

La Plata River Basin

The Basin

The La Plata River Basin has an area of approximately 3,000,000 Km² making it the fifth largest basin in the world and the second largest in South America. The La Plata basin is shared by five countries:

1. Argentina: contains 920,000 Km² of the basin or 29.7%,
2. Bolivia: contains 250,000 Km² of the basin or 6.6%,
3. Brazil: contains 1,415,000 Km² of the basin or 45.7%,
4. Paraguay: contains 410,000 Km² of the basin or 13.2%, and
5. Uruguay: contains 150,000 Km² of the basin or 4.8% (Calhman, 2008).



Figure 1: La Plata River Basin (Source: World Water Assessment Programme, 2009)

São Paulo, the largest city in South America, and four capitals are located in the basin: Buenos Aires, Brasília, Asunción and Montevideo. The three main rivers that form the basin are the Paraná (3,780 Km), Uruguay (1,600 Km) and Paraguay (2,620 Km), which all have sources in Brazil.

The Basin contains several important and varied ecosystems: Pantanal (most extensive wetland in the world), Atlantic Forest, Chaco and Savannah. The basin also encompasses the Guarani aquifer, one of the largest in the world.

The navigation along the basin was historically suitable for the development of important urban centers. The river's basin triggered agricultural and industrial development making the region responsible for generating 70% of the combined GDP of the five countries (Calhman, 2008).

Agriculture is the main economical activity in the basin, where soy, corn and wheat are produced in large scale. Livestock and fishing are also important sources of food and income. However, the environmental quality of the basin is deteriorating due to contamination by chemicals used in agriculture, population growth, highways, mining, dams and irrigation projects (World Water Assessment Programme, 2009.)

Energy generation in the basin is very important and the construction of dams has led to several misunderstandings in the past. There are approximately 75 dams in the basin. Three of the main dams are:

1. Itaipú: largest dam in the world located on the Paraná river between Brazil and Paraguai,
2. Salto Grande: Uruguay river on border between Argentina and Uruguay,
3. Yacyretá: Paraná river on the border between Argentina and Paraguay.

The hydroelectric potential in the basin is approximately 100,000 MW of which half is being utilized (Sell, 2005).



Figure 2: Itaipú dam (Source: Itaipú Binacional)

The La Plata Basin has a great potential for natural resources exploitation, making the cooperation of all countries involved and sectors of society necessary.

Treaties

Before the 1960s, some relevant agreements dealing with water use in the basin already existed. In 1969, the five countries signed the La Plata Basin Treaty creating the CIC (Intergovernmental Coordination Committee) responsible for developing activities of common interest in the Basin.

After this treaty, several other treaties were signed by two or three countries, showing the weaknesses in the 1969 agreement. In 1973, Brazil and Paraguay signed the Itaipú treaty which created "Itaipú Binacional", entity responsible for the creation of the Itaipú dam and its energy generation. This treaty generated several conflicts with Argentina, but they were finally resolved in 1979 with the Three Party Corpus and Itaipú Treaty.

Table 1: Main International Treaties after the La Plata Basin Treaty (Adapted from Calhman, 2008)

Treaty	Countries Involved	Year
Convention to Study the Use of the Rio Paraná's Resources	Argentina and Paraguay	1971
Rio Paraná's Joint Commission	Argentina and Paraguay	1971
Yacyretá Treaty	Argentina and Paraguay	1973
Salto Grande Joint Technical Commission Creation Treaty	Argentina and Uruguay	1973
"Itaipú Binacional" Creation Treaty	Brazil and Paraguay	1973
Lagoa Mirim Basin Treaty	Brazil and Uruguay	1978
Three Party Corpus and Itaipú Treaty	Brazil, Argentina and Paraguay	1979
Rio Uruguay and Peperi Guaçu Treaty	Brazil and Argentina	1983
Rio Quarai Natural Resources Use and Development Cooperation agreement	Brazil and Uruguay	1992
Rio Pilcomayo Binational Commission Creation Treaty	Argentina and Paraguay	1993
Rio Pilcomayo Trinational Commission Creation Treaty	Argentina, Bolivia and Paraguay	1995
Rio Bermejo Binational Commission Creation Treaty	Argentina and Bolivia	1995

The revitalization of CIC, the Marco Project focused on the sustainable development of the natural resources in the La Plata Basin and the environmental protection and sustainable development project of the Guarani Aquifer are demonstrating a tendency in integrated basin management.

Climate Change

Climate variation and its effects have caused several problems in the region since 1970, when the average annual river flow increased significantly in some stretches of the river. The main effects of the increase in flow and precipitation were:

- Soil erosion,
- Increase in water levels and flood frequency,
- Change of river beds and riparian environmental conditions,
- Increase in hydroelectric production, and
- Change in water quality due to suspension of sediments during floods (Calhman, 2008).

According to Barros (2005) there is an amplification of the variation of river flow compared to the variation of precipitation. For example: between 1951-1970 and 1980-1999 there was a 16% increase in precipitation in a region of the basin and a corresponding 35% increase in river flow. Similarly, a 7% decrease in precipitation between 1998-1999 due to El Niño and El Niña generated a corresponding 17% decrease in river flow. In addition to this, if we consider that 70% of the precipitation in the La Plata basin evaporates and only 30% reaches the rivers, climate change can make this region very vulnerable as it is highly dependent on hydroelectric power and navigation.

Bibliography

The La Plata River Basin, Water for Peace, Green Cross Italia
http://www.greencrossitalia.it/ita/acqua/wfp/plata_wfp_001.htm

“Gestão de Recursos Hídrico em Bacias de Rios Fronteiriços e Transfronteiriços – Rio Quaraí / Bacia do Prata”, Calhman, Olga Kelman Brocki, 2008

World Water Assessment Programme, 2009. *The United Nations World Water Development Report 3: Water in a Changing World*. Paris: UNESCO, and London: Earthscan. Pages 66-71.

“Direito Internacional de Águas na Bacia do Rio da Prata: Aplicação Regional de Princípios e Regras Procedimentais do Direito Internacional de Águas” Sell, M. S., 2005

Barros, V., Castañeda, M. E., Doyle, M., 1996. Recent precipitation Trends in Southern South America to the East of the Andes and indication of a mode of climatic variability. In: Proceedings of Latin America Workshop on Greenhouse gas emission of Energy sector and their Impacts, COPPE/ UFRJ, Rio de Janeiro, Brazil.

Itaipú Binacional
<http://www.Itaipú.gov.br/>