



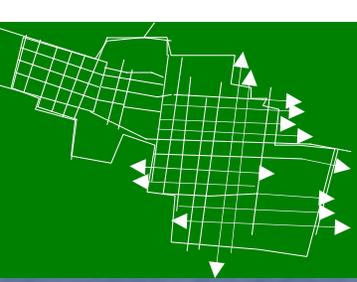
PARAGUAIAN INSTITUTE FOR
ENVIROMENTAL PROTECTION- IPPA



“GIS & REMOTE SENSING UNIT HEAD”

Head: Architect **Silvia B. Burgos Sosa**

SAN LORENZO- PARAGUAY

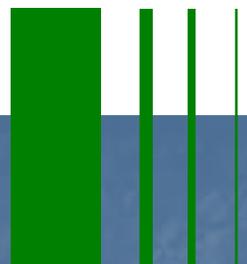
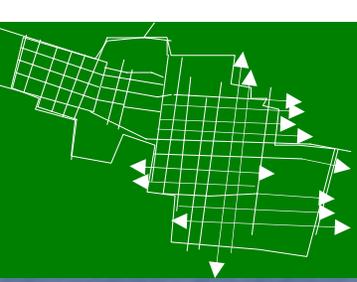


PARAGUAIAN INSTITUTE FOR ENVIROMENTAL PROTECTION- IPPA

The IPPA was founded in the year of 2000 as a social, environmental and scientific NGO and is located 12 km from Asuncion, the capital of Paraguay, in the heart of South America.

Our mission: Educate young people to act in defense of environmental problems and carry on sustainable projects based on environmental adequacy, social acceptance and economic viability.





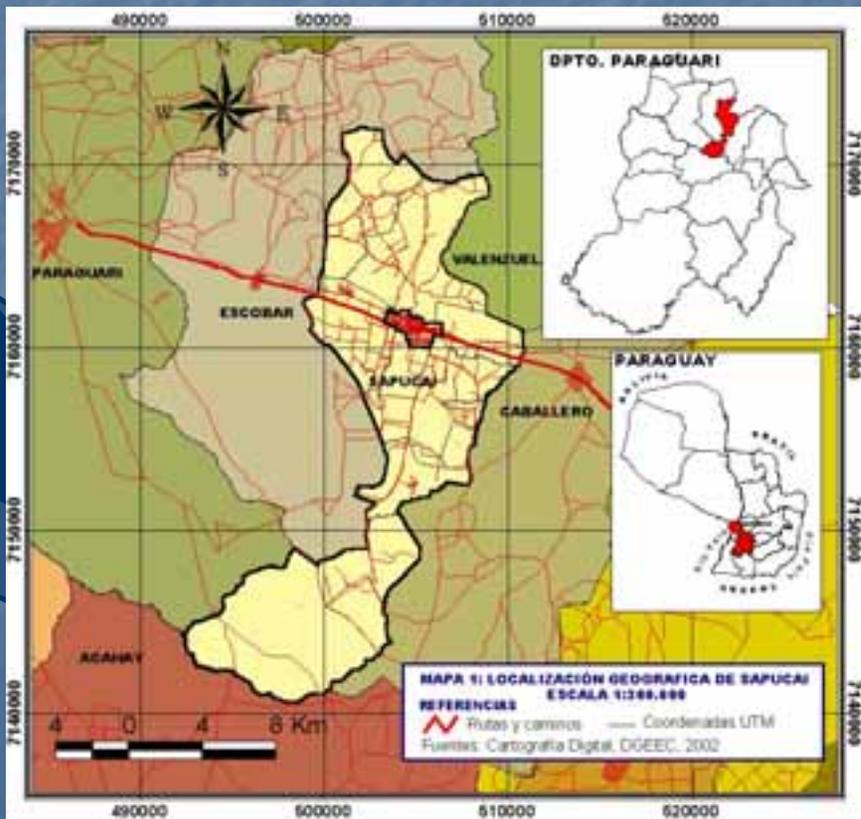
PROJECTS UNDERTAKEN by THE IPPA:

- Participative environmental diagnosis of the Ñeembucu basin, IPPA-The RAMSAR Convention for wetlands conservation.
- Environmental education of leaders for the rational use of the Guarani Groundwater System, IPPA-Organization of American States OAS.
- Multitemporal analysis of the town of Sapucaí , based on remote sensing and air photography interpretation of the last 40 years.



