malaria, typhoid fever, and various forms of dysentery.

A regional hospital is located at Concepción, and smaller hospitals are located at San Pedro (24°07'S-56°59'W), Rosario (24°27'S-57°03'W), and San Estanislao (24°39'S-56°26'W).

#### IV. Civil Government and Military Centers

Concepción is the only significant civil government center within the region. It serves as the seat of government for the Departamento de Concepción. It has civil, commercial, and criminal courts; a customs house; and municipal government offices. San Pedro is the capital of the Departamento de San Pedro, but has little more than the departamento office and a justice of the peace. Each of the 16 other population centers enumerated in the 1950 census serves as a distrito capital.

Concepción is headquarters for the Fourth Military Region. The 5th Infantry Regiment and the 4th Engineer Battalion were located there as of October 1959.

Transportes Aereos Militares, the military air transport line, operates airfields at Concepción and Bella Vista (22°08'S-56°31'W). At present these airfields have little military significance because their operational capabilities are limited by a lack of hard-surface runways and adequate servicing facilities.

#### V. Transportation

##### A. Roads

The road network within the North Central Region is very poor. There are no modern paved roads, and only two good all-weather graveled roads -- Concepción to Horqueta; and Rosario (24°27'S-57°03'W) to Itacurubí del Rosario (24°29'S-56°41'W). The former is the completed section of the highway that will connect Concepción and Pedro Juan Caballero (Paraguay Route V). Construction on the remaining section is scheduled to begin in 1960, and the route selected will follow the Aquidabán Valley. The present road between Horqueta and Pedro Juan Caballero follows the valley of the Ypané River. This dirt road is difficult to traverse because it has no rock base and most of it is very sandy. Improved dirt roads have been constructed between Itacurubí del Rosario and Unión (24°48'S-56°33'W) via San Estanislao (24°39'S-56°26'W) and between Puerto Antequera (24°08'S-57°07'W) and San Pedro.

Other roads in the region are unimproved dirt roads, which, for the most part, are passable only during dry weather and then only by trucks or jeeps. Many are temporary logging roads or trails maintained in

passable condition only while logging operations are underway in a given area.

Many local foot trails lead from village to village or merely from village to nearby yerba forest or logging site.

#### B. Railroads

Two railroad lines extend short distances from the Paraguay River into the western part of the region. The government-owned Ferrocarril Nacional del Norte (FCNN) runs from Concepción 56 kilometers (35 miles) eastward to Horqueta. This short stretch of railroad is the only section that was constructed of a railroad line originally planned to extend from Concepción to Pedro Juan Caballero. Both the roadbed and the rolling stock are in extremely poor condition, and trains must travel at a rate of only 10 kilometers per hour (6 miles per hour). Although the line carries some passengers, it is used principally to transport timber and agricultural products to the port of Concepción.

An industrial railroad owned by Maderera del Norte, S.A., extends from Puerto Ybapobó (23°42'S-57°12'W) some 32 kilometers (20 miles) eastward to forest holdings owned by the company. The railroad is operated solely for the purpose of transporting timber to Puerto Ybapobó.

#### C. Waterways

The Paraguay River serves as the principal transportation artery for the North Central Region. The traffic consists mainly of self-propelled vessels having drafts ranging from 4 to 9 feet (1.2 to 2.7 meters) and by towed cargo vessels drawing as much as 11 feet (3.3 meters) when fully loaded. Most of the vessels navigating in this section of the river draw less than 7 feet (2.1 meters) and have gross

tonnages of less than 500 tons. For relatively short periods each year when the river is at low-water stage, vessels have to be loaded for less than a 7-foot draft. In terms of navigation requirements the river normally reaches low-water stage in late September or early October and remains at this stage until January.

The ports along this section of the river are very small and only Concepción and Puerto Iapobó have any permanent port facilities. At the port of Concepción the city maintains a hardwood wharf, a steam crane, and large warehouses; and the Ferrocarril Nacional del Norte has a wharf and steam crane. Compania de Puerto Iapobó operates two wooden wharves, a steam crane, and a small warehouse at Puerto Iapobó. At most of the other ports -- for example, Puerto Rosario (24°27'S-57°05'W), Antequera, San Salvador (22°51'S-57°48'W) and Itapucumí (22°45'S-57°52'W) -- vessels either tie up directly to bluff banks or load and unload by means of small boats.

Several tributaries of the Paraguay River are navigable by light-draft launches, flat-bottomed scows, and rafts. The Aquidabán River is navigable by small craft for a distance of 3 kilometers (1.9 miles) above its mouth during low stages, and slightly farther upstream during periods of high water. The Ypané River is navigable for about 50 kilometers (31 miles) during high-water stages, although navigation is hindered by numerous stony ledges. The Jejui Guazú River is generally navigable by craft of 1-foot draft for a distance of 200 kilometers (124 miles) upstream from the mouth of the river. Many of its tributaries are also navigable by small craft during high-water stages.



D. Air

There are only two airfields in the North Central Region that have runways 2,000 feet or more in length. The Concepción airfield, with a 3,500-foot graded earth runway, is used jointly by Transportes Aereos Militares and Linea Aerea de Transporte Nacional for light transport service. The Bella Vista airfield, with a 2,000-foot sod runway, is used by the Transportes Aereos Militares for DC-3 aircraft and smaller planes.

Small grass landing strips are located at San Pedro, San Estanislao, and Paso Barreto (approximately 23°05'S-57°01'W).

VI. Telecommunications

A main telegraph line extends northward from Asunción to Concepción, serving nearly all of the intermediate towns located along the river. Branch lines extend from Puerto Rosario to Unión, via General Aquino (24°26'S-56°42'W) and San Estanislao; from San Pedro to Nueva Germania (23°54'S-56°34'W); from Concepción to Horqueta; and from Concepción to Bella Vista. The colony of 25 de Diciembre (24°42'S-56°33'W) is the terminus for a branch line extending northward from Eusebio Ayala (25°24'S-56°58'W) -- a central telegraph office on the Asunción-Villarrica line. Telegraph lines also extend along the two railroads of the region. Radiotelegraph centers are located at Concepción, Puerto Rosario, and Bella Vista.

Telephone lines extend from Concepción to Horqueta, and from Eusebio Ayala to 25 de Diciembre. Concepción has a radiotelephone office.

A medium wave radio broadcasting station, Radio Ypir, ZP-8, is located at Concepción. It is a 100-watt station operating on a frequency of 1480 kilocycles.

VII. Economic Development

The principal economic activities of the region are cattle raising, logging, and the production of yerba maté. Agriculture is carried on to a lesser extent, with maize, mandioca, bananas, and oranges as the chief crops; some tobacco is grown in the Departamento de Concepción.

Cattle estancias (ranches) are scattered throughout the grasslands of the region. Important sawmills are located at Concepción, Puerto Ybapobó, and in the vicinity of Rosario. Yerba maté production is concentrated primarily in the eastern part of the region. Small industries other than sawmills include a flour mill at Concepción; a small shipyard at Puerto Rosario; a ship repair shop at San Salvador; and a lime production center at Itapucumí. Mining and manufacturing are of little significance in the region.

Although subsistence agriculture is carried on throughout the North Central Region, the principal areas of intensive cultivation are in the vicinity of Concepción, Horqueta, San Pedro, and Rosario. Several small agricultural colonies have been established in the western part of the region, south of Concepción.

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