Analysis

and Selection of Communities in Paraguay

Project: Rural Electrification

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The ideas contained herein are the author's responsibility and do not necessarily reflect those of the sponsoring organizations: Latin American Energy Organization (OLADE), Canadian International Development Agency (CIDA) and the University of Calgary.

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CONTENTS:

List of tables and illustrations:

Abbreviations:

ANDE	*Administración Nacional de Electricidad*
DGEEC	*Dirección General de Estadísticas, Encuestas y Censos*
LPG	Liquefied Petroleum Gas
IBR	*Instituto de Bienestar Rural*
HDI	Human Development Index
INDERT	*Instituto Nacional de Desarrollo Rural y de la Tierra*
INDI	*Instituto Paraguayo del Indígena*
INTN	*Instituto Nacional de Tecnología y Normalización*
NASA	National Aerospace Agency
UBN	Unsatisfied Basic Need
OLADE	Latin American Energy Organization
NGO	Non–Governmental Organization
EAP	Economically Active Population
WAP	Working Age Population (over 10 years)
UNDP	United Nations Development Program

Executive Summary:

This study is divided into 10 chapters. The first chapter, Introduction, explains the work methodology used for this study. The second chapter describes the overall situation of Paraguay's indigenous peoples, considering primarily legal, demographic, ethnic, and socioeconomic aspects. Indigenous people, which constitute a very small minority of only 1.7 % of the country's population, have a very unfavorable socioeconomic status in comparison to the overall population. To demonstrate this, we reviewed in detail issues relating to illiteracy, type of housing, access to water supply, basic sanitation, and electricity. For all of these factors, indicators are well below figures for the overall population, even that of the rural areas.

The third chapter presents the methodology used to select the project's target communities and describes the indicators used for this purpose. These indicators are the percentage of rural population, the percentage of indigenous population, the percentage of homes without electricity, the percentage of the population with at least 1 unsatisfied basic need, the Human Development Index, the Gender–related Development Index, and the percentage of poor population.

The selection process was divided into three stages. The first consisted of selecting one target region within the national territory. Departments, being the country's first level of administrative division, were taken as regions. Through a comparative review of Paraguay's 16 departments, except for the capital city of Asunción, using the seven indicators that were selected, we found that the most underprivileged region is the Chaco, consisting of the three departments of *Presidente Hayes*, Boquerón and *Alto Paraguay*. This is an extensive region covering the western half of Paraguay, is scarcely populated, having less than 3 % of the country's total population, with a high percentage of indigenous population, and very little basic service coverage. Chapter 5 describes the most salient aspects of the project's target region: location and access, natural features, demographics, electrification, and socioeconomics.

The second stage consisted of selecting one target district within the target region. Chapter 6 uses exactly the same methodology as for defining the target region, assessing the same seven indicators. The eight districts of the Chaco were initially taken as a basis, three of which were excluded from the beginning as they belong to the *Presidente Hayes* department and are part of the metropolitan area of the capital city of Asunción. This comparison left us with the districts of *Villa Hayes*, *Puerto Pinasco*, *Mariscal José Félix Estigarribia*, *La Victoria,* and *Fuerte Olimpo*, the most underprivileged of which turned out to be the *Puerto Pinasco* district.

Chapter 7 is a description of the target district's most relevant aspects for the Project, including location, history, access, natural features, and demographics, an overview of the *Angaité* indigenous majority in the zone, the types of aid they receive and, lastly, socioeconomic and energy–related issues.

Chapters 8 and 9 contain a definition and detailed description of the three target communities, in the *Puerto Pinasco* territory. These are the indigenous communities of *La Patria* and *Riacho San Carlos*, and the *campesino* community of *Colonia Ceibo*, being the rural communities with the highest population in that district. A description of the selected communities includes location and access, demographics, ethnicity, economics, basic infrastructure, energy, and organizational considerations.

Finally, Chapter 10 addresses the selection of one of these three target communities, i.e., the one best meeting the conditions to implement the sustainable rural energy pilot project. For this purpose, we used a set of objectively verifiable criteria that are relevant to the project, as developed previously in Chapter 3.3. The indigenous community of *La Patria* clearly stood out in this comparison, and we recommend it to OLADE as the primary candidate in selecting the target community.

1. Introduction

This study is part of the preparatory process for Paraguay's sustainable rural electrification project, headed by the Latin American Energy Organization (OLADE), with support from the University of Calgary and the Canadian International Development Agency (CIDA), and with the *Viceministerio de Minas y Energía* (VMME) as the national counterpart. This project has already been executed in four Latin American countries – Guatemala, Haiti, Bolivia, and Paraguay – and is geared primarily towards indigenous peoples and women.

This purpose for this study is to review and select rural communities in which to implement the rural energy pilot project. The result of this review is a list of three indigenous and/or *campesino* communities located in the most underprivileged area of the country, primarily from a standpoint of its socioeconomic and rural electrification status. In the end, only one of these pre–selected communities will benefit from the pilot project, being the one that best meets the eligibility criteria.

This study was carried out using primarily statistical data, mostly from the latest National Census, performed in 2002. This means that the data used are still relatively current and, above all, comparable to any other part of the national territory. At the same time an Indigenous Census was taken, revealing abundant information specific to Paraguay's indigenous peoples, which has been very useful to this study.

Officials of different State institutions were interviewed on a few very specific topics, particularly regarding the target zone and pre–selected communities. These institutions were the *Dirección de Encuestas, Estadísticas y Censos* (DGEEC), the *Instituto Paraguayo del Indígena* (INDI), the *Instituto Nacional de Desarrollo Rural y de la Tierra* (INDERT), the *Administración Nacional de Electricidad* (ANDE), and the *Gobernación* of the *Presidente Hayes* department. Interviews were also held with the heads of certain NGOs working in the target zone, both environmentalist and indigenist. Since the author already had prior knowledge from several previous trips to the target zone for reasons unrelated to this project, it was not deemed necessary to visit again during the information–gathering process.

To enhance involvement in the project by state institutions that are directly or indirectly related to its subject matter, the *Viceministerio de Minas y Energía* created a *Comisión Interinstitucional*. During the information–gathering stage of this study, this commission had several meetings at the VMME headquarters, which were also attended by the local consultant. The following institutions participated in this process: VMME, ANDE, INDI, INDERT, DGEEC, *Instituto Nacional de Tecnología y Normalización* (INTN), *Secretaría Técnica de Planificación* (STP), *Secretaría de la Mujer* (SM), and *Secretaría de Acción Social* (SAS).

2. Indigenous Population of Paraguay

Legal Considerations

In Paraguay, indigenous communities enjoy certain special rights that are guaranteed by Chapter 5 of the National Constitution and by the *Estatuto de las Comunidades Indigenous* (Law Nº 904 / 81). The latter law is presently being amended by National Congress, and must only be passed by the House of Representatives.

Art. 63 of the Constitution establishes that: "*The right of indigenous peoples to preserve and develop their ethnic identities within their respective habitats is recognized and guaranteed. Likewise, they are entitled to apply freely their systems of social, economic, cultural, and religious organization, as well as voluntarily abide by the customary norms that regulate their internal relations, provided they do not violate the fundamental rights established herein. In cases of conflict of jurisdiction, the indigenous customary law will be taken into account."*

Art. 64 says: *"Indigenous peoples are entitled to community ownership of land in sufficient quantity and quality as to conserve and develop their particular ways of life. The State will provide these lands to them gratis, and they will not be subject to embargo, division, transfer, prescription, offered in guarantee of contractual obligations, nor rented; and will likewise be tax exempt. It is forbidden to withdraw or move their habitats without their express consent."*

Art. 67 establishes that: *"Members of indigenous peoples are exonerated from providing social, civil or military services and from the tax obligations established by law."*

The purpose of Law Nº 904 / 81 is described in Art. 1 as follows: "*The purpose for this law is the social and cultural preservation of indigenous communities, defense of their heritage and traditions, improvement of their economic conditions, involve them effectively in national development, and provide them access to a legal regime that will ensure their ownership of land and other productive resources, with rights that are equal to all other citizens".*

The *Instituto Paraguayo del Indígena* (INDI) was created to enforce this law, being an autarchic State entity entrusted with attending to indigenous affairs throughout the country, including all matters relating to their lands. Art. 32 lists its specific functions:

a) *"To create and implement policies and programs;*
b) *To coordinate, inspect and evaluate all public and private sector activities relating to indigenous peoples;*
c) *To provide scientific, technical, legal, and administrative–economic assistance to indigenous communities, whether directly or in coordination with other institutions, and seek assistance from domestic or foreign entities;*
d) *To perform a census of the indigenous population in coordination with indigenous or indigenist entities;*
e) *To perform, promote and regulate research on indigenous matters and disseminate information on same, by agreement between INDI and the communities;*

f) To adhere to the principles, resolutions and recommendations of international indigenist entities that are consistent with the purposes of this law, while promoting their compliance with the purposes of the INDI;

g) To support procedures and denouncements filed by indigenous peoples with governmental and private entities;

h) To study and propose norms to govern matters of civil registry, military service, education, penal liability, and identity documentation of indigenous peoples and oversee their enforcement;

i) To maintain relations with national and international indigenist entities, advise them and enforce agreements reached in these matters;

j) To promote indigenous technical and professional education, especially in farming, forestry and craft production, and train them in community organization and administration; and

k) To undertake all other activities in keeping with the purposes of the INDI".

2002 Indigenous Census

In 2002, in conjunction with the National Census that is normally carried taken 10 years, the *Dirección General de Estadística, Encuestas y Censos* (DGEEC) also performed an Indigenous Census to gather specific data on Paraguay's indigenous peoples, in addition to general data collected. These data were published by the DGEEC in two works, the first being "*Pueblos Indígenas del Paraguay: Resultados Finales*", with data presented primarily in the form of tables on household and population characteristics by ethnic group. The second work, titled "*Atlas de las Comunidades Indígenas en el Paraguay*," contains the following data for each of the 412 indigenous communities recognized by the INDI:

- **Name**: of the community
- **Geographic location**: department, district, area (rural or urban), and location / community maps
- **Distances**: from the department capital and from the district seat (in km)
- **Cultural and legal identity**: linguistic family, ethnicity (membership percentages), language spoken (%), legal status, and situation of the land
- **Socio–demographic conditions**: population by age and sex, number and type of homes, average inhabitants per dwelling, average years of study, possession of birth certificate (%), and possession of identity card (%)
- **Economic activities**: hunting and fishing (yes / no and what animal species), gathering (yes / no and what plant species), handicrafts (yes / no and what kind), Economically Active Population, employment ratio, primary occupation (% by type of occupation), and types of crops per household (% by types)
- **Services**: school building, health post or center, types of lighting in homes (% by type), and types of water in homes (% by type)

For communities consisting of more than one village, the above dataset is divided by population centers.

Demographics and Ethnicity

According to the Indigenous Census, Paraguay has an indigenous population of 87,099 individuals,[1] of which 85,322 (98.0 %) live inside 412 officially–recognized indigenous communities and only 1,777 outside. Most communities are populated by indigenous members of a single ethnic group, and in some cases also by minorities of other ethnicities, usually belonging to the same linguistic group. Non–indigenous persons also live in some of the communities. Thirty–three of the 412 communities consist of more than one village, most of which are located in the Chaco.

Of the 412 surveyed communities, 226 have legal status and property rights to their lands. In 84 other communities with legal status, land title deeds are still in process. Ninety–seven communities still do not have their legal status, 77 of which have their land title deeds in process. Only 20 communities have neither legal status nor their own land.

The percentage of indigenous population nationwide is only 1.7 %. In 1992, it was 1.2 %, showing that the indigenous population has grown more over the past 10 years than the general population. This trend is also seen in the high fertility rates among indigenous women (6.3) in comparison to the national feminine population (3.9). As for the percentage of indigenous population by region of the country, there are also large variations. Further details in this regard are presented in Chapter 4.2.

Paraguay has differentiated 20 indigenous ethnicities belonging to five linguistic groups: Guaraní, *Lengua Maskoy*, *Mataco Mataguayo*, *Zamuco*, and *Guaicurú*. Of all indigenous peoples, 53.4 % are part of the Guaraní group that primarily inhabits the Eastern Region; 22.7 % belong to the *Lengua Maskoy* group, almost all of which live in the Chaco, as does the *Mataco Mataguayo* group with 17.9 %. The two linguistic groups with the least population are the Zamuco with 4.2 % and the Guaicurú with 1.8 %, which also inhabit the Chaco. The most numerous ethnic group is that of the Mbya, with 14,858 individuals. In second and third place are the *Nivaclé* and the *Ava–Guaraní*, with 13,965 and 13,315 members, respectively, followed closely by the *Páî Tavyterâ*, with 12,965 individuals. These four ethnicities collectively make up 63 % of Paraguay's indigenous population.

In the southern part of the border zone, between the departments of *Alto Paraguay* and Boquerón, there live a few members of the *Ayoreo Totobie–gosode* ethnic group, who were not surveyed in the census. These are the last forest–dwelling indigenous groups of Paraguay who live in isolation from civilization, meaning they do not benefit from the legal regime for indigenous communities. Nevertheless, there are several indigenist NGOs that are addressing their plight, especially to ensure their right to their own land.

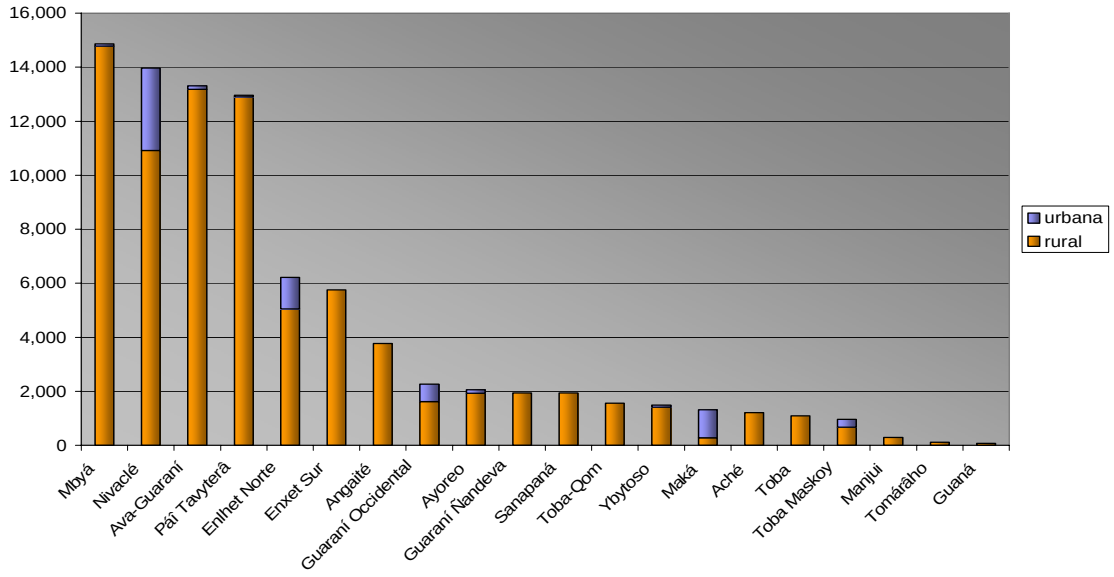
[1] Includes 559 non–indigenous persons living in the communities.

Table 1: Indigenous Population by Ethnic Group and Area of Residence

Linguistic family	Ethnic group	Total pop.		Urban pop.		Rural pop.	
		Amt.	%	Amt.	%	Amt.	%
Guaraní	*Aché*	1,210	1.39	0	0.00	1,210	100.0
	Ava–Guaraní	13,315	15.29	142	1.07	13,173	98.93
	Mbyá	14,858	17.06	82	0.55	14,776	99.45
	Pái Tavyterâ	12,964	14.88	58	0.45	12,906	99.55
	Guaraní Ñandeva	1,943	2.23	0	0.00	1,943	100.0
	Guaraní Occidental	2,255	2.59	635	28.16	1,620	71.84
	Subtotal	**46,545**	**53.44**	**917**	**1.97**	**45,628**	**98.03**
Lengua–Maskoy	*Toba Maskoy*	952	1.09	281	29.52	671	70.48
	Enlhet Norte	6,221	7.14	1,178	18.94	5,043	81.06
	Enxet Sur	5,747	6.60	0	0.00	5,747	100.0
	Sanapaná	1,942	2.23	0	0.00	1,942	100.0
	Toba	1,085	1.25	0	0.00	1,085	100.0
	Angaité	3,763	4.32	0	0.00	3,763	100.0
	Guaná	72	0.08	0	0.00	72	100.0
	Subtotal	**19,782**	**22.71**	**1,459**	**7.38**	**18,323**	**92.62**
Mataco–Mataguayo	*Nivaclé*	13,965	16.03	3,045	21.80	10,920	78.20
	Maká	1,316	1.51	1,039	78.95	277	21.05
	Manjui	290	0.33	0	0.00	290	100.0
	Subtotal	**15,571**	**17.88**	**4,084**	**26.23**	**11,487**	**73.77**
Zamuco	*Ayoreo*	2,054	2.36	126	6.13	1,928	93.87
	Tomárâho	108	0.12	0	0.00	108	100.0
	Ybytoso	1,479	1.70	72	4.87	1,407	95.13
	Subtotal	**3,641**	**4.18**	**198**	**5.44**	**3,443**	**94.56**
Guaicurú	*Toba–Qom*	1,560	1.79	0	0.00	1,560	100.0
Total		**87,099**	**100.0**	**13,118**	**15.06**	**73,981**	**84.94**

Source: DGEEC, 2002 Indigenous Census and internal data

Illustration 1: Indigenous Population by Ethnic Group and Area of Residence



Source: DGEEC, 2002 Indigenous Census and internal data

Socioeconomics

General

Most indigenous peoples of Paraguay live in absolute poverty and often depend on aid from the State or from NGOs to survive. However, no statistical data are available on income levels among Paraguay's indigenous. The data available for the entire country are only those gathered in the 2002 Indigenous Census, which does not contemplate matters of this nature. Nevertheless, the poverty situation is reflected indirectly in other indicators, such as illiteracy rates, types of housing, access to safe water, and availability of electricity.

As for economic activity, most of Paraguay's ethnic groups work primarily at agriculture and, in the Chaco, some cattle raising. The *Maká*, *Nivaclé*, *Manjui*, *Ayoreo*, and *Toba Qom* people mostly manufacture handicrafts, primarily weaving cotton and wool textiles, objects of leather and plant fibers, and woodcarving. Depending on the location of their communities, many indigenous individuals in rural zones are also employed as manual laborers by the *estancias* or neighboring farms. Other important activities for most indigenous people are hunting, fishing and gathering wild honey and edible / medicinal plants for self–consumption.