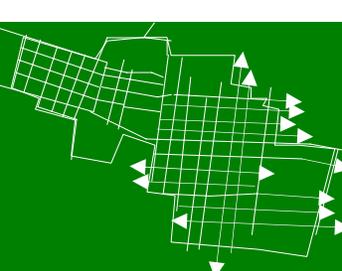
Guidelines for sustainable development and some criteria for the ecological urbanization of the city of Sapucaí.

Introduction: The town of Sapucaí is located in the Paraguari department, about 60 miles from Asuncion, the capital of Paraguay, with geographical Coordinates of 25° 40' South and 56° 58' West and with a population of 2307 inhabitants.





Physical conditions: The climate is humid and temperate, with warm and rainy summers and dry and cool winters, mean annual temperature is 22° Celsius and a mean annual precipitation of 1,400 mm. The relieve is very variable because the situation of the town in one valley surrounded by the Altos Hills to the north and by the Green Hills to the south.



Guidelines for sustainable development and some criteria for the ecological urbanization of the city of Sapucaí.

Social problems: An important historical impact was identified, like the permanent closure of the Carlos Antonio Lopez Railway in the year of 2000, which divided the history of Sapucaí in two stages, before and after this year, which affected the life of Sapucaí economically, socially and environmentally. For example, of the economically active population in the year 2006, 82% were occupied workers and 18% were unoccupied. The main social problem is the migration of the young people outside the country because there are not enough jobs in the town.

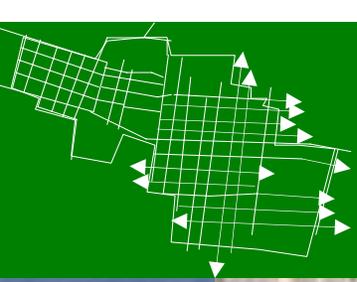
Environmental problems

Many kinds of environmental problems were identified too, like the climatic change forced by deforestation, many streamlets dried off, and so drink water availability fall 50 % stopping the grow and development of the town.

Other kind of problems is the inefficient basic services, such as insufficient potable water distribution, poor educational and health infrastructure, and no sewer treatment plant.

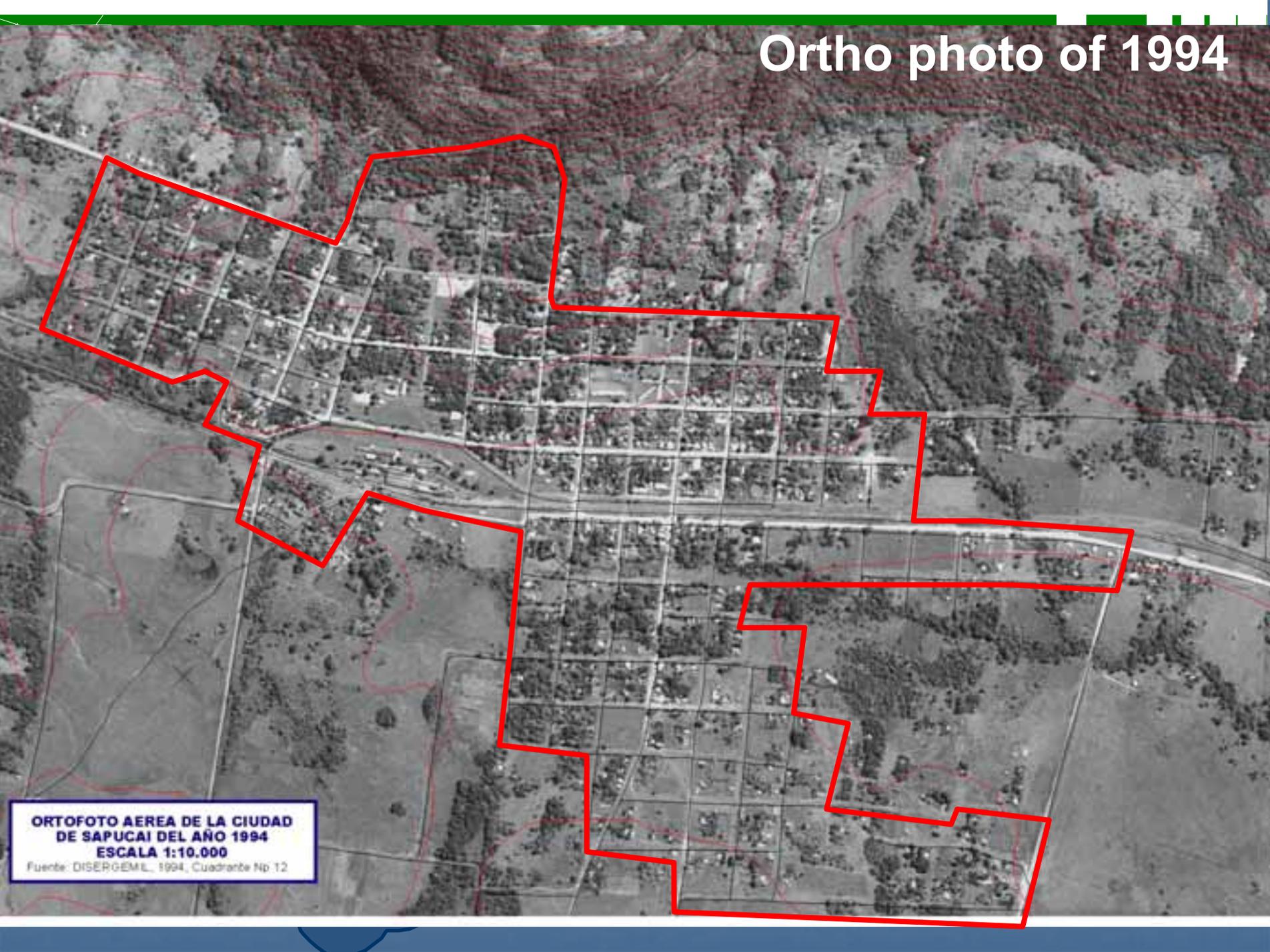
The multitemporal analysis showed that urban areas expanded in the last 40 years, while population decreased in the period 1965-1994 due to emigration caused by the end of the railway and recently grew up again in the period 1994-2005 due to local emigration from rural areas caused by soil degradation.

Multitemporal analysis based on remote sensing and air photography interpretation or the last 40 years or the city of Sapucaí.



Air photo of 1965

Ortho photo of 1994



**ORTOFOTO AEREA DE LA CIUDAD
DE SAPUCAI DEL AÑO 1994
ESCALA 1:10.000**

Fuente: DISERGEME, 1994, Cuadrante N° 12

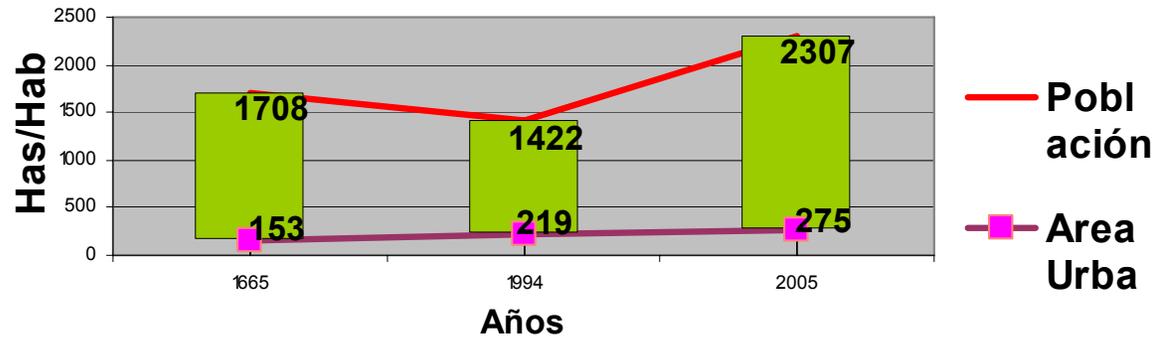
Constructed urban area 

urban border 

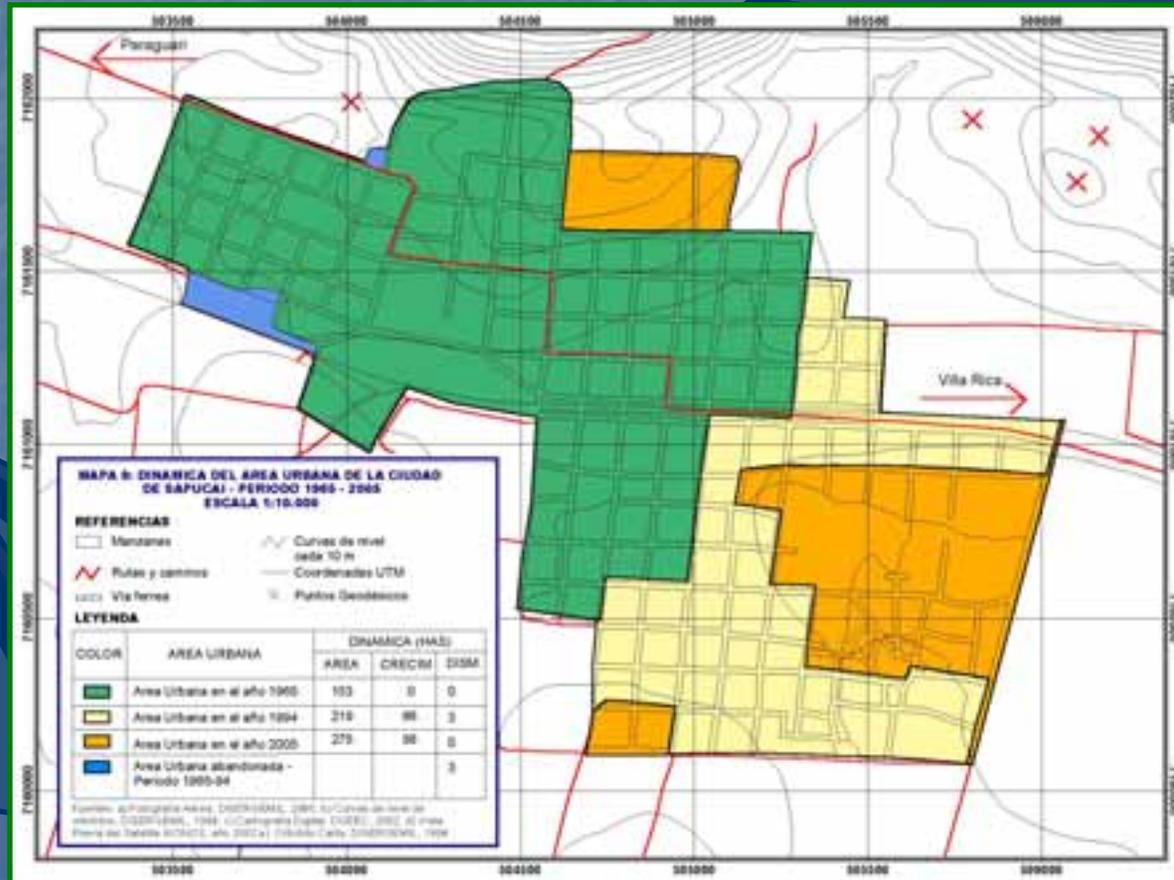
**Ikonos of
2005**



Crecimiento de la Población Urbana y el Area Urbana de la Ciudad de Sapucaí



The multitemporal analysis showed that urban areas expanded in the last 40 years, while population decreased in the period 1965-1994 