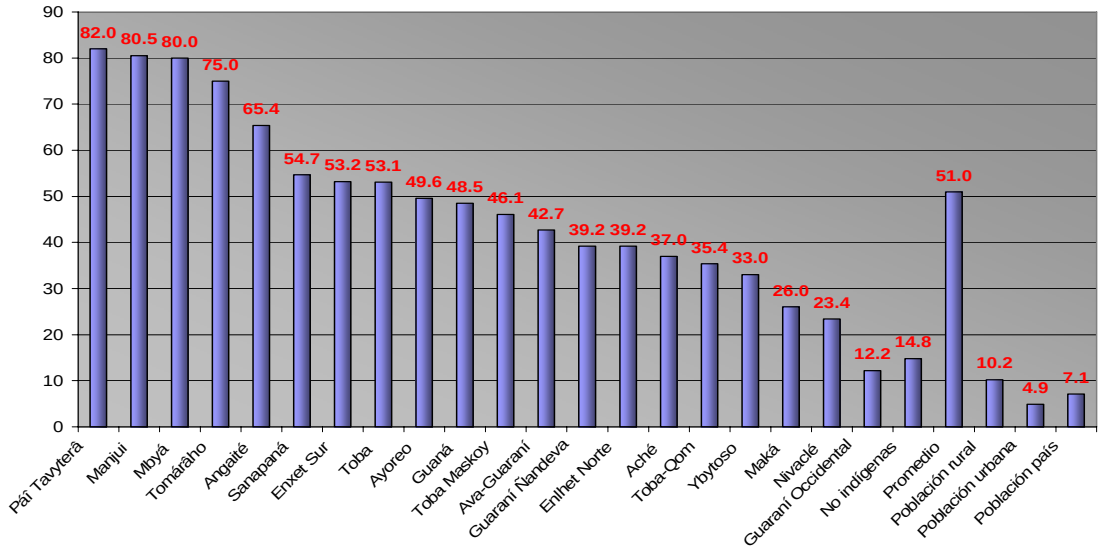
Illiteracy and Schooling

The illiteracy rate among indigenous people is extremely high, reaching an average of 51.0 %, which is much greater than Paraguay's general population (7.1 %) and rural population (10.2 %). However, large differences are seen between the different ethnic groups (see Illustration 2). It is noteworthy that there are now schools in most indigenous communities, especially the larger ones. Many have indigenous teachers from their respective ethnic or linguistic groups, with salaries paid for by the State. Due to the lack of resources and educational policies suited to specific indigenous needs, the teaching quality leaves much to be desired.

The lowest illiteracy rates are found among the *Guaraní Occidental* (12.2 %), non–indigenous persons living in indigenous communities (14.8 %), the *Nivaclé* (23.4 %), and the *Maká* (26.0 %). The highest illiteracy rates are seen among the *Páî Tavyterá* with 82.0 %, followed by the *Manjui* with 80.5 %, the *Mbyá* with 80.0 %, and the *Tomárâho* with 75.0 %.

Since illiteracy data are not grouped by sex, school attendance over 5 years of age was measured to gain an idea of the difference between males and females. The data on Table 2 refer to the percentage of persons over age 5 that never attended school. On an average, this category groups 42.8 % of indigenous girl children and only 35.8 % of the boys. These figures are much higher than those for the rural population of the country in general, which are 10.9 % and 8.7 % for females and males, respectively. As in the case of illiteracy, large differences are seen between ethnic groups.

Illustration 2: Percentage of Illiterate by Ethnic Group



Source: DGEEC, 2002 Indigenous Census and internal data

Table 2: Percentage of indigenous persons over age 5 who never attended school[2]

Ethnic group	Male	Female	Both
Guaraní Occidental	8.5	9.9	9.2
Aché	24.9	24.3	24.6
Ava–Guaraní	26.8	32.7	29.7
Mbyá	61.3	71.2	66.0
Pâi Tavyterâ	65.7	72.5	69.0
Guaraní Ñandeva	20.9	33.8	27.1
Toba Maskoy	28.0	37.5	32.7
Enlhet Norte	18.2	27.7	22.8
Enxet Sur	31.1	40.9	35.8
Sanapaná	36.5	43.6	39.9
Toba	31.1	42.0	36.5
Angaité	40.9	46.8	43.8
Guaná	21.4	39.6	30.7
Nivaclé	14.9	17.3	16.1
Maká	9.8	22.5	16.2
Manjui	73.5	77.6	75.5
Ayoreo	35.6	44.2	39.7
Ybytoso	17.9	21.5	19.6
Tomárâho	51.3	47.8	49.4
Toba–Qom	20.4	24.7	22.5
Non–indigenous	11.9	12.3	12.0
Average indigenous	**35.8**	**42.8**	**39.1**
Rural	8.7	10.9	9.7
Urban	5.6	6.0	5.8
Country average	**7.0**	**8.0**	**7.5**

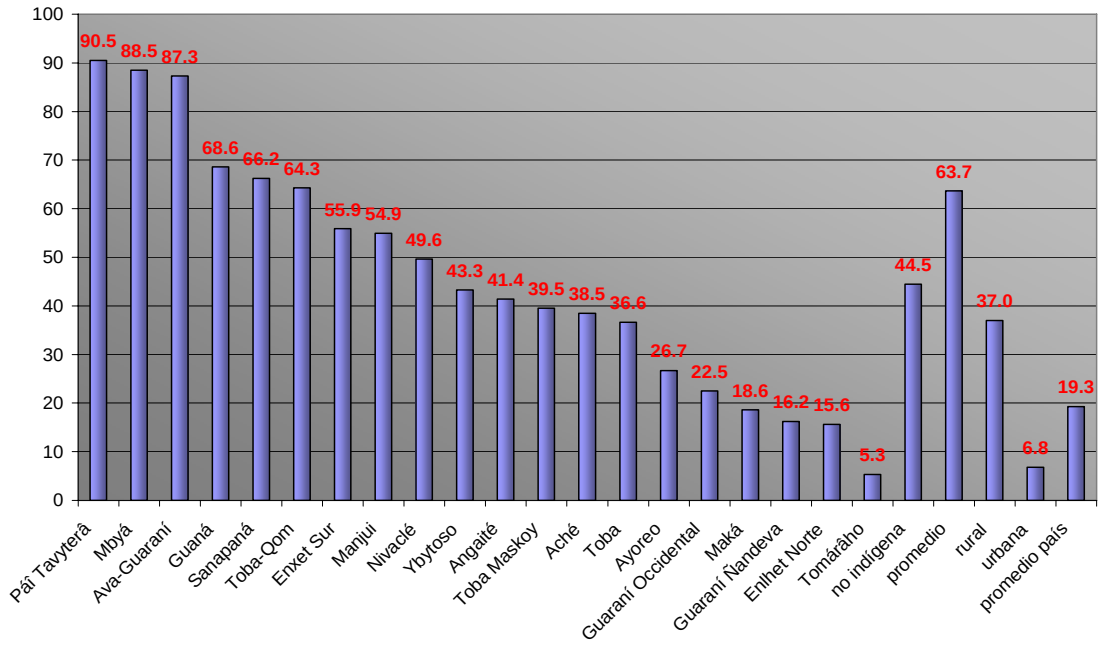
Source: DGEEC, 2002 Indigenous Census and internal data

[2] The data referring to the country in general also include those not answering the question.

Housing Types

The predominant type of housing among indigenous people is the thatched hut, which is usually built of wood, covered with straw, leaves or palm thatching, and has a clay floor. On an average, 63.7 % of all indigenous dwellings are of this type, while the average for overall rural homes is only 37.0 %. There are large differences among ethnic groups. The most underprivileged in this regard are the *Páî Tavyterâ*, the *Mbyá* and the *Ava–Guaraní*, whose percentages are around 90 %. At the other end of the scale are the *Tomárâho*, *Enxet Norte*, *Guaraní Ñandeva,* and *Maká* peoples, with figures below 20 %.

Illustration 3: Percentage of Indigenous Dwellings being Thatched Huts by Ethnic Group



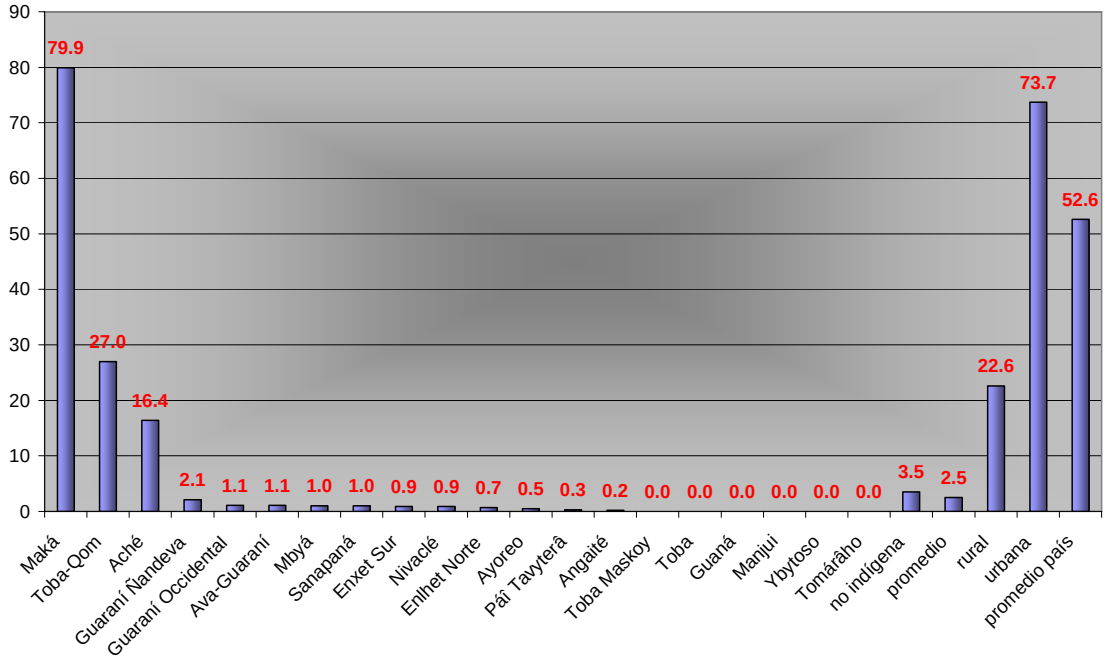
Source: DGEEC, 2002 Indigenous Census and internal data

Access to Safe Water and Basic Sanitation

The situation of access to safe water among indigenous people is catastrophic. On an average, only 2.5 % of all indigenous homes have this service, compared to 22.6 % of all rural dwellings in general (see Illustration 4). Only the *Maká* and *Toba Qom* peoples surpass this overall average, primarily because they live mostly in or near urban zones. The *Aché* also have a relatively privileged situation, probably due to aid received from NGOs in this regard. All other ethnic groups range between 0.0 and 2.1 %.

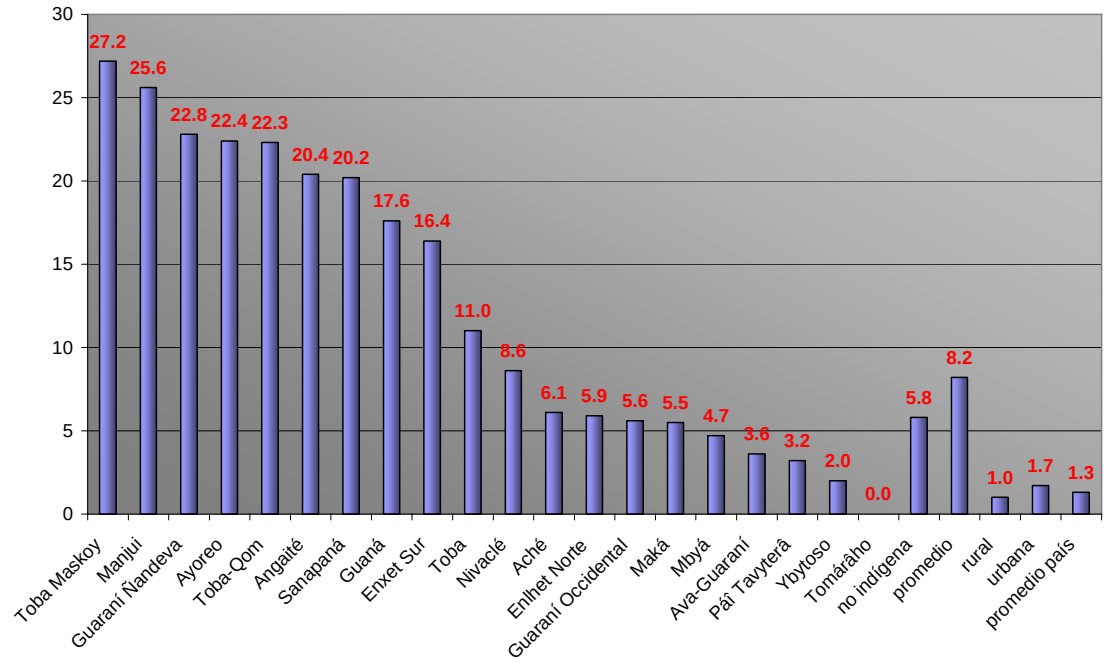
The basic sanitation situation is a little better, although equally worrying. On an average, 8.2 % of all indigenous homes lack even a simple latrine–type toilet (see Illustration 5). The average for the overall rural population is a mere 1.0 %. There is only one ethnic group – the *Tomárâho* – whose dwellings all have toilets, followed by the *Ybytoso*, with 2.0 %. The most underprivileged ethnic groups in this regard are the *Toba Maskoy* (27.2 %) and the *Manjui* (25.6 %).

Illustration 4: Percentage of Indigenous Homes with Safe Water by Ethnic Group



Source: DGEEC, 2002 Indigenous Census and internal data

Illustration 5: Percentage of Indigenous Homes lacking Toilets by Ethnic Group



Source: DGEEC, 2002 Indigenous Census and internal data

Access to Electricity

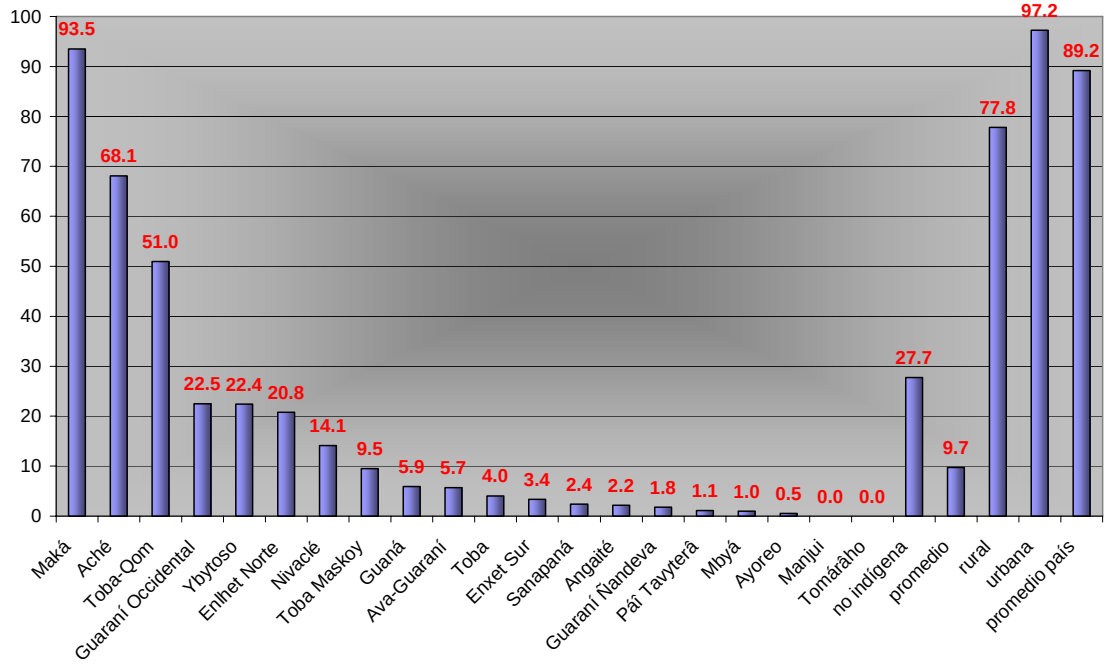
Comparing access to electricity between indigenous communities (most of which are rural) and the overall rural population, the differences are as large as for all other

utilities. On an average, only 9.7 % of all homes located in indigenous communities have electricity, in contrast to 77.8 % of all rural homes among the general population. Large differences are also found between ethnic groups (see Illustration 6).

There are two ethnic groups – the *Manjui* and the *Tomárâho* – whose communities have no dwellings with electricity. In both cases, the population is very small (see Table 1). Figures below 2.5 % are found among the *Ayoreo*, *Mbyá*, *Pâî Tavyterâ*, *Guaraní Ñandeva*, *Angaité*, and *Sanapaná* ethnic groups. From 2.5 to 10 % of all homes with electricity are located in the communities of the *Enxet Sur*, *Toba*, *Ava–Guaraní*, *Guaná*, and *Toba Maskoy* peoples.

At the other end of the list are the *Maká* with the highest percentage (95.3 %). This is a special case, being only indigenous group that lives mostly in urban areas. Other ethnic groups with figures well above the average are the *Aché* (68.1 %) and the *Toba–Qom* (51.0 %).

Illustration 6: Percentage of Indigenous Homes with Electricity by Ethnic Group



Source: DGEEC, 2002 Indigenous Census and internal data

3. Methodology for Selecting Communities

Selection Stages

The process of pre–selecting the 3 target communities was carried out in three stages, analyzing a certain number of objectively verifiable and quantifiable indicators relating to elements of the central purpose for the sustainable rural electrification project. These figures are available for the entire country and are comparable among communities.

At the beginning of each stage, a zone was selected with the relatively most significant unfavorable sum of indicators. The first stage was for selecting one region of the country, for which the chosen indicators were compared among the 16 departments. The second stage analyzed only the department with the relatively most significant unfavorable sum of indicators, to perform the same procedure with the districts within that department. In the third stage, three indigenous and/or *campesino* communities were selected by reviewing more specific project criteria, detailed in Chapter 3.3.

Comparison Indicators for Selecting the Target Zone

Selecting the Indicators

The indicators to be used should best reflect the project focus: the “ruralness” of the target zone, its indigenous nature, its energy status, its level of human development, its level of education, the economic standard of its population, and gender equality.

For the two first stages of the process, seven indicators were selected that were deemed the most important to cover the above matters, and on which sufficient objective, coherent data were available for the entire country, as follow:

1. Percentage of rural population (PR)
2. Percentage of indigenous population (PI)
3. Percentage of rural homes without electricity (VRSE)
4. Percentage of population with at least one Unsatisfied Basic Need (1NBI)
5. Human Development Index (HDI)
6. Gender–related Development Index (GDI)
7. Percentage of persons living in poverty (PP)

The first 3 indicators were determined based on the findings of the 2002 National Census and Indigenous Census published by the DGEEC, and the other 4 were taken from the “*Atlas de Desarrollo Humano de Paraguay* 2005” published by the UNDP office in Paraguay, also based on data collected by the 2002 National Census.

Defining the Selected Indicators

Each of the selected indicators has the following definition:

1. Percentage of Rural Population:

The ratio of population living in rural zones to total population, in percentage terms.

2. Percentage of Indigenous Population:

The ratio of indigenous population to total population of the same zone, in percentages.

3. Percentage of Rural Homes without Electricity:

The ratio of rural homes without electricity to total rural homes in the same zone, in percentage terms. This figure was based on the census indicator for the source of lighting in homes.

4. Percentage of Population with at Least one Unsatisfied Basic Need:

The ratio of population with at least one Unsatisfied Basic Need (UBN) to total population in the same zone, in percentages. A total of four UBN were considered: housing quality, sanitation infrastructure, access to education, and subsistence capacity.

5. Human Development Index:

The Human Development Index (HDI) is a composite figure that measures average progress in three basic dimensions of human development: a long, healthy life, knowledge, and a dignified standard of living. This index is calculated on the basis of life expectancy at birth, adult literacy rates, gross enrolments in primary, secondary and tertiary schools, and per capita gross domestic product. The maximum possible value is 1, and the minimum is 0. Figures under 0.5 are considered low, from 0.5 to 0.8 are medium, and above 0.8 are high.

6. Gender–related Development Index:

The Gender–related Development Index (GDI), as in the case of the HDI, is a composite figure measuring average inequality between men and women on three basic dimensions making up the HDI as adjusted to reflect inequalities between men and women. Its maximum possible value is 1, the minimum is 0, and the same assessment limits are used as with the HDI.

7. Percentage of Persons Living in Poverty:

The ratio of population living in poverty to total population of the same zone, in percentage terms. The poverty threshold is defined as the cost of the basic family basket, as calculated from time to time by the DGEEC, versus income.

Establishing the Scale to Choose the Target Zone

The department and district scale was established as follows: each zone having the highest percentage figure and the lowest index figure for a given indicator was given 3 points. The zone with the second highest value on the next lowest indicator was given 2 points, and the third highest figure received 1 point. All remaining zones received 0 points. Zones were considered as being selected when having the maximum number of points after adding up the units for all 7 indicators.

In principle, districts were only considered for selection when belonging to the department with the highest score in the previous selection stage. However, the three departments of the Chaco have very few districts (*Presidente Hayes* – 5, Boquerón – 1, *Alto Paraguay* – 2),[3] and most have large territories and small populations, making it difficult to use this selection method. In order to broaden the base for selecting the target district, the entire Chaco was considered as a single region.

[3] Since June 2005 there is a third district (*Bahía Negra*), but since no separate statistical data is available, it was not yet considered in this study.

Comparison Indicators for Selecting the Target Community

The indicators for first pre–selecting 3 communities from among all those in the target district and then selecting the target community from among the three pre–selected ones should directly reflect project goals and feasibility requirements and be objectively verifiable. Table 3 shows a series of technical, legal, social, and economic indicators that satisfy this demand and were used in the selection process.

Basically, two types of indicators stand out from a standpoint of their influence on selection. The first type might be called categorical, as answers are yes / no, respectively existing or non–existing. In this category, certain indicators exclude a community from selection when not meeting the selection criterion.

The second type of indicator could be called relative, because answers are numerical values that could be absolute or relative, or relative qualifications of a situation. Using these selection criteria, ranges of preference were established for selecting the community. A minimum or maximum limit may also be used for excluding a community.

Table 3: Selection Criteria for Target Communities

Parameter	Indicator	Selection Criterion
Electric infrastructure	Existence of electric grid	Non–existing (exclusive)
	Electrification plans through grid	Non–existing (exclusive)
	Distance from existing electric grid	The farther the better, minimum 25 km (exclusive)
Land or water access	Access by land or water	Existing (exclusive)
	Quality of road access	Usable +/– all year (exclusive)
Legal situation	Legal status (only for indigenous communities)	Existing or in progress (exclusive)
	Landholding	Own or belonging to INDI, INDERT or NGO (exclusive)
Community organization	Existence of community organizations	Existing or being formed
	Consolidation of community organizations	The more the better
Internal conflicts or with neighbors	Existence of significant conflicts	Non–existing (exclusive)
Population	Number of inhabitants	Minimum 250 inhabitants (exclusive)
Indigenous people	Percent of indigenous population	The larger the better
Women's participation	Degree of participation in community decisions	The greater the better
	Existence of women's groups	Existing or being formed
Poverty level	Family income	The lower the better
Payment for utilities	Availability of payment for future energy service	The more availability the better
Economic activity	% economically active population	The larger the better
Primary production potential	Area of land per family	The larger the better
Women's participation	Women's production activities	The more activities the better
Inter–institutional cooperation	Cooperating institutions exist	The more existing the better

Source: Internal data

4. Defining the Target Region

Following the methodology described in Chapter 3, the seven chosen indicators were reviewed for all 16 departments of Paraguay, except for the capital city of Asunción, which is of no importance to this project.

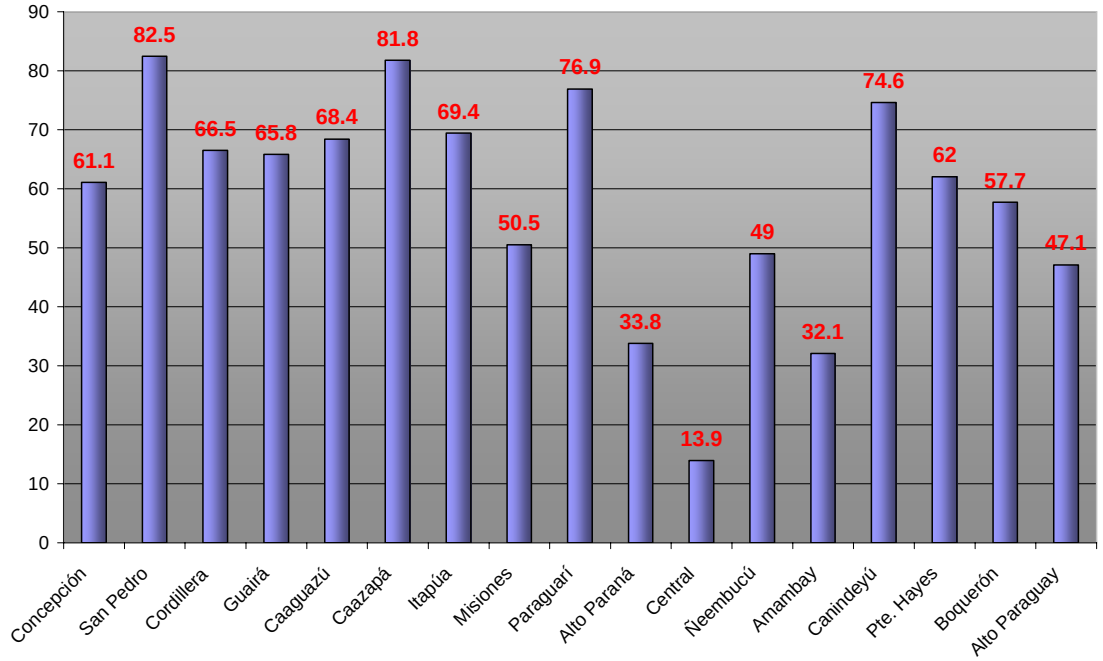
Illustration 7: Division of Paraguay into Departments

Source: Web page of the President's Office

Percentage of Rural Population

There is a major difference in the different departments' percentage of rural population. The largest are in the departments of *San Pedro* (82.5 %), Caazapá (81.8 %) and Paraguarí (76.9 %), all of which are located in the Eastern Region. These figures are almost twice the national average of 43.4 %. As can be expected, the Central Department, the closest to the capital city of Asunción, has the lowest figures with only 13.9 %. Except for *Alto Paraná* and Amambay, all other departments are above the national average.

Illustration 8: Percentage of Rural Population by Departments



Source: DGEEC, 2002 National Census and internal data

Percentage of Indigenous Population

As for the percentage of indigenous population, there are also large variations depending on the region of the country. Several departments – Cordillera, Misiones, Paraguarí, and Ñeembucú – have no indigenous population. The department having by far the largest percentage of indigenous population is Boquerón with 47.6 %, followed by *Alto Paraguay* with 24.8 %, *Presidente Hayes* with 24.6 %, Amambay with 9.2 %, and Canindeyú with 6.9 %.

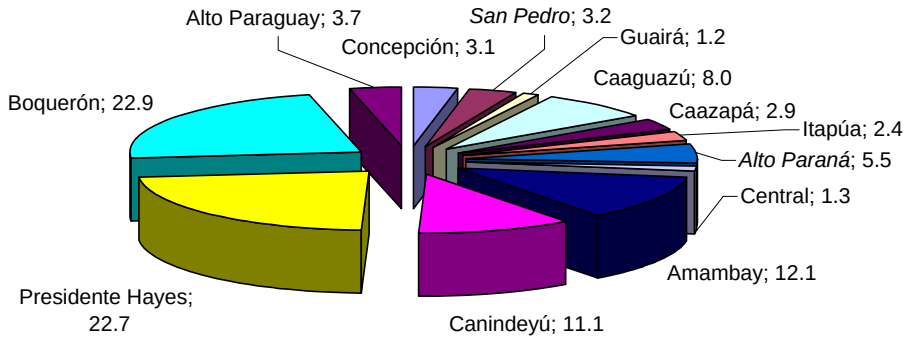
The first three departments are part of the Chaco region, whose population on average is 31.7 % indigenous. The department of Boquerón holds the largest percentage of indigenous population in the country, with 22.9 %, followed closely by *Presidente Hayes,* with 22.7 %. The following departments in this list are Amambay with 12.1 %, Canindeyú with 11.1 % and Caaguazú with 8.0 %.

Table 4: Indigenous Population by Departments and Areas of Residence

Department	Total pop.		Urban pop.		Rural pop.		%.
	Amt.	%	Amt.	%	Amt.	%	indig.
Concepcion	2,681	3.08	222	8.28	2,459	91.72	1.50
San Pedro	2,762	3.17	0	0.00	2,762	100.00	0.87
Cordillera	0	0.00	0	–	0	–	0.00
Guairá	1,056	1.21	0	0.00	1,056	100.00	0.60
Caaguazú	6,925	7.95	0	0.00	6,925	100.00	1.57
Caazapá	2,544	2.92	0	0.00	2,544	100.00	1.83
Itapúa	2,105	2.42	7	0.33	2,098	99.67	0.46
Misiones	0	0.00	0	–	0	–	0.00
Paraguarí	0	0.00	0	–	0	–	0.00
Alto Paraná	4,766	5.47	146	3.06	4,620	96.94	0.86
Central	1,130	1.30	0	0.00	1,130	100.00	0.08
Ñeembucú	0	0.00	0	–	0	–	0.00
Amambay	10,541	12.10	58	0.55	10,483	99.45	9.19
Canindeyú	9,625	11.05	52	0.54	9,573	99.46	6.92
Eastern Region	**44,135**	**50.67**	**485**	**1.10**	**43,650**	**98.90**	**0.88**
Presidente Hayes	19,804	22.74	0	0.00	19,804	100.00	24.59
Boquerón	19,962	22.92	5,511	27.61	14,451	72.39	47.55
Alto Paraguay	3,198	3.67	281	8.79	2,917	91.21	24.80
Western Region	**42,964**	**49.33**	**5,792**	**13.48**	**37,172**	**86.52**	**31.73**
Country	**87,099**	**100.00**	**6,277**	**7.21**	**80,822**	**92.79**	**1.69**

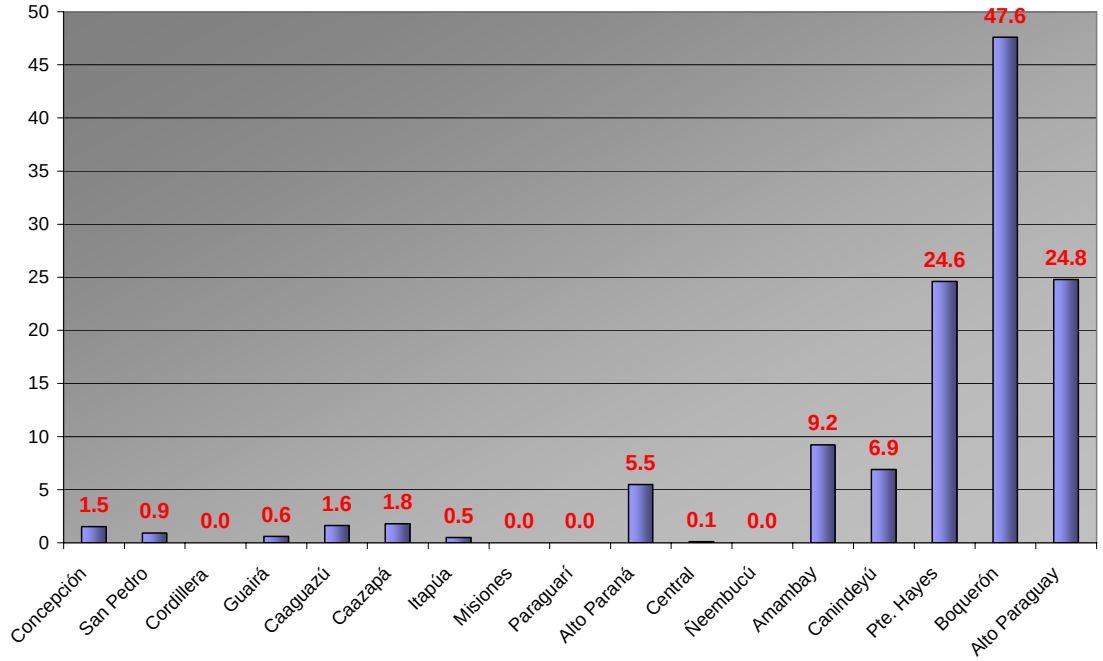
Source: DGEEC, 2002 Indigenous Census and internal data

Illustration 9: Percentage of Indigenous Population by Departments



Source: DGEEC, 2002 Indigenous Census and internal data

Illustration 10: Percentage of Indigenous Population within each Department



Source: DGEEC and internal data

Percentage of Rural Homes without Electricity

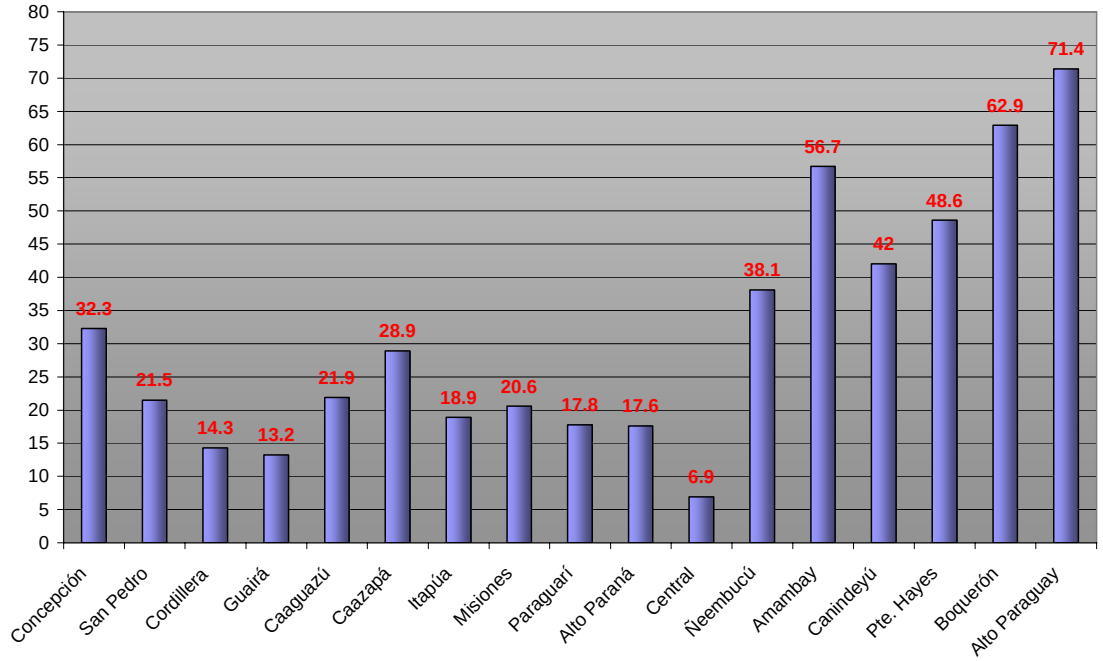
This indicator also shows large differences by department. As expected, the departments located near the capital city of Asunción – Central and Cordillera – have the lowest figures. *Presidente Hayes* is an exception, as its figures are among the highest due to its large size and its population density, especially in the areas that are farthest from Asunción.

The most underprivileged departments are the three making up the Chaco region, i.e., *Alto Paraguay* with 71.4 %, Boquerón with 62.9 % and *Presidente Hayes* with 48.6 %, plus the two northeastern departments of Canindeyú with 56.7 % and Amambay with 56.7 %, and Ñeembucú in the south with 38.1 %.

As shown in illustration 11,[4] and as expected, the percentage of rural homes lacking electricity closely correlates to the population density of each department. The lower the population density, the greater the percentage of homes without electricity. All departments with high figures for this indicator have a population density of less than 10 inhab / km^2. In the Chaco as a whole, this density is only 0.55 inhab / km^2.