due to emigration caused by the end of the railway and recently grew up again in the period 1994-2005 due to local emigration from rural areas caused by soil degradation.



Conclusions of this study are



- The town of Sapucaí has growth without any kind of planning tool
- Most of the surface waters are polluted;
- Public services are inefficient;
- Inefficiency of the town equipment and infrastructure;
- Historical buildings are threatened by poor maintenance and robbery;
- Most of young people emigrate looking for jobs and opportunities.

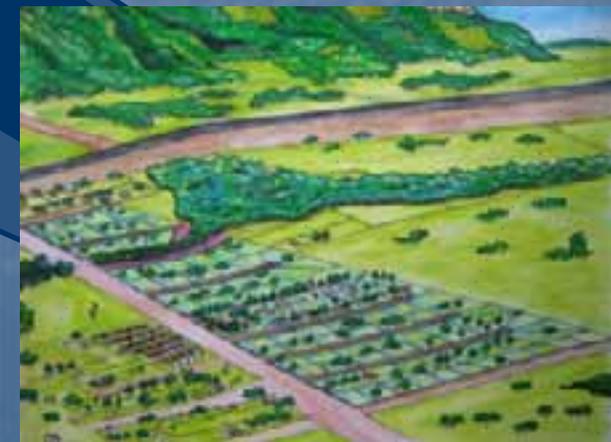
Plan for Sustainable Development of Sapucaí