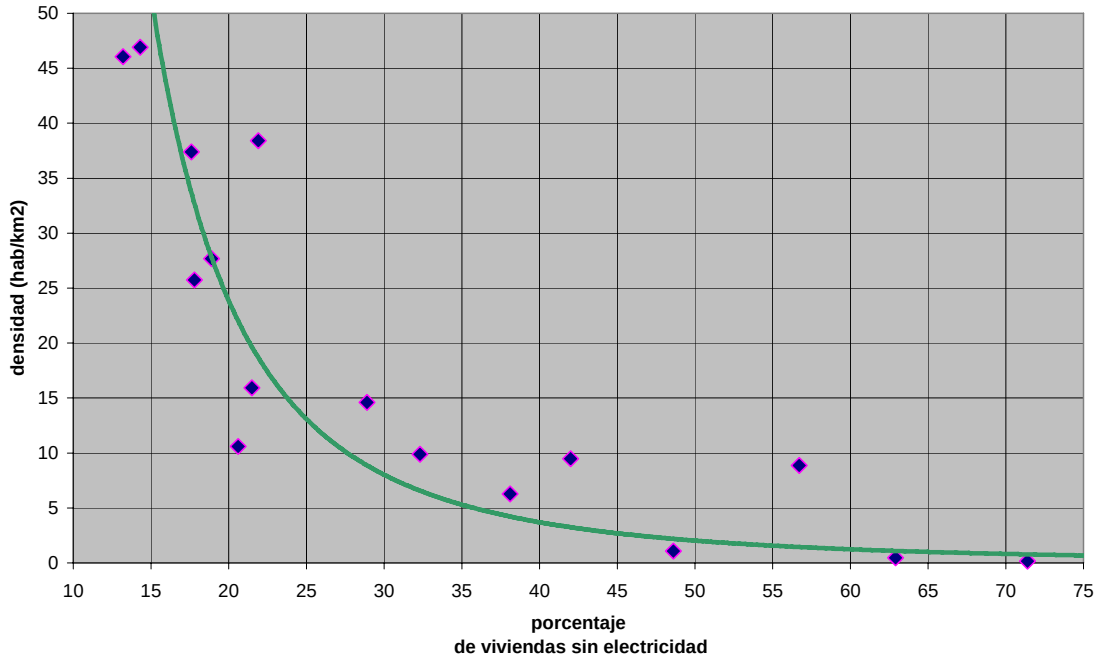
[4] In preparing this graph, the Central department was excluded, as its population density is far superior to that of any other departments.

Illustration 11: Percentage of Rural Homes without Electricity



Source: DGEEC and internal data

Illustration 12: Percentage of Rural Homes without Electricity vs. Population Density

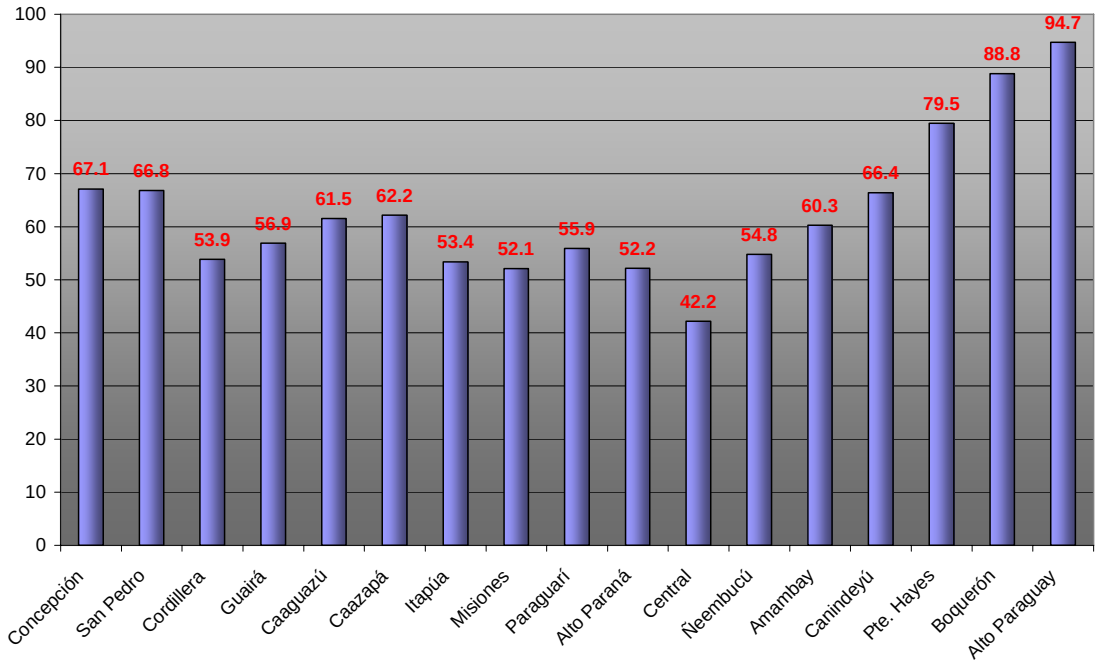


Source: DGEEC and internal data

Percentage of Population with at Least one Unsatisfied Basic Need

Most of the Paraguayan population has at least one Unsatisfied Basic Need. Even Central, the department with the lowest figures, is at 42 %. In all other departments, the figures are above 50 %. The highest percentages are in the Chaco, ranging from 80 to 95 % depending on the department. The greatest deficit in most departments is sanitation infrastructure and housing quality.

Illustration 13: Percentage of Population with at Least one UBN by Departments

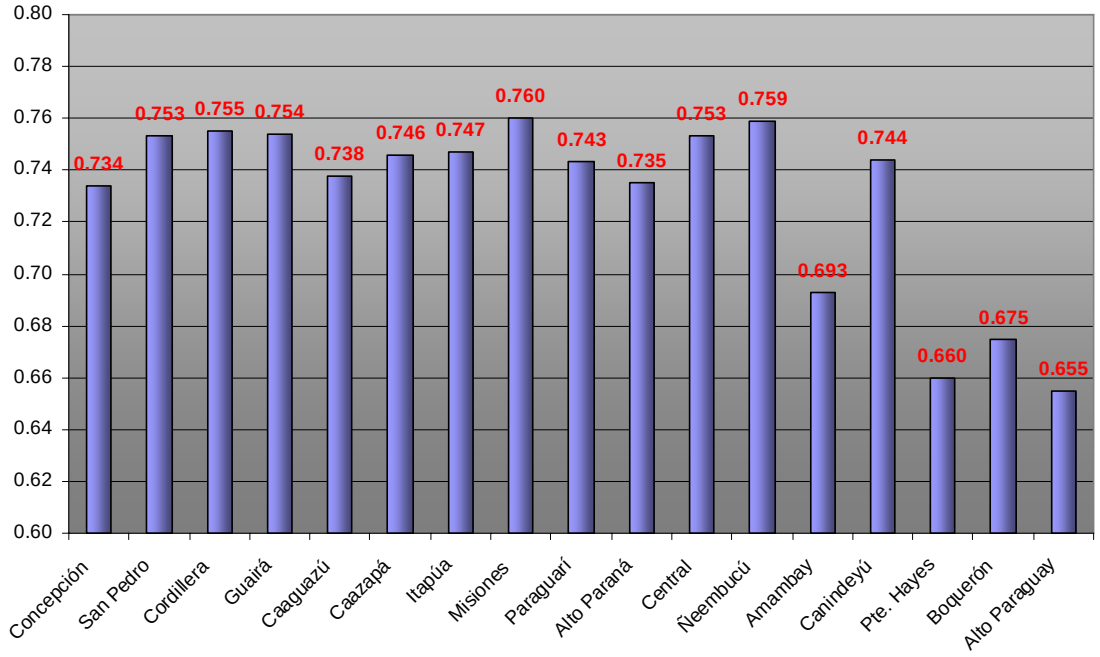


Source: UNDP and internal data

Human Development Index

Except for the department of Amambay, the Eastern Region is relatively uniform in terms of the HDI, ranging from 0.73 to 0.76. Amambay, with 0.69, is slightly higher than the Chaco departments, whose figures range from 0.66 to 0.68, while the national average is 0.751. It is worth repeating that, for this indicator, the lowest figures are the most unfavorable, and this more or less confirms the trends found for the indicators discussed thus far as regards the Chaco.

Illustration 14: Human Development Index by Departments

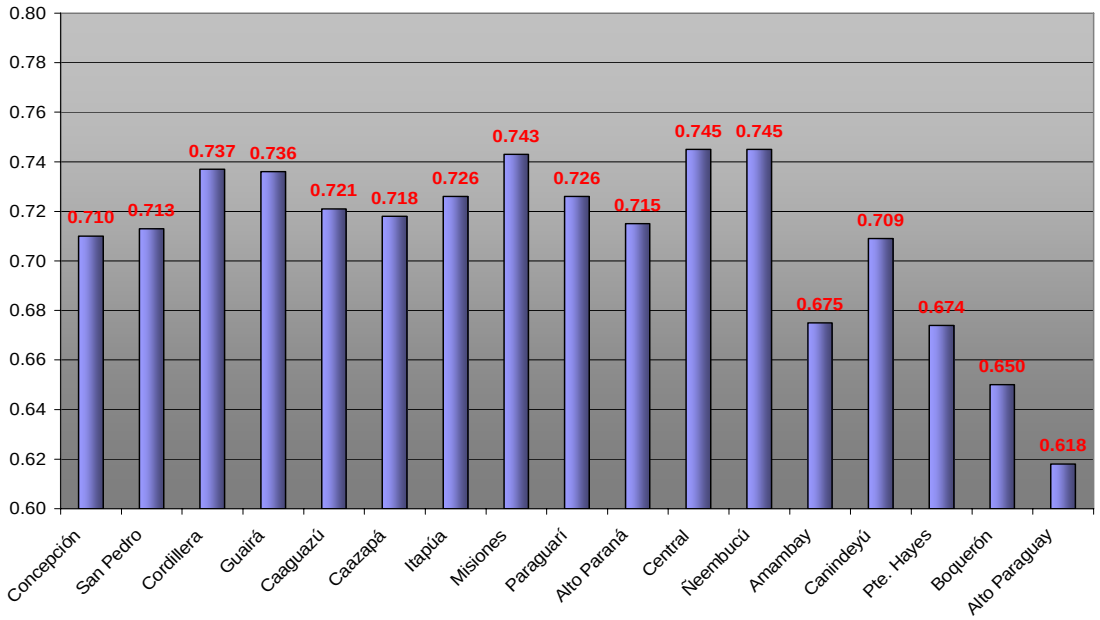


Source: UNDP and internal data

Gender–related Development Index

This indicator paints a very similar picture to that of the HDI, leading one to conclude that in places where the HDI is low there is also a greater divergence in human development levels between men and women.

Illustration 15: Gender–related Development Index by Departments



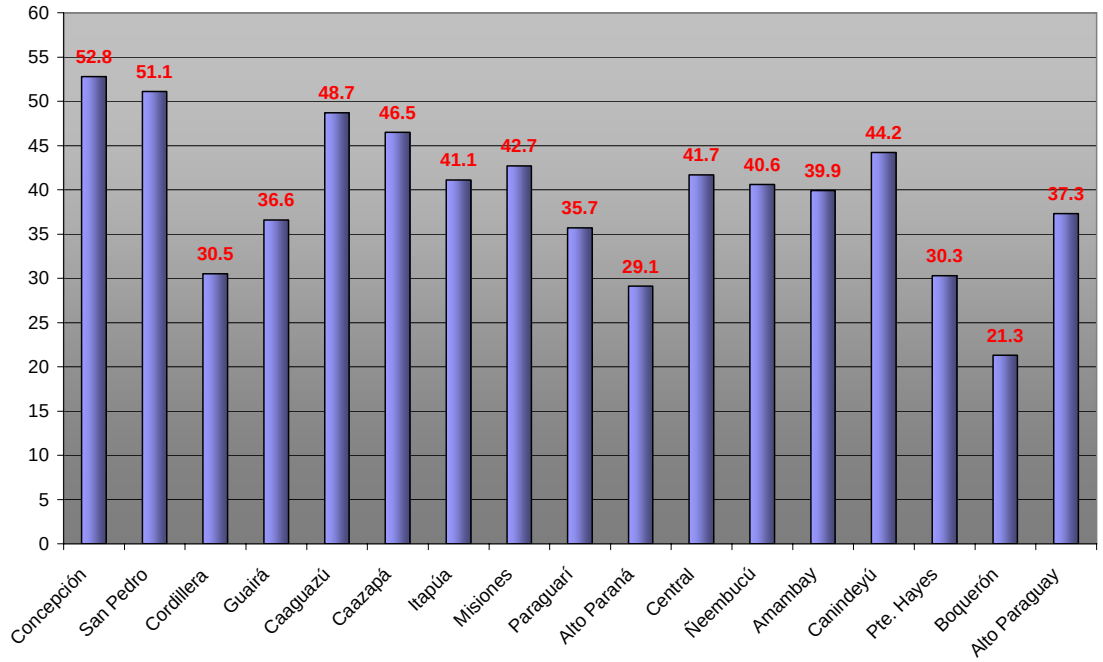
Source: UNDP and internal data

Percentage of Poor Population

This indicator is practically the only one not following the same trend as the others. It is not the Chaco departments that have the highest percentages of poor population, but rather the departments of Concepción, *San Pedro*, Caaguazú, and Caazapá, with figures ranging from 47 to 53 %. Surprisingly, Boquerón is the department with the lowest percentage of poor population in the entire country, with only 21 %. This phenomenon can be explained by the fact that the departments with the highest figures for this indicator have a high rate of *campesino* population, most living in poverty. In the Chaco, on the other hand, aside from the large indigenous population that is generally poor, there are many farmers and ranchers with fairly high levels of income.

In the central Chaco, in the border zone between its three departments, there are three Mennonite colonies – Menno, Fernheim and Neuland – populated primarily by followers of this Christian faith of Germanic origin. Due to their prosperity and large population – some 16,500 persons – they have a strong influence on this indicator, especially in the department of Boquerón that holds most of the Mennonite population. In addition, the numerous indigenous communities located in near proximity to them are mostly in better economic and social conditions than the rest. This is partly because many work as farmhands or manual workers for the Mennonite colonists, and partly because they receive much support from the Mennonites to enhance their quality of life in the areas of health, education, legalization of land, and technical assistance for farm production.

Illustration 16: Percentage of Poor Population by Departments



Source: UNDP and internal data

Mennonite colonies represent major centers of attraction for the indigenous population, especially in the lower Chaco and Pilcomayo river area. Over the past 50 years, this has caused on–going indigenous migration towards the central Chaco. Due to this migration and natural growth, indigenous numbers quintupled over that period, reaching the present level of some 25,000 persons, 52 % of the entire central Chaco population. However, despite this relatively favorable socioeconomic situation in the

central Chaco, all other indicators are unfavorable, especially in Boquerón. This phenomenon is difficult to explain without deeper study.

Summary

Table 5 brings together the figures for all indicators taken into account for selecting the target region, enabling one to compare both indicators and departments. Table 6 presents the scores given according to the methodology described in Chapter 3.2.3. Here we see much consistency in the classification for most indicators, except for the percentage of population living in poverty, as mentioned above. Practically all other indicators show the three Chaco departments as having the least favorable relatively significant values. Another exception is the percentage of rural homes without electricity, where the Amambay department has a higher figure than the *Presidente Hayes* department.

The department having the highest score when adding up the units for all 7 indicators is *Alto Paraguay* with 14 points, followed by the department of Boquerón with 10 points. In third place we find the departments of *Presidente Hayes* and *San Pedro* with the same score of 5 units. In four of the seven indicators, the *Alto Paraguay* department has the maximum of 3 points, and in one it has 2 points.

All other departments receiving points are Concepción with 3, Caazapá with 2, and Caaguazú, Paraguarí and Amambay with 1 unit each. The remaining 8 departments have 0 points. Since *San Pedro* received points in only two indicators, which were not the most significant ones, and *Presidente Hayes* received points in four, the former department was eliminated from the pre–selection of the top three.

As mentioned in chapter 3.2.3., the entire *Chaco* was taken as a single region, which is why all three pre–selected departments are part of the target region. This will serve as a basis for following up with the selection process, i.e., defining the target district.

Table 5: Values for Chosen Indicators by Departments

Department	PR	PI	VRSE	1NBI	HDI	GDI	Pilot Project
Concepcion	61.1	1.5	32.3	67.1	0.734	0.710	52.8
San Pedro	82.5	0.9	21.5	66.8	0.753	0.713	51.1
Cordillera	66.5	0.0	14.3	53.9	0.755	0.737	30.5
Guairá	65.8	0.6	13.2	56.9	0.754	0.736	36.6
Caaguazú	68.4	1.6	21.9	61.5	0.738	0.721	48.7
Caazapá	81.8	1.8	28.9	62.2	0.746	0.718	46.5
Itapúa	69.4	0.5	18.9	53.4	0.747	0.726	41.1
Misiones	50.5	0.0	20.6	52.1	0.760	0.743	42.7
Paraguarí	76.9	0.0	17.8	55.9	0.743	0.726	35.7
Alto Paraná	33.8	5.5	17.6	52.2	0.735	0.715	29.1
Central	13.9	0.1	6.9	42.2	0.753	0.745	41.7
Ñeembucú	49.0	0.0	38.1	54.8	0.759	0.745	40.6
Amambay	32.1	9.2	56.7	60.3	0.693	0.675	39.9
Canindeyú	74.6	6.9	42.0	66.4	0.744	0.709	44.2
Presidente Hayes	62.0	24.6	48.6	79.5	0.660	0.674	30.3
Boquerón	57.7	47.6	62.9	88.8	0.675	0.650	21.3

Alto Paraguay	47.1	24.8	71.4	94.7	0.655	0.618	37.3

Source: DGEEC, UNDP and internal data

Table 6: Classification for Selecting the Target Department

Department	PR	PI	VRSE	1NBI	HDI	GDI	Pilot Project	sum	Classif.
Concepcion							3	**3**	**5**
San Pedro	3						2	**5**	**3**
Cordillera									**10**
Guairá									**10**
Caaguazú							1	**1**	**7**
Caazapá	2							**2**	**6**
Itapúa									**10**
Misiones									**10**
Paraguarí	1							**1**	**7**
Alto Paraná									**10**
Central									**10**
Ñeembucú									**10**
Amambay			1					**1**	**7**
Canindeyú									**10**
Presidente Hayes		1		1	1	2		**5**	**3**
Boquerón		3	2	2	2	1		**10**	**2**
Alto Paraguay		2	3	3	3	3		**14**	**1**

Source: Internal data

5. Description of the Target Region

Location and Access

The Paraguayan Chaco, also called the Western Region, occupies all of the national territory from the western banks of the Paraguay River westward, i.e., up to the Pilcomayo River, which defines the border with Argentina. To the north, a dry border divides the Paraguayan Chaco from the Bolivian territory. From the Apa River to the north, the Paraguay River forms the border with Brazil.

Its primary access routes from the capital city of Asunción are National Route Nº 9, commonly called the Trans–Chaco road, which is paved up to *Estancia La Patria*, and the Paraguay River. A bridge located in the district of *Mariano Roque Alonso* enables crossing the Paraguay River to reach the Chaco region from the metropolitan area. Aside from the Trans–Chaco road, the Pilcomayo River area is accessible by National Route Nº 12, which is not paved. Access from the northern part of the Eastern Region is along Route Nº 5 that connects *Pedro Juan Caballero* to Concepción and *Pozo Colorado*. The final unpaved 120 km stretch needed to connect Paraguay an Bolivia is under construction, between *Estancia La Patria* and *Infante Rivarola* on the border.

Natural Characteristics

The *Gran Chaco Sudamericano* is an enormous plain covering over 1 million km^2. It stretches more or less from Argentina's *Santiago del Estero* in the south to Bolivia's *Santa Cruz de la Sierra* in the north, and from the foothills of the Andes in the west to the Paraguay and Paraná Rivers in the east. The part that belongs to Paraguay is 34 % of its total area. It is divided in half, in a north–south direction into the sub–humid to humid Chaco in the east and the sub–humid to dry Chaco in the west.

The maximum rainfall occurs near the Paraguay River, with average yearly values of 1,300 mm, while most of the dry Chaco ranges around 500 mm. Precipitation is markedly concentrated in the Summer, meaning dry Winters, and vegetation depends entirely on rainfall. The most humid part is predominantly thick forests, with palm groves in flood areas. Towards the drier zones, vegetation turns shorter and scarcer. Due to the high temperatures almost year round, evapo–transpiration exceeds precipitation in most of the Chaco, causing problems of soil salinity and water shortages for human and animal consumption, especially during the Winter.

The Paraguayan Chaco presently has nine national parks and other protected areas, with a total surface area of about 26,800 km^2 covering approximately 10.9 % of its territory. There are also projects to create another six protected areas on a total of 12,600 km^2, which would raise the sum of all protected areas to 16 % of the Chaco. In 2001, the *Reserva de la Biosfera del Chaco* was also created, covering an area of some 47,000 km^2 in the departments of *Alto Paraguay* and Boquerón, and containing the six national parks of that region.

Demographics

The three Chaco departments have a joint population of only 135,186 persons, a mere 2.63 % of the country's entire population. Its surface area of 246,925 km^2, however, is greater (60.7 %) than that of the Eastern Region, where most of the population is concentrated. Consequently, the population density of 0.55 inhab / km^2 is very low.

A full 59.2 % of the Chaco's population lives in the rural zone, over the 43.4 % national average. The Chaco population is 31.7 % indigenous, very high in comparison to the national average of only 1.7 %.

Table 7: Chaco Population by Sex and Area of Residence

Department	Urban			Rural			Total		
	Male	Female	Both	Male	Female	Both	Male	Female	Both
Presidente Hayes	14,204	14,690	28,894	28,326	25,273	53,599	42,530	39,963	82,493
Boquerón	8,204	8,214	16,418	13,133	11,555	24,688	21,337	19,769	41,106
Alto Paraguay	2,194	2,201	4,395	3,907	3,285	7,192	6,101	5,486	11,587
Chaco	**24,602**	**25,105**	**49,707**	**45,366**	**40,113**	**85,479**	**69,968**	**65,218**	**135,186**

Source: DGEEC, 2002 National Census and internal data

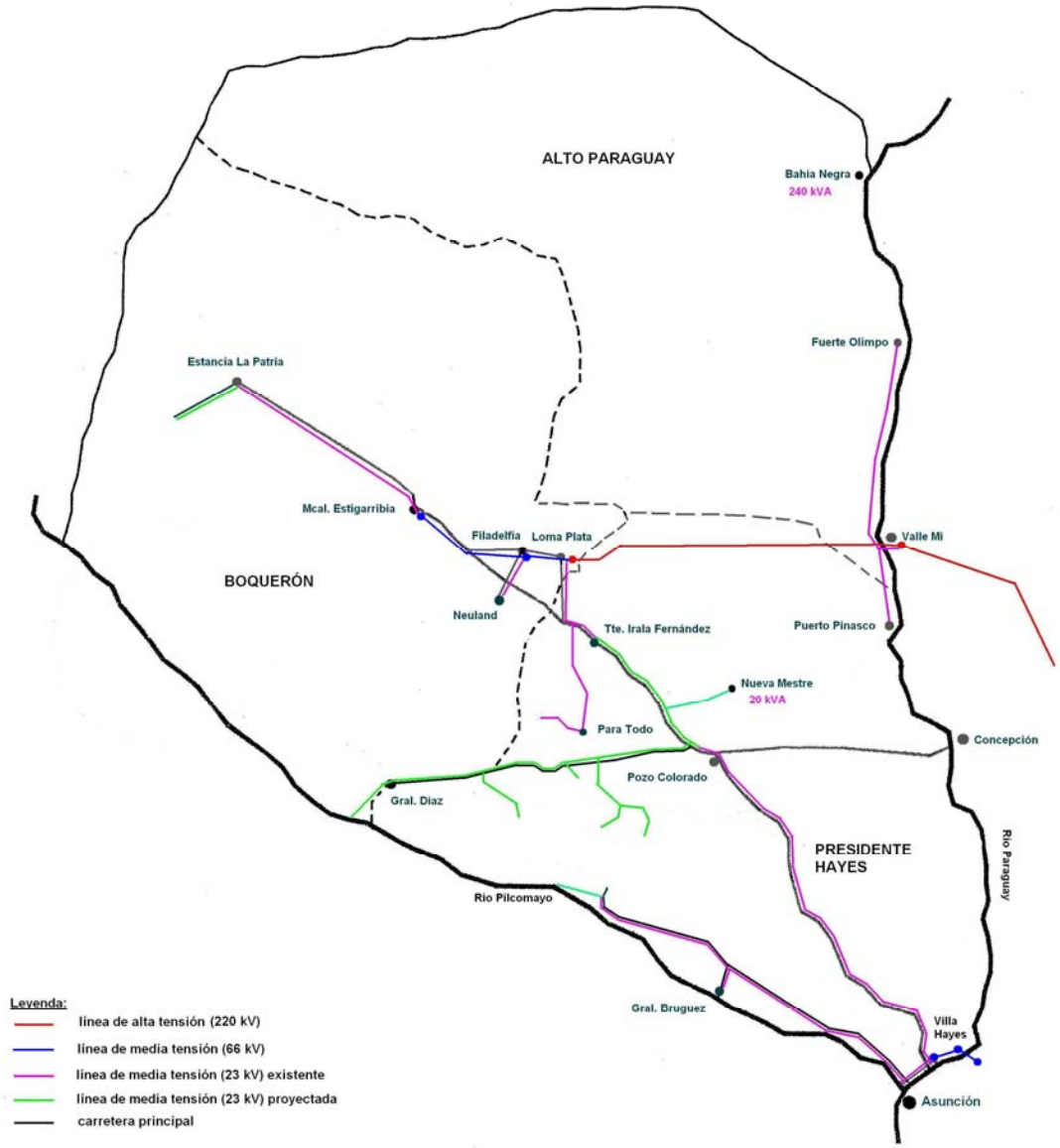
Electrification

The Paraguayan Chaco is fed by two different, independent ANDE power systems (see Illustration 16). The first feeds the central Chaco and part of the western bank of the Paraguay River through a high–tension line (220 kV) that comes from the Itaipú Plant via Carayaó, Horqueta and *Valle Mí*, where there is a transformation sub–station to medium tension (23 kV). From there it follows the high–tension line across the Paraguay River to *Loma Plata*, where there is another transformation sub–station to medium tension and a 66 kV sub–transmission line that connects *Loma Plata* to *Mcal. Estigarribia*, passing through Filadelfia.

From the *Valle Mí* sub–station, the electricity is distributed by medium tension (23 kV) along the western banks northward to *Fuerte Olimpo*, passing through *Colonia Carmelo Peralta* and *Puerto Guaraní*, and southward to *Puerto Pinasco,* passing through *Puerto Casado*. From the sub–stations of *Loma Plata* and Filadelfia, respectively, it feeds the three Mennonite colonies of Menno, Fernheim and Neuland, with an extension along the Trans–Chaco road to the site of *Tte. 1º Irala Fernández*. From *Cruce de los Pioneros*, there is a southbound branch to *Campo Aceval*, passing through Lolita and *Para Todo*, also part of the Mennonite colonies. From the *Mcal. Estigarribia* sub–station, a 23 kV medium–tension line continues to *Estancia La Patria*.

The second system feeds the southern Chaco with a medium–tension line (23 kV) from the *Villa Hayes* sub–station, where 66 kV of power comes from Limpio across the Paraguay River. From *Villa Hayes* it separates into two main branches. The first follows Route 9 (Trans–Chaco) to *Pozo Colorado*, and the other feeds *Puerto José Falcón* to the border with Argentina and on to where the Trans–Chaco crosses Route 12, running along the Pilcomayo River to *Gral. Bruguez* and from the *El Triángulo* crossroads to *Tte. Esteban Martínez*.

Illustration 17: Map of the Chaco with ANDE's Actual and Planned Power Mains



Source: ANDE and internal data

ANDE's medium–term plans for expanding its medium tension lines are as follow:

- Connect *Pozo Colorado* to *Tte. 1º Irala Fernández*, which will interconnect the two systems;
- From the Trans–Chaco road between *Pozo Colorado* and *Río Verde* to *Nueva Mestre*, where there is currently a diesel generator group that provides the community with electricity;
- From *Pozo Colorado* westward to *Mision José Estero*, passing through *Gral. Díaz* with several branches along the way southwards to feed the *estancias*;
- From *Estancia La Patria* along Picada 108 to the Docado crossroads (future bi–oceanic corridor now under construction to the border at *Infante Rivarola*).

The Chaco districts that benefit the least from ANDE electrification, both currently and in the near future, are primarily *Fuerte Olimpo*, *La Victoria*, *Mcal. Estigarribia,* and *Puerto Pinasco*. Most of the planned expansions will benefit the district of *Villa Hayes*.

Aside from electrification through ANDE's grid, we should mention two separate systems also belonging to ANDE, located in *Bahía Negra* and *Colonia Nueva Mestre*, respectively. *Bahía Negra* is a town located in the *Alto Paraguay* department at the northeastern end of the Chaco, on the banks of the Paraguay River. It has a 240–kVA diesel generator that provides power for the entire town, as well as the neighboring indigenous community of *Puerto Diana*. *Nueva Mestre* is a *campesino* settlement located in the *Presidente Hayes* department, where a 20 kVA diesel generator supplies electricity to the community. As mentioned above, ANDE has plans to electrify *Nueva Mestre* with an extension from the Trans–Chaco road.

Socioeconomics

The Chaco economy is dominated on the one hand by three large Mennonite colonies in the central Chaco, where settlers of European origin and Mennonite faith established a flourishing farming and agro–industrial system, based primarily on a cooperative system, since their arrival in the zone almost 80 years ago. On the other hand, the rest of the Chaco's territory contains a great number of large *estancias*, many with several thousand hectares of land, which are committed to cattle raising. Throughout the Chaco there are some 3,000,000 heads of cattle, 30 % of the Paraguay's entire stock.

Other economic activities of note in the rural Chaco are forestry – including charcoal production –, apiculture, some eco–tourism, and handicrafts among the indigenous.

6. Defining the Target District

Introduction

As mentioned above, the basis for selecting a district was the Chaco region as a whole, the most underprivileged region of Paraguay from practically all standpoints as seen in Chapter 4. However, the selection process excluded the three districts of *Benjamín Aceval*, *José Falcón* and Nanawa, which are part of the *Presidente Hayes* department. The reason is that they are considered part of the metropolitan area of the capital city, Asunción, albeit physically separated from it by the Paraguay River. This leaves five districts that were assessed with the same indicators as were used to select the region.

The department of *Alto Paraguay*, the farthest from the capital, contains the districts of *La Victoria* and *Fuerte Olimpo*. In July of this year, the *Fuerte Olimpo* district was divided in two, and the new district of *Bahía Negra* was created by presidential decree. However, since no separate statistical data are available for these two districts, they were still considered one for the purposes of this study. The department of Boquerón has only one district called *Mariscal José Félix Estigarribia*. The districts of *Villa Hayes* and *Puerto Pinasco*, together with the three districts that were excluded from the selection process, form the department of *Presidente Hayes*. The following table shows the main demographic data for these five districts.

Table 8: Population by area of residence and population density for pre–selected districts

District	Population					Area in Km^2	Density Inhab / km^2
	Total	Urban	Rural	% Urban	% Rural		
Fuerte Olimpo	6,338	2,520	3,613	39.8	60.2	58,377	0.11
La Victoria	6,558	2,699	3,859	41.2	58.8	23,972	0.27
Mcal. Estigarribia	41,979	17,761	24,218	32.3	57.7	91,669	0.46
Villa Hayes	55,801	17,192	38,609	30.8	69.2	59,668	0.94
Puerto Pinasco	3,948	808	3,140	20.5	79.5	9,537	0.41

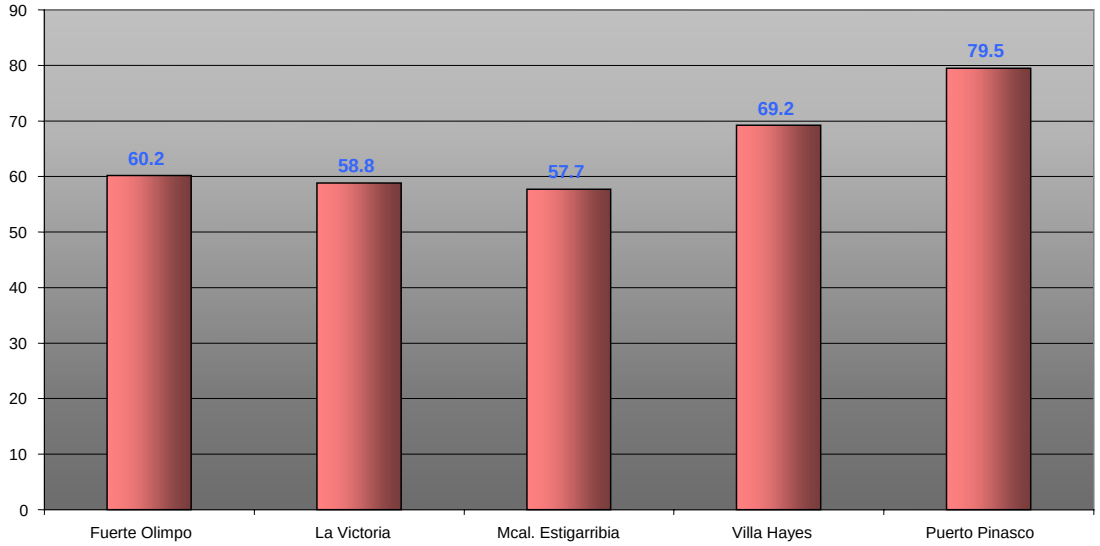
Source: DGEEC, 2002 National Census and internal data

These five districts have very small populations in relation to their surface area, with population densities of under one inhab / km^2. The most extreme case in this regard is *Fuerte Olimpo*, with a density of only 0.11 inhab / km^2. Except for *Puerto Pinasco*, the sizes of the pre–selected districts reaches figures that are comparable to those of small Central American countries like Guatemala, El Salvador or Panama.

Percentage of Rural Population

The district with the highest percentage of rural population is *Puerto Pinasco* with 79.5 %, followed by *Villa Hayes* with 69.2 % and *Fuerte Olimpo* with 60.2 %. The districts with the least rural population are *Mcal. Estigarribia* with 57.7 % and *La Victoria* with 58.8 %.

Illustration 18: Percentage of Rural Population in Pre–selected Districts



Source: DGEEC, 2002 National Census and internal data

Percentage of Indigenous Population

With 20,764 individuals, the *Mcal. Estigarribia* district has the largest indigenous population of the five pre–selected districts, 45.2 % of which live in urban areas and 54.8 % in rural areas. In second place is the *Villa Hayes* district with 16,710 indigenous persons, only 1.9 % of which live in urban areas. In *Fuerte Olimpo* and *Puerto Pinasco*, al indigenous groups live in rural areas.

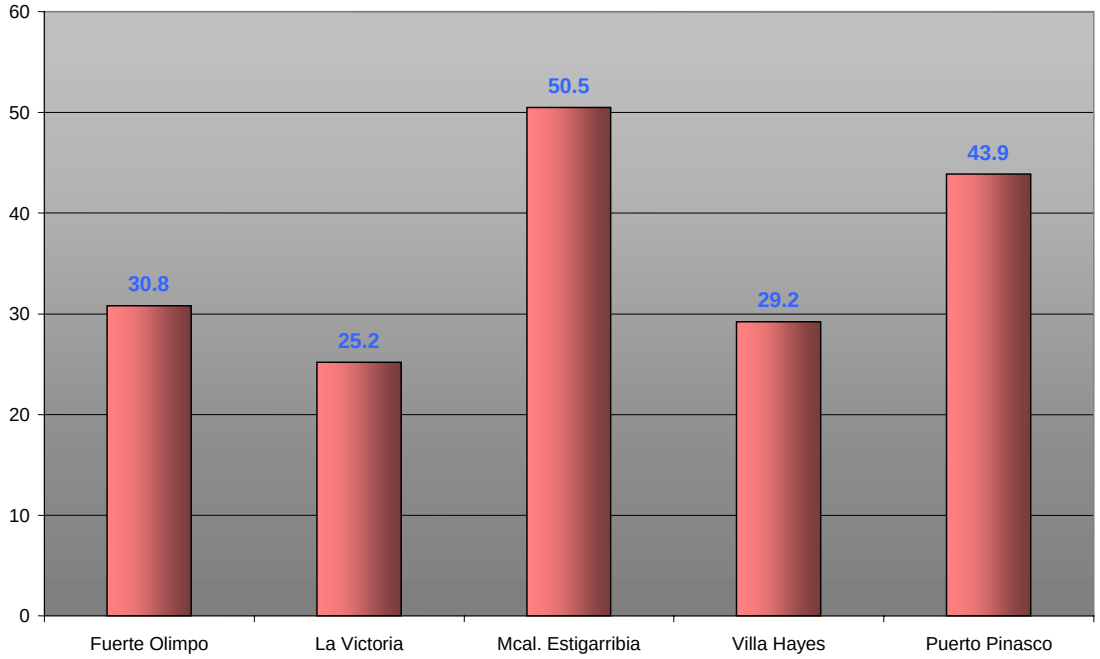
Table 9: Indigenous Population by Area of Residence in Pre–selected Districts

District	Indigenous Population				
	Total	Urban	Rural	% Urban	% Rural
Fuerte Olimpo	1,547	0	1,547	0.00	100.00
La Victoria	1,651	281	1,370	17.02	82.98
Mcal. Estigarribia	20,764	9,396	11,368	45.25	54.75
Villa Hayes	16,710	321	16,389	1.92	98.08
Puerto Pinasco	1,732	0	1,732	0.00	100.00

Source: DGEEC, 2002 Indigenous Census and internal data

The percentage of indigenous population in relation to the overall population is also the highest in *Mcal. Estigarribia* with 50.5 %, followed by *Puerto Pinasco* with 43.9 %.