Programs	Projects
<p>1 Environment</p>	<ol style="list-style-type: none"> 1. <i>Urban zoning based on land classification and natural elements;</i> 2. <i>Ecologic urbanization of new areas;</i> 3. <i>Sewer treatment plant construction;</i> 4. <i>Historic buildings conservation plan;</i> 5. <i>Young people organization to take action in development issues.</i>
<p>2 Economy</p>	<ol style="list-style-type: none"> 1. <i>Farmers training program to improve food production an environment quality,</i> 2. <i>Forest industry improvement plan;</i> 3. <i>Organic production plan;</i> 4. <i>Clean technology program for processing plants like sugar cane and milk;</i> 5. <i>Justice price and marketing development plan;</i> 6. <i>Ecotourism development plan:</i>
<p>3 Social .</p>	<ol style="list-style-type: none"> 1. <i>Promotion of social organization by districts;</i> 2. <i>Social capital improvement by training courses;</i> 3. <i>Young people inclusion in sustainable development programs;</i> 4. <i>Social participation program for rural areas;</i> 5. <i>Create a social participation channel in the town administration.</i>
<p>4 Public services</p>	<ol style="list-style-type: none"> 1. <i>Implement an environmental secretariat in the town administration;</i> 2. <i>Implement a geoprocessing unit in the town administration;</i> 3. <i>Elaborate an strategic plan for the sustainable development of the county;</i> 4. <i>Educational and Health improvement plan;</i> 5. <i>Create a public library;</i> 6. <i>Elaborate and maintain a web page of the Sapucaí county.</i>

Criteria for the ecological urbanization or the city of Sapucaí.

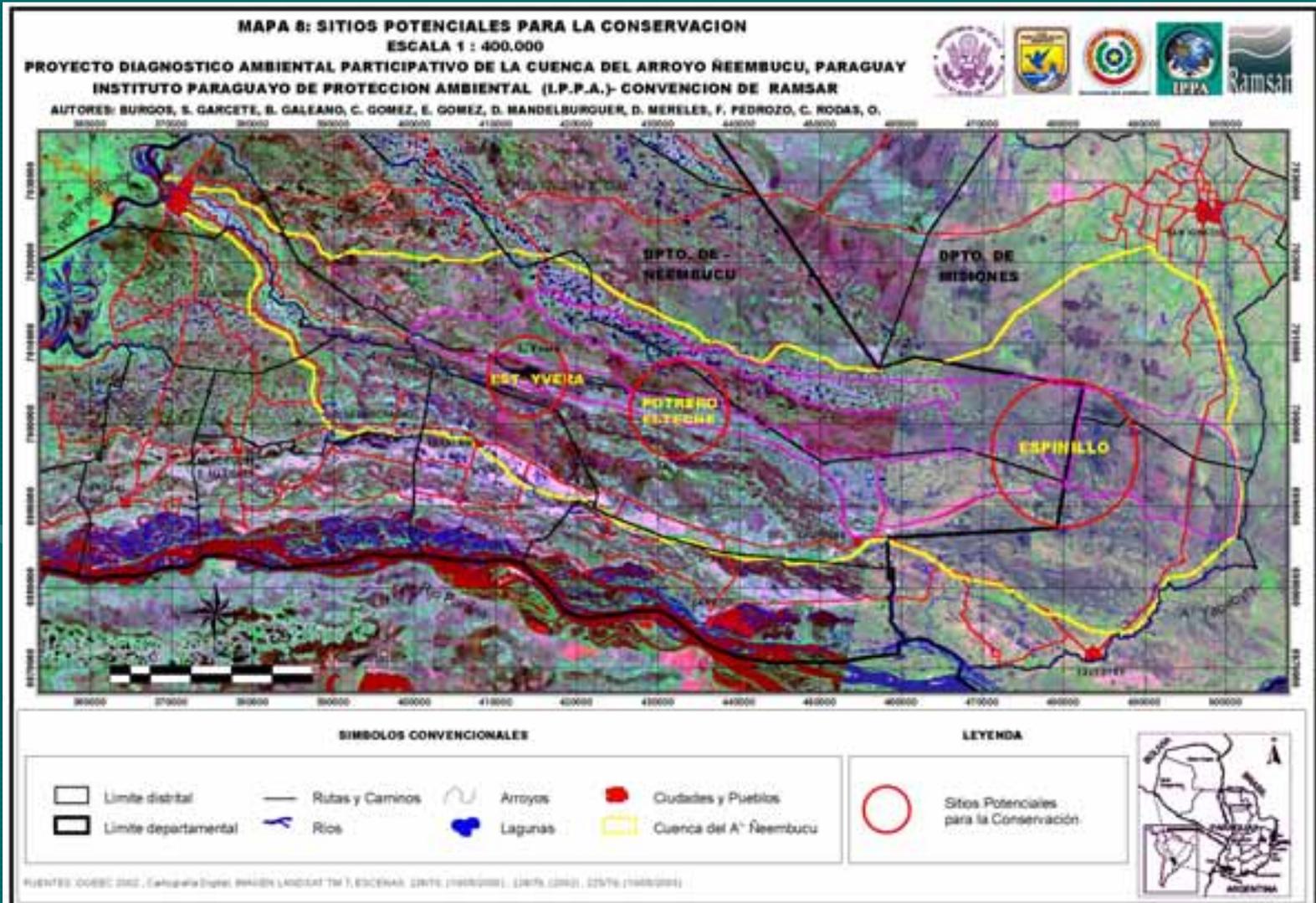
- Street web design has to considerate environmental issues like relief, wetlands and soils;
- Infrastructure according to cost/benefit analysis;
- Considerate social needs and emigrations.