Illustration 19: Percentage of Indigenous Population in Pre–selected Districts

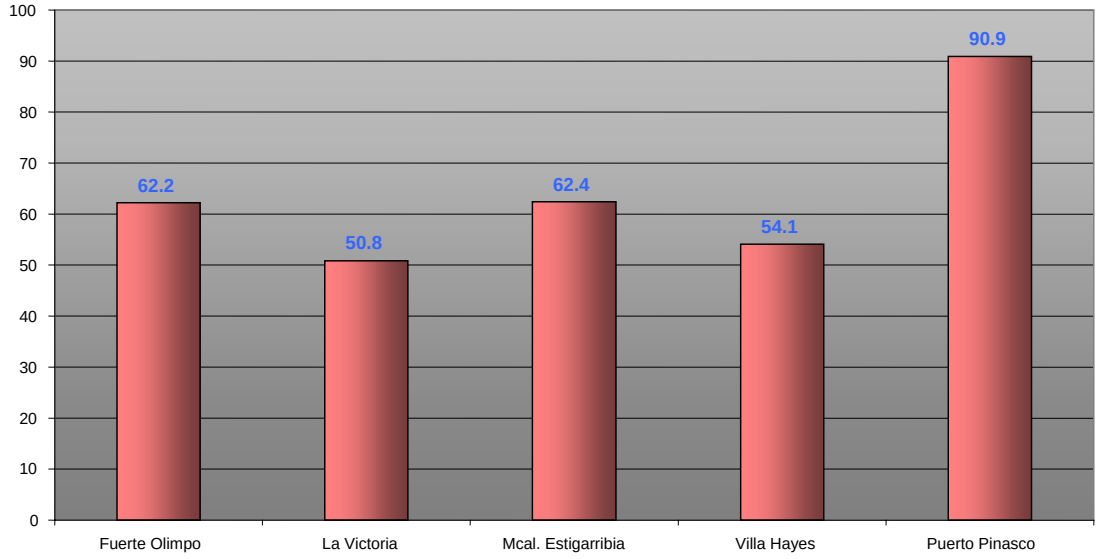


Source: DGEEC, 2002 Indigenous Census and internal data

Percentage of Rural Homes without Electricity

Of the five districts, one stands out clearly from the rest in this indicator. In the *Puerto Pinasco* district, 91 % of all rural homes have no electricity, while in the other districts, this figure ranges from 51 to 62 %.

Illustration 20: Percentage of Homes without Electricity in Pre–selected Districts

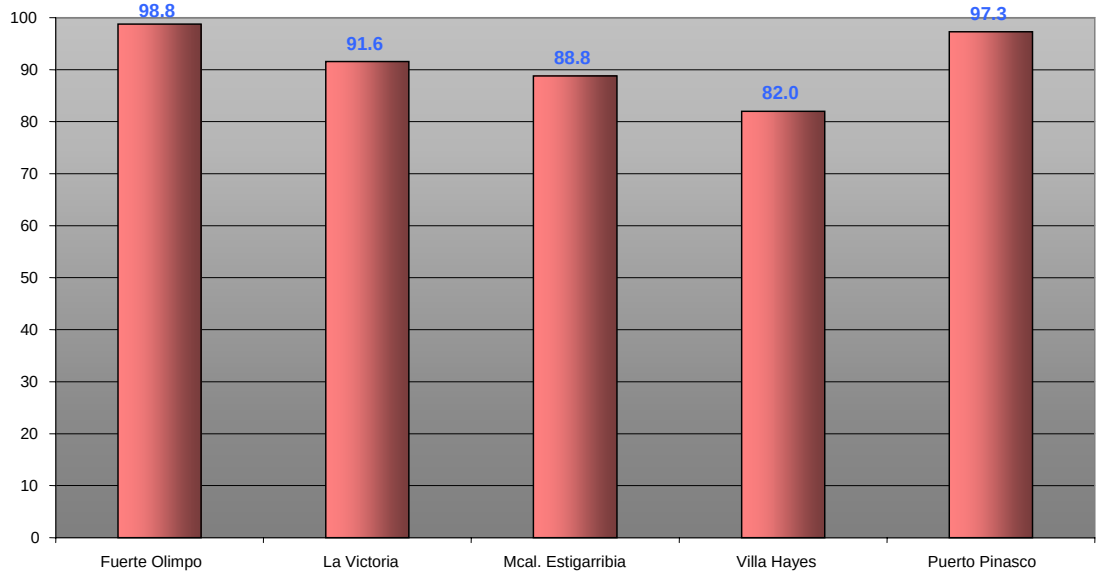


Source: DGEEC, 2002 National Census and internal data

Percentage of Population with at Least one Unsatisfied Basic Need

All five districts have very high figures for this indicator, peaking with *Fuerte Olimpo* with 98.8 %, followed closely by *Puerto Pinasco* with 97.3 %. Despite its large Mennonite population with fairly high socioeconomic standards, *Mcal. Estigarribia* has a surprisingly high 88.8 %. The situation of *Villa Hayes*, with 82.0 %, is somewhat better than the other districts, possibly due to the proximity of its capital to the metropolitan area of Asunción.

Illustration 21: Percentage of Population with at Least one UBN in Pre–selected Districts

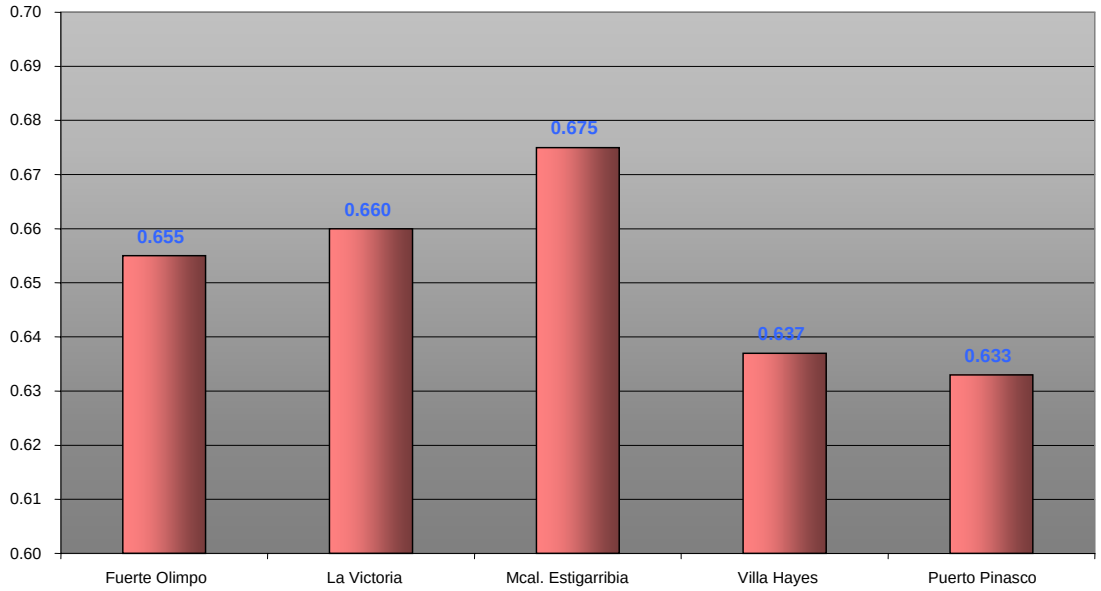


Source: UNDP and internal data

Human Development Index

All five districts have fairly low values, which are considered by UNDP as a medium level. For comparison purposes, the national average is 0.751. The district having the lowest figure is *Puerto Pinasco* with 0.633, followed closely by *Villa Hayes* with 0.637. The best–situated district is *Mcal. Estigarribia* with 0.675, which may be due to the positive influence of the Mennonite colonies.

Illustration 22: Human Development Index in Pre–selected Districts

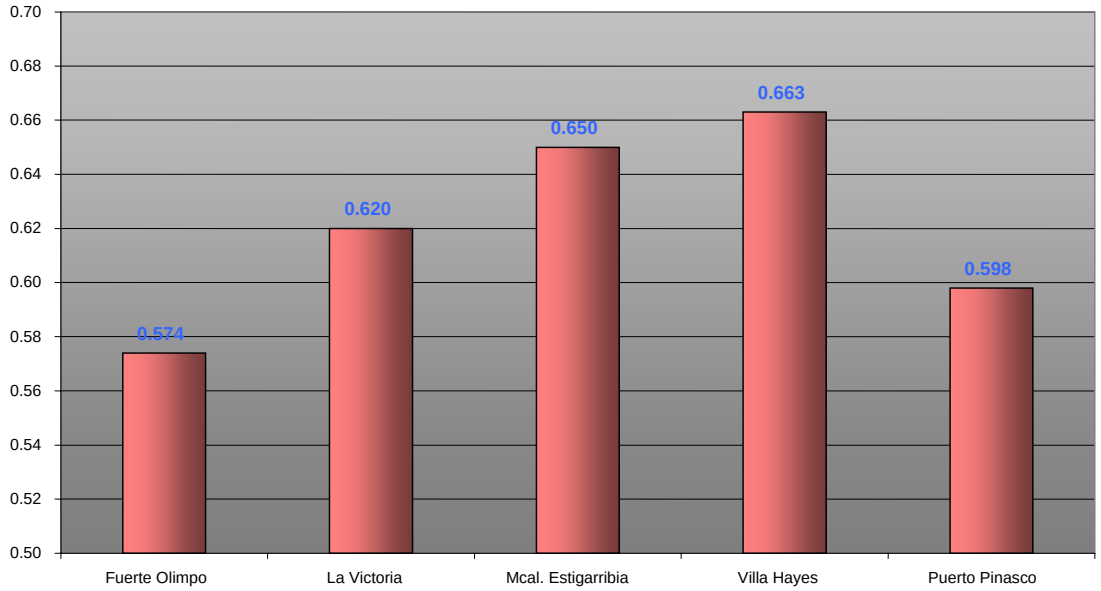


Source: UNDP and internal data

Gender–related Development Index

The values for this indicator in almost all districts are even lower than in the case of the Human Development Index. They all follow more or less the same trend, except for *Villa Hayes*, where the Gender–related Development Index is even higher than that for Human Development. The lowest figure is for *Fuerte Olimpo* with 0.574, followed by *Puerto Pinasco* with 0.598.

Illustration 23: Gender–related Development Index in Pre–selected Districts

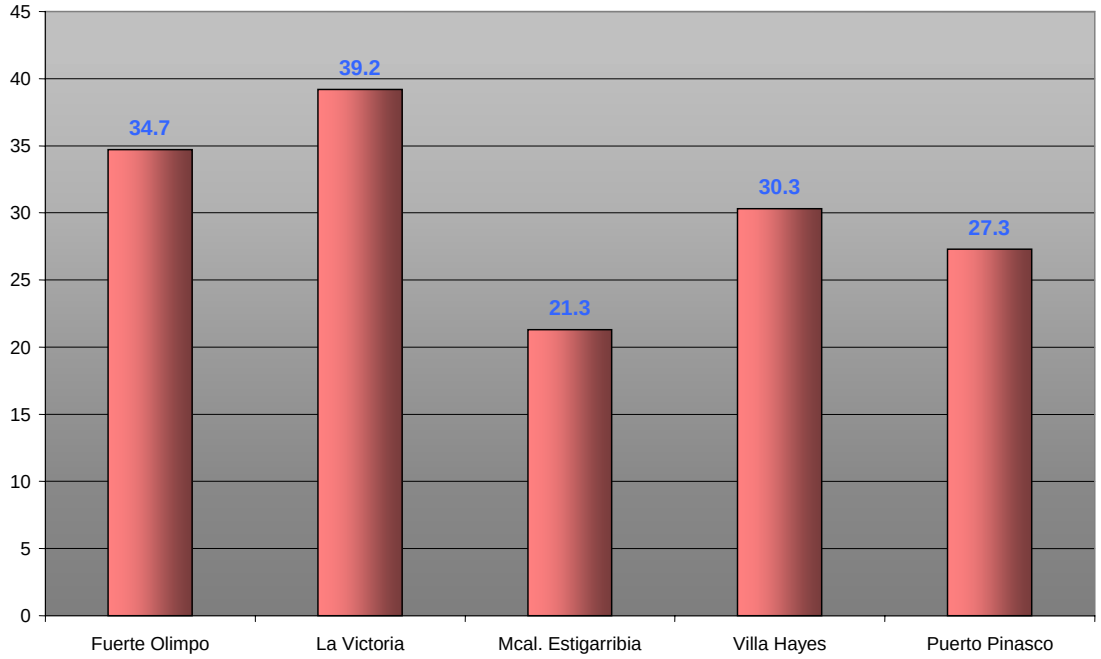


Source: UNDP and internal data

Percentage of Poor Population

The district with the greatest percentage of poor population among the five pre–selected ones is *La Victoria* with 39.2 %, followed by *Fuerte Olimpo* with 34.7 % and *Villa Hayes* with 30.3 %. The district with the least poor population is *Mcal. Estigarribia* with 21.3 %.

Illustration 24: Percentage of Poor Population in Pre–selected Districts



Source: UNDP and internal data

Summary

Table 10 shows the figures for the seven indicators in the five pre–selected districts, for comparison purposes. Table 11 gives the respective scores, which, when evaluated in the same way as when defining the target region (Chapter 4.8.), shows the following:

The highest–scoring district is *Puerto Pinasco* with 16 points, putting *Fuerte Olimpo* in second place with 12 points. The other three districts are well behind with 5 points for *La Victoria* and *Villa Hayes* and 4 points for *Mcal. Estigarribia*. As in the department assessment, consistency among indicators is fairly high, but also as in that case, the percentage of poor population follows a different trend from all other indicators. One can clearly conclude, then, that the *Puerto Pinasco* district would be the target zone for the rural electrification project. In four of the seven indicators, *Puerto Pinasco* has the highest score of 3 units, and in two of the indicators it has the second highest score.

Table 10: Values for Indicators in Pre–selected Districts

District	PR	PI	VRSE	1NBI	HDI	GDI	Pilot Project
Fuerte Olimpo	60.2	30.8	62.2	98.8	0.655	0.574	34.7
La Victoria	34.4	25.2	50.8	91.6	0.660	0.620	39.2
Mcal. Estigarribia	51.9	50.5	62.4	88.8	0.675	0.650	21.3
Villa Hayes	69.2	29.2	54.1	82.0	0.637	0.663	30.3
Puerto Pinasco	81.5	43.9	90.9	97.3	0.633	0.598	27.3

Source: DGEEC, UNDP and internal data

Table 11: Classification for Selecting the Target District

District	PR	PI	VRSE	1NBI	HDI	GDI	Pilot Project	Sum	Classif.
Fuerte Olimpo	1	1	1	3	1	3	2	**12**	**2**
La Victoria				1		1	3	**5**	**3**
Mcal. Estigarribia		2	2					**4**	**5**
Villa Hayes	2				2		1	**5**	**3**
Puerto Pinasco	3	3	3	2	3	2		**16**	**1**

Source: Internal data

7. Describing the Target District

Location, History and Access Routes

The *Puerto Pinasco* district is located to the northeast of the *Presidente Hayes* department, bordering on the *La Victoria* district of the *Alto Paraguay* department, with a total area of 9,537 km2. Its capital is on the Paraguay River, some 500 km from the capital city of Asunción following the most direct access route. This site was founded in the early XX Century, at the same time as other sites along the western bank of the river, such as *Puerto Sastre* (now *Puerto Esperanza*) or *Puerto Casado* (now *La Victoria*), when industrial exploitation of the red quebracho tree began on the western side of the Paraguayan Chaco. This tree was used primarily to extract tannin, a product used in the leather–tanning industry, and for some time was one of Paraguay's major exports.

Illustration 25: Map of the *Presidente Hayes* Department Divided into Districts [5]

Source: DGEEC

The land in this zone was purchased at that time by a foreign company that built a tannin extraction factory in *Puerto Pinasco*, and the town grew up around it. A railroad was also built to transport trunks from field to factory. After depredating the quebracho forests, the factory closed down in the late '60s, laying off its +/– 3,000 employees and depriving the population of its main source of income. The flourishing town of *Puerto Pinasco* then fell into rapid decline, from which it has still not been able to emerge, leaving the entire zone in a deplorable economic state.

Access to the town of *Puerto Pinasco* from the capital city of Asunción is via Route Nº 9 – *Carlos Antonio López*, better known as the Trans–Chaco road, which is currently paved up to *Estancia La Patria* at Km 667. At the locality of *Fortín Zalazar*, Km 336, it

[5] The circumscriptions represented on the map are census districts. The census district of *Pozo Colorado* is part of the political district of *Villa Hayes*.

turns eastward along an earthen road for some 170 km, passing several *estancias* along the way. None of the roads within the municipal territory are paved, which hampers vehicular traffic considerably, especially in the rainy season, when they become impassable. The Paraguay River remains an important traditional transportation route for both people and merchandise, and practically all year round it affords easy access to the numerous settlements along its banks.

Natural Characteristics

The zone of *Puerto Pinasco* is part of the Chaco, with a sub–humid to humid climate and yearly precipitations averaging 1,200 mm. The driest months are during the Winter (May to September) and the wettest ones are in the Summer (November to April). The average yearly temperature is 21.6 ºC, with an average of 24.8 ºC in January, the hottest month, and 16.0 ºC in July, the coldest month. At the extremes, Summers can reach over 40ºC and Winters a few degrees below zero.