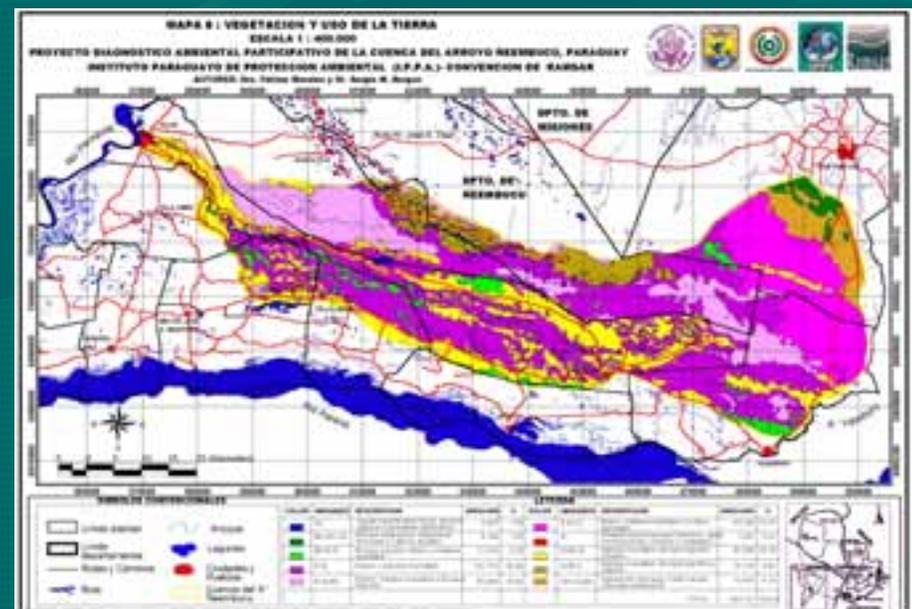
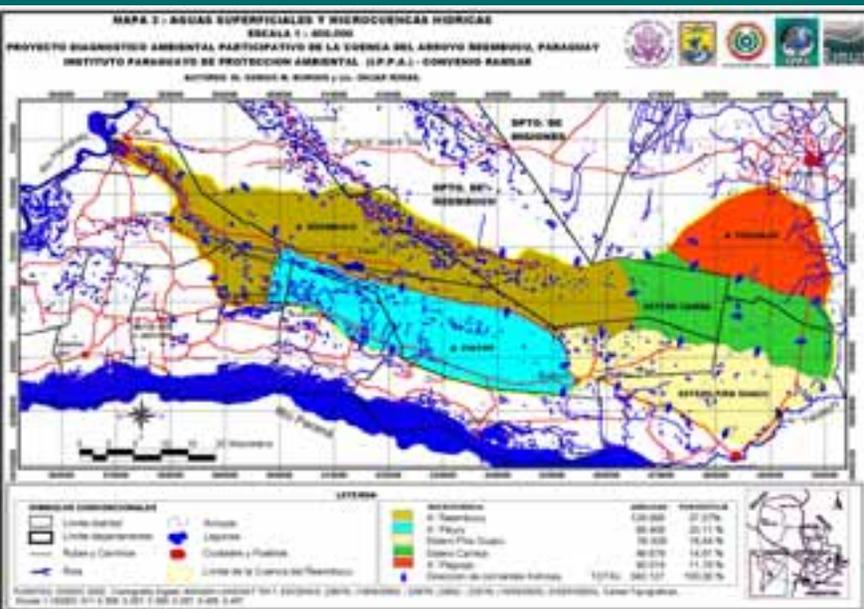
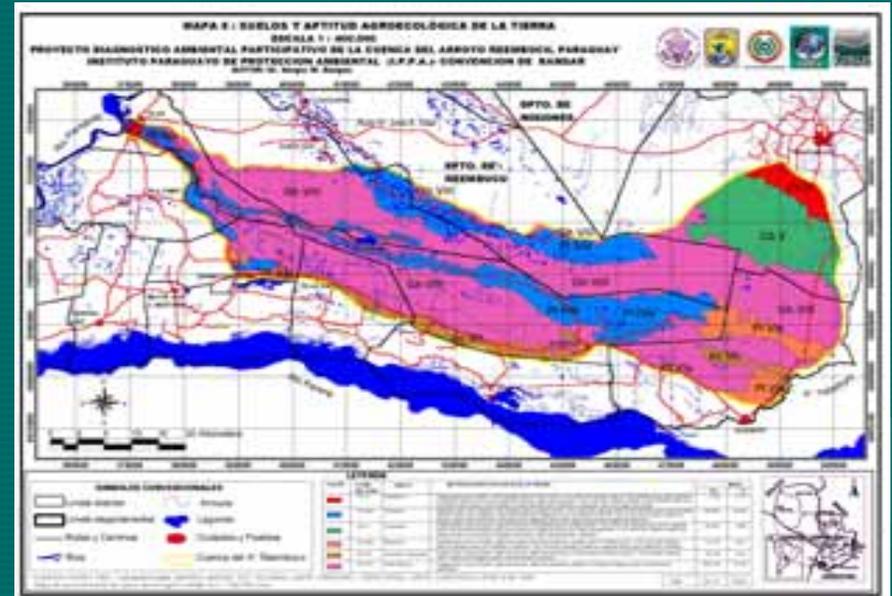
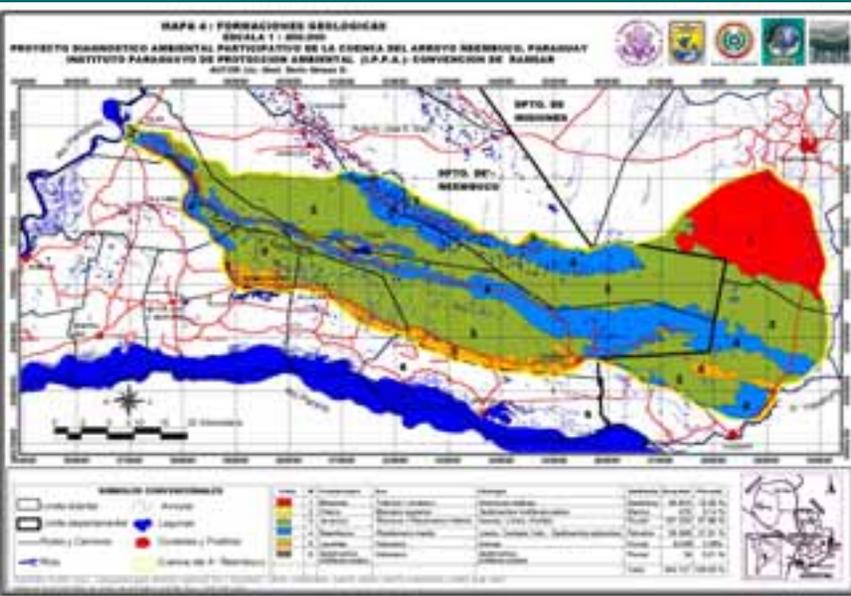
Participative environmental diagnostic or the Ñeembucu brook.