The landscape is that of a plain, and is drained by a number of streams that flow into the Paraguay River. Natural vegetation consists of different ecosystems typical to the humid Chaco, including lowland forests that once contained a large number of red quebracho trees, and flood zones that are mostly covered with palm trees (karanda'y). The land is generally very clayey and gray colored. During the dry season it is hard, and when it rains it turns to mud. The zone of the *Toro Pyta* marsh in the northwestern part of the district was proposed for creating a national park named *Laguna Ganso*, which will have an area of 60,000 ha.

Demographics

Puerto Pinasco has a population of 3,948 inhabitants, 808 or 20.5 % of which is urban, i.e., lives in the town of *Puerto Pinasco*, and 3,140 (79.5 %) is rural. The population density is low, as in practically the entire Chaco zone, with only 0.41 inhab / km^2. According to the census, the indigenous population is 1,732 individuals, which is 55.2 % of the district's entire population. The indigenous people, mostly of the *Angaité* ethnic group, are settled in two recognized communities named *La Patria* (1,246[6]) and *Riacho San Carlos* (486). Nine hundred thirty–nine persons live in *Colonia Ceibo*, a *campesino* settlement. The other 469 inhabitants are dispersed throughout the municipal territory, primarily in *estancias* (see Table 12).

Table 12: Distribution of the *Puerto Pinasco* Population by Locality

Locality	Inhabitants
Puerto Pinasco	808
Colonia Ceibo	939
La Patria	1,246
Riacho San Carlos	486
Rest of rural zones	469
Total	**3,948**

Source: DGEEC and internal data

[6] The total population of the *La Patria* indigenous community is 1,500 persons, 254 of which are in the territory of the *Villa Hayes* district.

The Angaité Ethnic Group

The *Angaité* are part of the Maskoy linguistic family and presently live in a territory that, in addition to the *Puerto Pinasco* district, includes part of the *La Victoria* and *Mcal. Estigarribia* districts. According to the 2002 Indigenous Census, 3,763 indigenous persons belong to this ethnic group, which is 4.32 % of the entire indigenous population for Paraguay. Of these, 100 % live in rural zones and 65.4 % of those aged 15 years or over are illiterate, much higher than the 51.8 % average for indigenous people (see Illustration 2). Only 0.2 % and 2.2 % of all *Angaité* homes have safe water and electricity, respectively, which is also below the average for indigenous Paraguayans (see Illustrations 4 and 6).

Before the tannin companies were opened in the Chaco, during the late XIX Century and early XX Century, the *Angaité* lived in small communities or centers in extended families, usually consisting of twenty to sixty individuals. Their economy was based on gathering, hunting and fishing, and they had small subsistence gardens and a few domestic animals. Their contact and trade with the white world was via the Paraguay River and was based on swapping.

With the arrival of the tannin companies, the indigenous people of the zone began their incorporation into the "white economy", i.e., depending on wages for subsistence. Thus began a process of proletarianization, pauperization, and a physical, spiritual and cultural weakening of the Maskoy peoples. After the tannin factories closed, the centers of *Angaité* migration were primarily the *estancias*, considered places to avail oneself of the essentials for survival.

Their homes, as with those of most indigenous peoples in the Chaco, usually consist of a single 20 to 25 m^2 room made of *karanday* (*copernicia Alba*) palm trunks, where several families may live. In the *estancias,* the *Angaité* generally live separately from other Paraguayan workers, who treat them with disdain. Women work as house cleaners or cooks.

Before, the *Angaité* had plantations of squash and other familiar garden crops that were compatible with the Chaco's soil. They had means for redistributing produce through a strict reciprocity system, considering that any goods acquired should be shared amongst all members of the community. Even today, when *Angaité* members receive their working wages, they feed their families as well as other relatives or neighbors until the money is gone. The *Angaité* living in communities combine their traditional economies with portering and other occasional jobs to obtain income in cash money.

The indigenous people of *Puerto Pinasco* benefit from ongoing aid in different areas (education, health, food, production, etc.) primarily from the *Gobernación* of the *Presidente Hayes* department. As with other *Gobernacione*s of the Chaco, this one has an *Secretaría de Asuntos Indígenas* that coordinates all related matters. In order to enhance active indigenous participation in the work of the *Gobernación*, the *Consejo Departamental Indígena* was formed, presided by the Governor and having representatives of the seven ethnic groups inhabiting the department, with a leader of each respective ethnic group democratically elected to this position.

Socioeconomics

The current economy of the *Puerto Pinasco* district is predominantly extensive cattle farming. The majority of its rural territory is covered with mostly large–size *estancias*, which are primarily committed to raising livestock. The riverside population also exploits the rich fishing resources found in the Paraguay River and its tributaries.

Table 13: Percentages of Economic Activity by Area of Residence and Sex

Zone	Area	Sex	WAP	EAP / P	EAP / WAP	Empl.	NI
Puerto Pinasco District	Rural	Males	68.6	51.6	75.2	96.8	0.3
		Females	66.9	30.1	45.0	99.6	0.4
		Both	67.8	41.5	61.2	97.8	0.3
	Urban	Males	72.6	45.8	63.1	95.9	0.3
		Females	69.0	25.4	36.8	99.0	0.8
		Both	70.9	36.3	51.1	96.9	0.5
	Total	Males	69.4	50.4	72.6	96.7	0.3
		Females	67.3	29.1	43.3	99.4	0.5
		Both	68.4	40.4	59.0	97.6	0.4
Presidente Hayes Department	Rural	Males	73.7	52.8	71.7	96.3	0.3
		Females	70.9	24.6	34.7	94.6	0.1
		Both	72.4	39.5	54.6	95.8	0.2
	Urban	Males	73.9	49.2	66.5	92.3	0.3
		Females	76.0	27.0	35.6	90.7	0.1
		Both	75.0	37.9	50.6	91.7	0.2
	Total	Males	73.8	51.6	69.9	95.0	0.3
		Females	72.7	25.5	35.0	93.1	0.1
		Both	73.3	38.9	53.1	94.4	0.2
Entire Country	Total	Males	75.1	51.7	68.8	95.4	0.4
		Females	75.7	24.8	32.8	92.6	0.3
		Both	75.4	38.4	50.9	94.5	0.3

Source: DGEEC and internal data
Legend: WAP = Working Age Population; EAP = Economically Active Population; P = population; empl = employed; NI = not informed.

Of the *Puerto Pinasco* district population, 40.4 % claims to be economically active (EAP). This is 59.0 % of the Working Age Population (WAP), which is a very low figure (see Table 13), even below the urban zone (36.3 % to 51.1 %). There is also a large difference between sexes. The percentage of economic employment among women is more than 20 % less than that of men. When compared to the working–age population of 68.4 % (women 67.3 % and men 69.4 %), there is a large difference, showing the high rate of hidden unemployment (26.9 %). Open unemployment, on the other hand, is very low, showing that most people without work are not looking for a job.

Comparing the *Puerto Pinasco* data to those of the entire *Presidente* department and even the whole country, the same general trends are seen. The most outstanding difference is perhaps the significantly much lower figure for the EAP / WAP ratio among women of rural *Puerto Pinasco* (45.0 %) than the departmental average (34.7 %) and the national average (32.8 %). This indicates greater female activity in the economic sector than in other places.

In the *Puerto Pinasco* district, 75.5 % of the EAP works in the primary sector (see Table 14), and this percentage even reaches 86.3 % in rural areas. These are clearly higher values than those seen for the *Presidente Hayes* department as a whole or for the entire country. However, in urban *Puerto Pinasco*, the tertiary sector is predominant, with 53.6 %, followed by the primary sector with 27.6 %. There are large differences between the sexes, mostly in the urban area.

Table 14: Percentages of Employment by Economic Sector

Zone	Area	Sex	Primary	Secondary	Tertiary	Ni+b
Puerto Pinasco District	Rural	Males	89.1	4.6	5.7	0.6
		Females	80.7	7.2	11.7	0.4
		Both	86.3	5.5	7.8	0.5
	Urban	Males	40.6	19.3	38.1	2.0
		Females	1.0	11.5	85.4	2.1
		Both	27.6	16.7	53.6	2.0
	Total	Males	80.1	7.3	11.8	0.9
		Females	66.5	7.9	24.8	0.7
		Both	75.5	7.5	16.2	0.8
Presidente Hayes Department	Rural	Males	67.9	12.7	18.4	0.9
		Females	50.3	12.0	36.4	1.3
		Both	62.8	12.5	23.7	1.0
	Urban	Males	13.4	32.2	51.9	2.5
		Females	1.7	8.2	85.6	4.5
		Both	9.2	23.5	64.1	3.2
	Total	Males	50.6	18.9	29.1	1.4
		Females	31.4	10.5	55.6	2.5
		Both	44.5	16.3	37.5	1.8
Entire Country	Total	Males	36.7	21.4	39.7	2.2
		Females	5.9	11.0	79.1	4.0
		Both	26.8	18.0	52.3	2.8

Source: DGEEC and internal data *NI+B = No information and seeking employment*

Energy Considerations

Energy Consumption

Currently, electricity distributed through the ANDE grid is available only in urban *Puerto Pinasco*. Of the 175 homes in the urban zone, 152 are connected to the grid, while the other communities of this district lack service. The *estancias* in the zone mostly use power generator groups with diesel motors or, in some cases, also photovoltaic solar panels. However, due to the large distance from the Capital, gas oil is expensive. The 2002 National Census found that only 51 of the 561 rural homes had electricity, less than 10 %. LPG reaches *Puerto Pinasco* by river boat, and it is utilized in 87 of the 152 urban homes for cooking, while all other urban homes cook primarily with firewood. In the rural area, only 25 of the 561 homes had gas stoves, and the others cooked almost solely with firewood.

Solar and Wind Energy Resources

According to NASA satellite measurements for the *Puerto Pinasco* area*,* overall daily solar radiation on a horizontal surface has the average monthly and yearly figures detailed below in Table 15, meaning that solar potential is medium to high.

Table 15: Overall Daily Solar Radiation in *Puerto Pinasco* in kWh / m^2

Month	Radiation
January	6.18
February	5.86
March	5.13
April	4.08
May	3.35
June	3.04
July	3.41
August	4.01
September	4.53
October	5.53
November	6.12
December	6.34
Year	**4.80**

Source: NASA

As for wind resources, data available from the nearest land measurements are from the *La Victoria* weather station located some 40 km north of *Puerto Pinasco*, where yearly wind–speed averages at a height of 5 m were only 1.7 m/s. According to the wind map prepared by the INTN in the study "*El Recurso Eólico en Paraguay*", the average yearly energy in the zone at a height of 10 m would be some 350 kWh / m^2, which is considered a rather low potential. There is little variation in the average wind speed from month to month throughout the year.

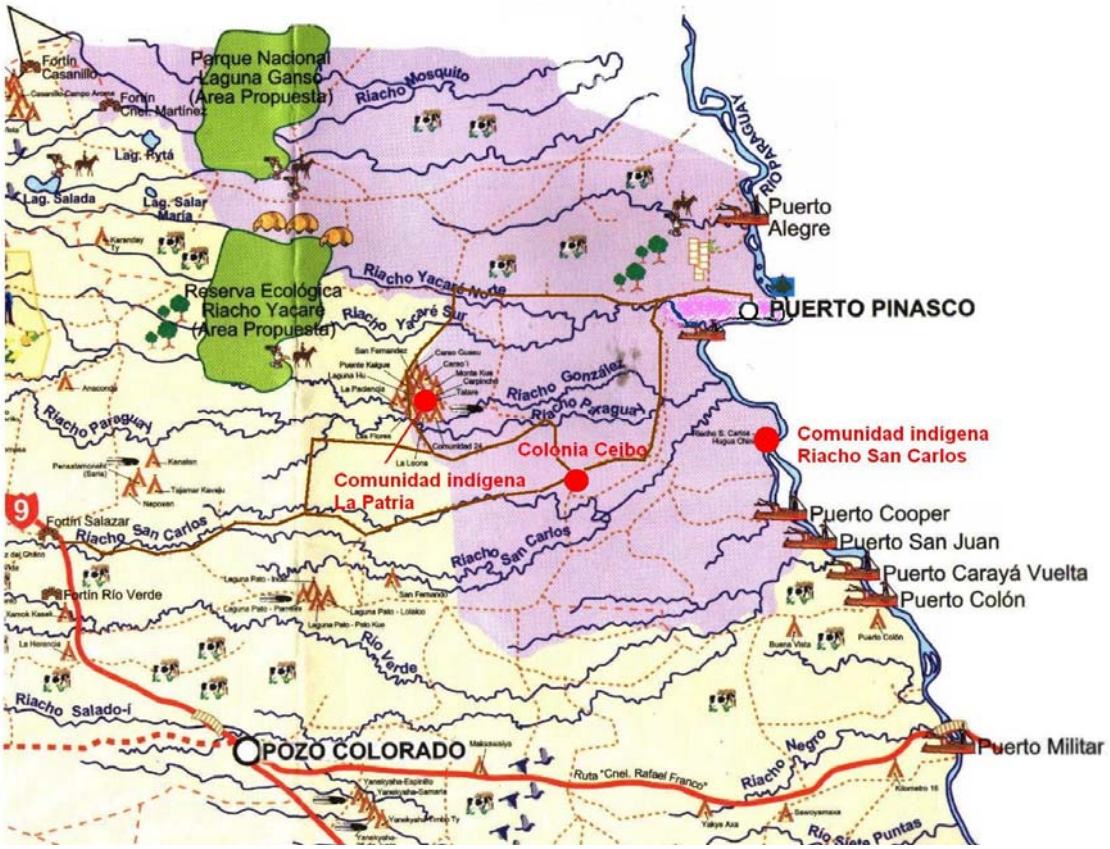
8. Defining the Target Communities

As seen in Chapter 7, *Puerto Pinasco*, selected as the target district, has a very few rural communities. Actually, there are only three rural population groupings that might be considered communities in the sense of OLADE's rural electrification project. Two are indigenous (*La Patria* and *Riacho San Carlos*) and one is *campesino* (*Colonia Ceibo*).

The methodology for choosing communities, as described in Chapter 3.1, asks for a list of three indigenous and/or *campesino* communities during this third stage of selection. Since precisely the required number of rural communities was available to be presented for defining the project's target community, it was not necessary to go through any additional selection procedures within the target district.

The following map shows the *Puerto Pinasco* district with the location of the three communities and their main access routes from National Route Nº 9.

Illustration 26: Map of the *Puerto Pinasco* District Locating Target Communities



Source: "Tiempos del Mundo"

9. Description of Target Communities

La Patria Indigenous Community

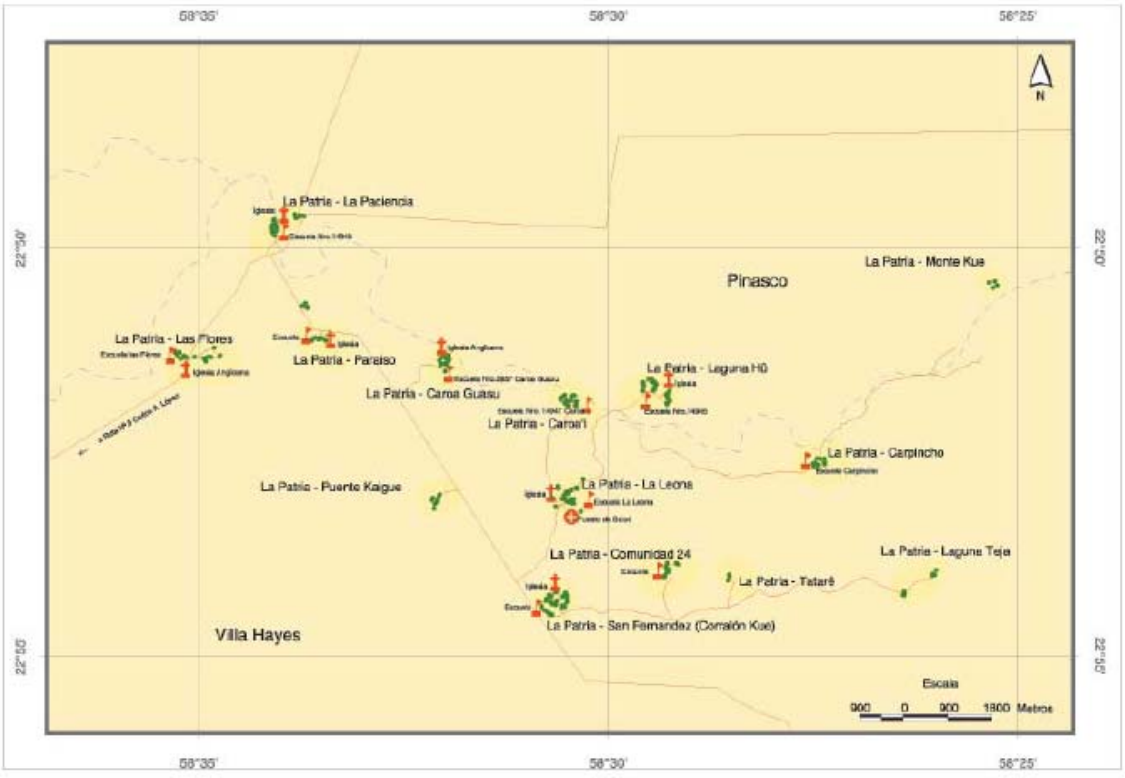
Location and Access

The *La Patria* indigenous community is located on the western border of the *Puerto Pinasco* district, at a distance of 101 km from the district's capital. The 22,520 ha of land on which the community is settled is the communal property of its inhabitants. A small part of it is on the territory of the *Villa Hayes* district. The main access to the community is in the area of *Estancia Riacho San Carlos*, located approximately half way between *Fortín Zalazar,* at Km 335 on the Trans–Chaco road, and *Puerto Pinasco*.

Demographics and Ethnicity

The *La Patria* community has 1,500 persons living in 14 villages distributed throughout the property. The following map and table show village names, relative locations, respective populations by sex, and number of homes. Of all community dwellers, 88.1 % belong to the *Angaité* ethnic group, 7.1 % to the *Sanapaná* ethnic group, 2.6 % to the *Enxet Sur* ethnic group, 1.5 % to the *Enlhet Norte* ethnic group, and 0.2 % to the *Guaraní Occidental* ethnic group. Most villages live 2 to 4 km from each other. From the first village to the last there is a distance of some 15 km.

Illustration 27: Map of the *La Patria* Community



Source: DGEEC, "Atlas de las Comunidades Indígenas en el Paraguay"

Table 16: Population of the *La Patria* Community by Villages

Village	Homes	Women	Men	Population
Caroa Guasu	20	53	45	98
Caroa'i	29	53	68	121
Laguna Hû	24	76	80	156
Puente Kaigue	8	21	22	43
Comunidad 24	18	29	49	78
La Leona	26	120	113	233
Tatarê	2	17	11	28
San Fernández–Corralón *Kue*	34	107	107	214
Capybara	14	55	61	116
Laguna *Teja*	8	27	23	50
Monte Kue	9	21	23	44
Paraíso	15	30	35	65
La Paciencia (*Villa Hayes*)	28	65	59	124
Las Flores (*Villa Hayes*)	19	78	52	130
La Patria	**245**	**767**	**733**	**1,500**

Source: DGEEC, 2002 Indigenous Census and internal data

Economics

The employment index for the people of *La Patria* is 72.0 %, notably higher then the average for the rural parts of the district, which is 41.6 %. Of the economically active population, 66.3 % work in agriculture, 9.9 % are farm laborers, 9.3 % are beekeepers, 4.8 % are forestry laborers, and 3.3 % are artisans. The primary crop types are squash, sweet potatoes, cassava, watermelons, and beans. In addition to these primary activities, there is also hunting, especially capybara, armadillo, wild pigs, and crocodiles, and fishing for different fish species in the brooks of the zone.

Energy and Basic Infrastructure

The community has no electricity and is located some 100 km from the power grid. To light their homes, 50 % use candles, 48 % use fireplaces, and 1.2 % kerosene lamps. For cooking, 100 % of all homes use firewood collected in the bush surrounding the villages. Nine of the 14 villages have schools, seven have churches and one has a health post. Drinking water is taken from ponds or springs by 85.4 % of the population, from cisterns by 7.7 % and from wells by 6.9 %.

Organization and Cooperation

The community has one central leader, and the villages in turn are headed by their own leaders, all of which come together to form the Community Council that meets periodically. The current central leader is at once the representative of the *Angaité* ethnic group to the *Consejo Departamental Indígena* of the *Gobernación de Presidente Hayes*. Furthermore, *La Patria* has a beekeeper's association, an artisan's association, and a parents' commission that supports the work of community schools.

As cooperation, they receive aid from the *Gobernación* de *Presidente Hayes* for different social issues (see Chapter 7.6.) and from the NGO Tierra Viva that offers indigenous persons legal counsel in landholding, labor relations and penal matters.

Riacho San Carlos Indigenous Community

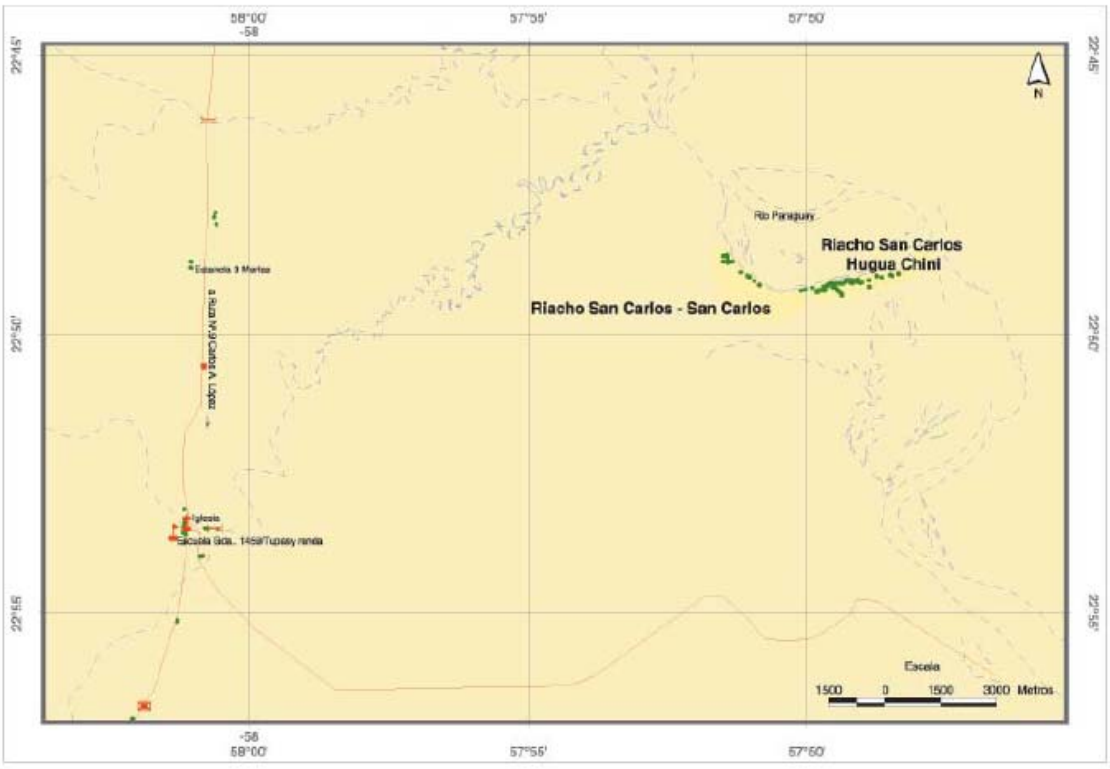
Location and Access

The *Riacho San Carlos* indigenous community is located on the banks of the Paraguay River, near of the mouth of the *San Carlos* stream, 40 km south of *Puerto Pinasco*. The 3,682 ha of land on which the community is settled is the communal property of its members. Access to the community by land is very difficult, as there is no passable road, and the easiest access is by water on the Paraguay River.

Demographics and Ethnicity

The *Riacho San Carlos* community has 486 persons living in two villages located not far from each other. The following map and table show village names, relative locations, respective populations by sex, and number of homes. Of all community members, 90.1 % belong to the *Angaité* ethnic group, 7.6 % to the *Enxet Sur* ethnic group, 0.6 % to the *Sanapaná* ethnic group, 0.2 % to the *Toba Maskoy* ethnic group, and 1.4 % are non–indigenous.

Illustration 28: Map of the *Riacho San Carlos* Community



Source: DGEEC, "Atlas de las Comunidades Indígenas en el Paraguay"

Table 17: Population of the *Riacho San Carlos* Community by Village

Village	Homes	Women	Men	Population
San Carlos	23	70	66	136
Hugua Chini	60	175	175	350
Riacho San Carlos	**83**	**245**	**241**	**486**

Source: DGEEC, 2002 Indigenous Census and internal data

Economics and Basic Infrastructure

The employment rate for the people of *Riacho San Carlos* is 76.3 %. Of the economically active population, 65.3 % work in agriculture, 19.8 % are farm hands, 6.25 % wash and iron clothes, 1.2 % are artisans, and 0.8 % are domestic laborers. The main crop types are sweet potatoes, squash, cassava, beans, and watermelons. Aside from these main activities, there is also hunting, especially capybara, armadillo, wild pigs, and crocodiles, and fishing for different fish species in the Paraguay River and brooklets of the zone. The two villages have schools, and one has a health center. Drinking water is taken from ponds or springs by 97.6 % of the population, and supplied from an Australian tank to 2.4 %.

Energy Considerations

The community has no electricity and is located some 40 km from the power grid. For lighting their homes, 96.4 % use candles, 2.4 % kerosene lamps, and 1.2 % fireplaces. For cooking, 100 % of all homes use firewood collected in the bush around the community.

Organization and Cooperation

Like most indigenous communities in Paraguay, this one is headed by a leader who is democratically elected by its members for a given term. With official recognition through an INDI resolution, this leader represents the community towards the outside world and is entitled to advance administrative and legal proceedings on its behalf.

As cooperation, they receive aid from the *Gobernación* de *Presidente Hayes* on different social issues (see Chapter 7.6) and from the NGO Tierra Viva, which offers indigenous persons legal counsel in landholding, labor relations and penal matters. There is currently a request by the community to extend its property, which Tierra Viva is taking care of.

Colonia Ceibo Campesino Community

Location and Access

The *Colonia Ceibo campesino* community is located about 80 km southwest of *Puerto Pinasco*. The settlement, inhabited primarily by small–scale cattle farmers and *estancia* workers, has 500 ha divided into 238 urban lots and 35 farming lots. Although the colony was created over 20 years ago under the category of “rural center”, the land was never awarded to its occupants. The primary reason is that transfer from the former owner, the *Vicariato Apostólico del Chaco*, to the then IBR and now INDERT, has not been settled to date. INDERT is the institution in charge of managing the colony.

Access to the community from Asunción is via the same road that connects *Fortín Zalazar* to *Puerto Pinasco*, up to the crossroads located in the area of *Estancia Riacho San Carlos* some 80 km from *Fortín Zalazar*, from where it veers southeast following this road for approximately 25 km. Here it turns east and continues another 25 km passing through *Estancia San Ramón*. From *Puerto Pinasco,* one can reach *Colonia Ceibo* by following the old railroad for 82 km.

Demographics

The community of *Colonia Ceibo* has 939 inhabitants, 510 of which live in the sub–urban nucleus and 429 are spread out in rural zone of the colony, some 100 of which are indigenous. The following map and table show the colony layout, its respective population by sex, and the number of homes.

Table 18: Population of *Colonia Ceibo* by Area of Residence

Area	Homes	Women	Men	Population
Colonia Ceibo – sub–urban	114	249	261	510
Colonia Ceibo – rural	99	157	272	429
Colonia Ceibo	**213**	**406**	**533**	**939**

Source: DGEEC, 2002 National Census and internal data

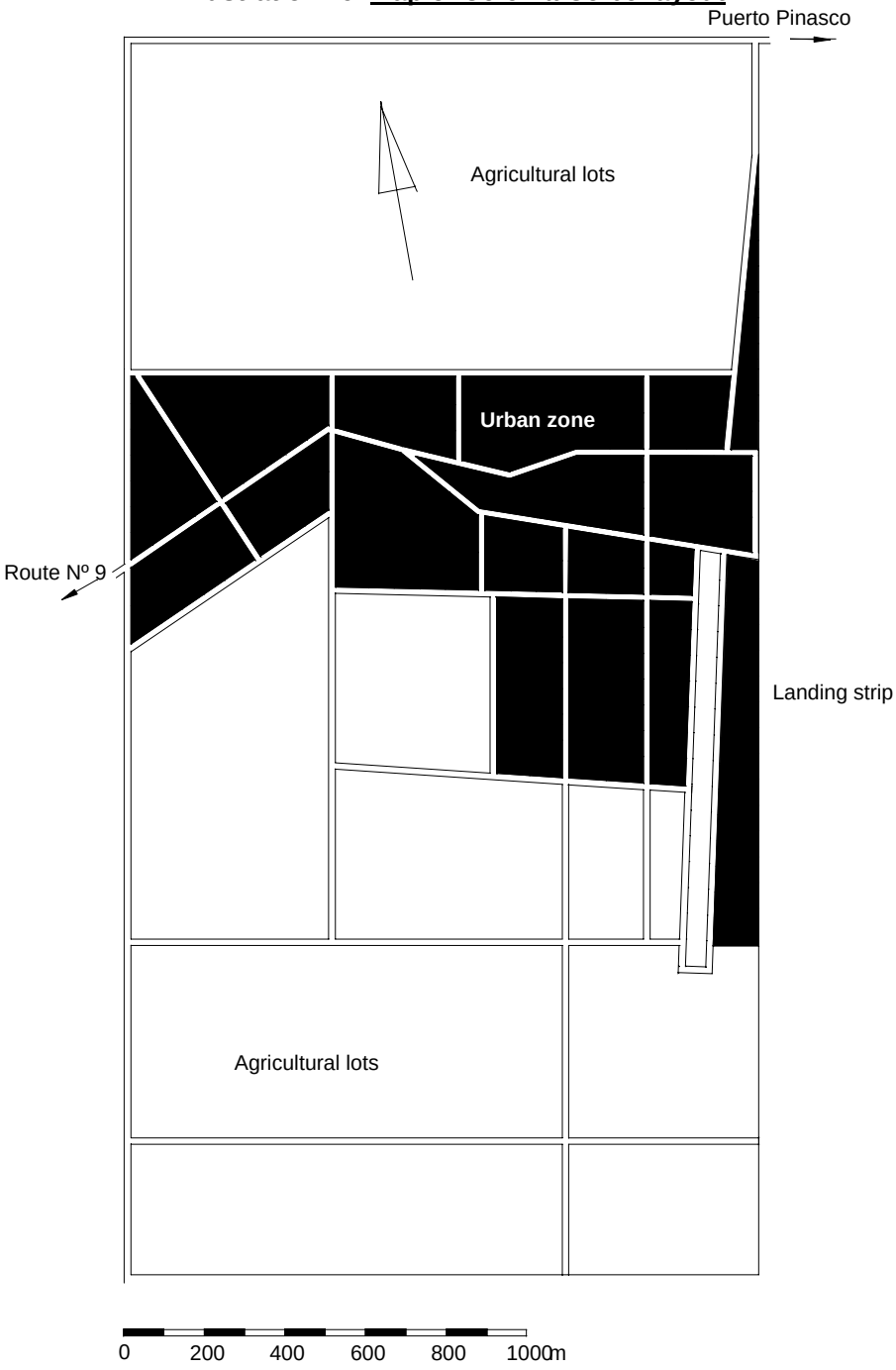
Socioeconomics

Most of the *Colonia Ceibo* population works as basic laborers or farm hands at neighboring *estancias*. Some work at small–scale cattle raising, using the farming lots of the colony to graze their animals, which due to the uncertain legal situation are utilized as *de facto* communal pastures.

Energy and Basic Infrastructure

As with the two indigenous communities, the *campesino* community has no electricity and is about 80 km from the power grid. As for energy sources for lighting homes and cooking food, there are no specific data on *Colonia Ceibo*. However, one can assume that they will be similar to those found for the two indigenous communities. *Colonia Ceibo* has a number of community centers, such as a school, a high school, a health center, a civil registry office, and a church.

Illustration 29: **Map of *Colonia Ceibo* layout**



Source: INDERT and internal data

Organization and Cooperation

Colonia Ceibo has a neighborhood commission that is recognized by INDERT and represents the population in its struggle to achieve transfer of the lots they have been using for several years and the respective property deeds. The institutions that most support the community in social matters are the *Vicariato Apostólico del Chaco*, which donated the land to INDERT, and the *Gobernación* of the *Presidente Hayes* department.

10. Target Community Recommendation and Conclusions

In choosing the target community from among the three pre–selected communities for OLADE's sustainable rural electrification pilot project, most of the selection criteria described the Chapter 3.3. were applied, i.e. those on which objective information was available. On Table 19, criteria pertaining to the communities with the most favorable figures are marked in yellow. Where the three communities have the same values that meet the established requirements, none is marked. Criteria that are exclusive to one of the communities would be marked in red, but this situation was not forthcoming.

Table 19: Comparison of Selection Criteria for Target Communities

Indicator	*La Patria*	San Carlos	Ceibo
Existence of electric grid	no	no	no
Existence of electrification plans through the grid	no	no	no
Distance from existing electric grid	100 km	40 km	80 km
Existence of access (land and/or water)	yes	yes	yes
Quality of land access	regular	poor	regular
Legal status (indigenous communities only)	yes	yes	NA
Land owned by inhabitants	yes	yes	in process
Availability of land per family (ha / home)	91.2	44.4	2.3
Existence of community organization	yes	yes	yes
Existence of major internal conflicts	no	no	no
Minimum number of 50 dwellings	yes	yes	yes
Percentage of indigenous population	100.0 %	98.6 %	+/– 10 %
Percentage of economically active population	72.0 %	76.3 %	+/– 60 %
Existence of cooperating institutions	yes	yes	yes
Sum of most significant criteria	**4**	**2**	**1**

Source: Internal data

Comparing the three communities with the above method, the *La Patria* indigenous community stands out clearly, wherefore, we recommend implementing the rural energy pilot project in that community.

In Guatemala, where the Rural Electrification Project is well on its way, some 100 families benefited from a seed capital of about US$ 60,000 for investments in the community. In contrast, *La Patria* has a total of 245 families. If all these families benefited from that capital from the start, project impact on the community as a whole would probably be far less, or would only be felt after a longer time period, than in the case of Guatemala. This is not advisable in a pilot project, so we suggest a phased approach that would consist of initially selecting only one or a few of the villages in the community. Later, when the seed capital has born its initial fruits, the investment project could be gradually replicated in the other villages.

According to the *Secretaría de Asuntos Indígenas* of the *Gobernación de Presidente Hayes*, the village of *La Leona* in certain ways plays the role of center for the entire community, also being the only village with a health post. Therefore, we propose choosing this village of 26 families as the project's first target village. In order to reach some 100 families, 2 to 3 other nearby villages could be added, such as *San Fernández*, *Caroa'i* and *Caroa Guasu*, for example. In total, these four villages consist of 109 families.

A mixed solution could also be considered in which one or two villages would benefit from a production project and the community as a whole would receive more of a social project, such as implementing improved stoves in the kitchens of all dwellings. From our viewpoint, however, it would be preferable to make the final decision as to which villages would actually benefit, after the initial visit to the community, taking into account project acceptance by the people of the respective villages.

Most people with experience in cooperation with indigenous people have mentioned that it is quite difficult to implement a project of this nature in a Paraguayan indigenous community, especially in the Chaco, primarily due to the low level of human and cultural development. Until relatively recently, the indigenous groups of the Chaco lived in the wilderness as nomadic hunters and collectors, and their homes consisted of simple huts made of vegetable materials. Only with the onslaught of modernity in the Chaco over the past decades, along with the occupation of ancestral indigenous lands by “Latino” Paraguayans and European descendents, did the indigenous way of life change drastically. They were forced to adapt to a more sedentary lifestyle, integrate into the monetary economy and farm production in order to survive. The INTN, for example, with recent experience in rural electrification of an indigenous community in the Chaco (see Pulfer: *Diagnóstico del Sector Energético en Paraguay*, 2005), had many problems relating to the aforementioned indigenous situation, which were only overcome after a prolonged, intensive process of sensitization, awareness–building and training in all areas of importance to project success.

Another aggravating factor in the case of this project, which requires repayment of capital delivered to the community, is the bad habit of passive paternalism that has become ingrained among most indigenous Paraguayans. They have become used to the State and civil society aiding them whenever they face an acute crisis, for example during the draughts that visit the Chaco almost yearly in the Winter months, when they are regularly supplied with water and groceries. This attitude clearly hinders implementing sustainable projects of the kind proposed by OLADE. Project feasibility may only be determined after initial visits to the field, talking to potential beneficiaries, and providing them with the tools needed to understand the system to be applied.

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