The objective has to identify potential areas for wetland conservation and RAMSAR Sites.

This potential areas for conservation were identified using remote sensing tools.

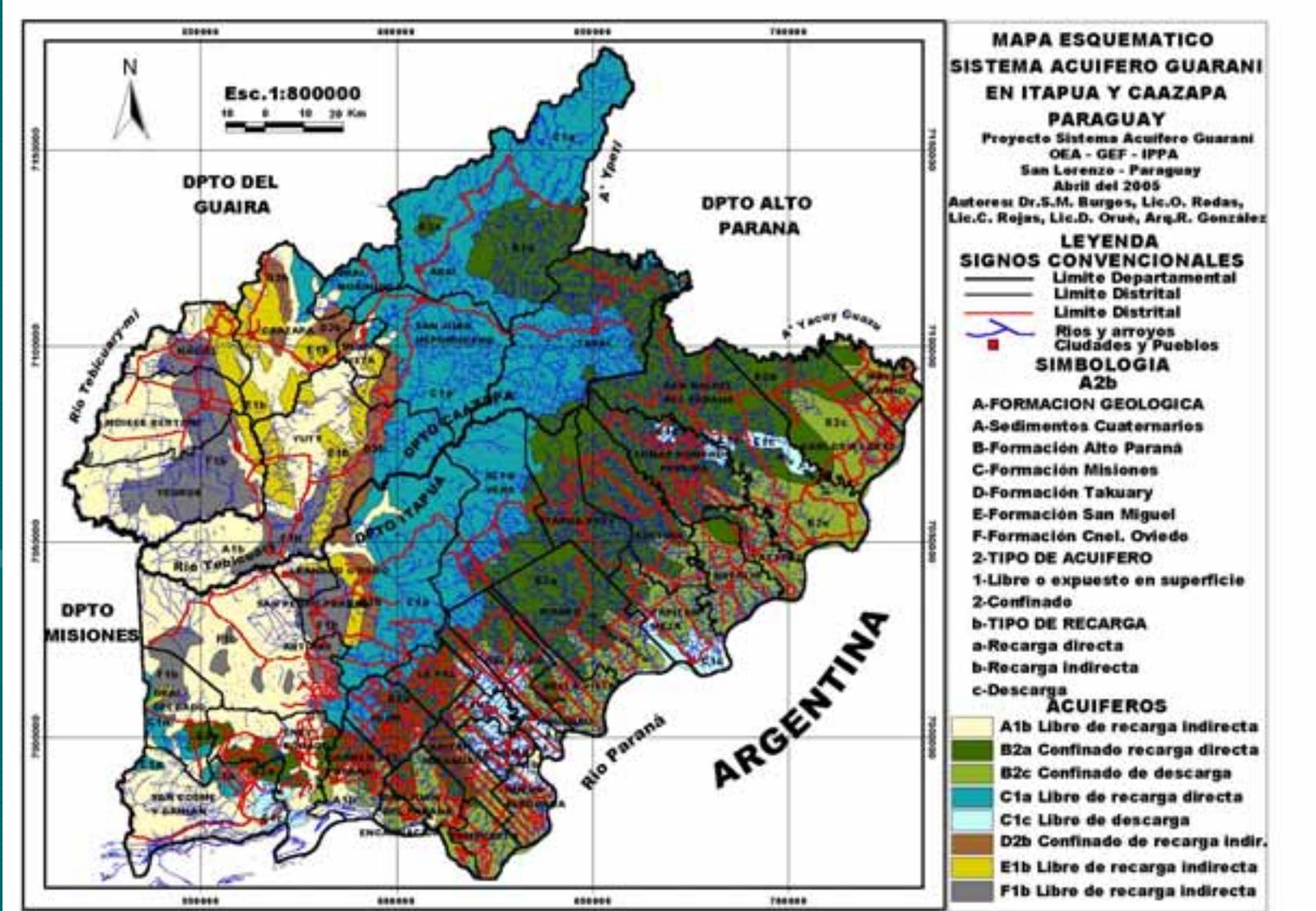


OTHER MAPS OF THE BASIN: Geology, soils, micro basins and vegetation.



Environmental education of leaders for the rational use or waters from the Guarani Groundwater System in the Itapua and Caazapa Departments of Paraguay.

The main objective of the project were to train about 150 local leaders; elaborate a groundwater map of these two departments, design and press a color wallpaper





***THANKS, GRACIAS,
AGUIJE !!!***

For more information contact us in:

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Or visit us in www.ippa.org.py

(in reconstruction)