



# INTERNATIONAL WATERS RESULTS NOTES

<http://www.iwlearn.net/results>

19-09-2011

## Regional (Argentina, Brazil, Paraguay and Uruguay): Environmental Protection and Sustainable Development of the Guarani Aquifer System Project

GEFID#: 974, IBRD Project ID: P068121, Project Status: Completed



1. One of the main outcomes of the Project is the establishment of the institutional mechanism to coordinate the activities of the four countries in the management of Guarani Aquifer System (GAS) that did not exist before the Project. The Project also extended this new culture of cooperation among specialists, universities and institutions in the four countries.
2. Technical and scientific studies conducted through the Project concluded that lateral movement of groundwater in the GAS is very slow and impacts from over pumping and pollution are highly localized. Therefore, management of the aquifer is essentially a local set of activities. The four countries now have a good understanding and feel much more confident to develop and manage the aquifer individually without worrying about wide-ranging regional/transboundary impacts. It would have been very difficult to get to this point and to have this shared understanding without having a regional project.
3. As a preventive project, the key performance indicators basically targeted the reduction of future risks:
  - (i) pollution risks diminished or controlled;
  - (ii) overdraft risks diminished or stabilized;
  - (iii) future inter-country groundwater conflicts risk diminished; and
  - (iv) future mitigation and stabilization costs reduced.

**Dinesh Aryal, [daryal@worldbank.org](mailto:daryal@worldbank.org)**  
**Environment Unit, Sustainable Development Department, Latin  
 America and the Caribbean Region, World Bank**

## PROJECT OBJECTIVE

The Project Development Objective (PDO) is the sustainable use and management of the Guarani Aquifer System (GAS) in Argentina, Brazil, Paraguay and Uruguay for current and future generations, supported by the joint development and implementation of an adequate, functioning aquifer management framework, based on sustainable technical, scientific, institutional, legal, financial, political, and environmental grounds.

## RESULTS: PROCESS

The Project successfully defined the institutional framework necessary for the management of the GAS. With the support from the Project, different institutional frameworks at all levels (regional, national and local) remained operational and the countries have committed to continue with activities and institutional nucleus created through the Project beyond the project duration. The approval of the SAP that defines the future sustainable management framework of the GAS also testifies to the commitment by the governments and attests the success of the Project.

INDICATOR#1 – Establishment of an institutional framework: The countries, through the Steering Committee (at multi-country level), the National Project Execution Units (one per country), and the Regional Coordination Unit, has established the institutional framework.

INDICATOR#2 – Existence of SAP: The SAP was finalized and approved by the SC. The SAP has now become a living document to lead the joint and individual actions of the countries

## RESULTS: STRESS REDUCTION

The Project was successful in identifying and quantifying water quality threats, and “hot spots” for groundwater overuse. Furthermore, the Project developed and adopted guidelines for well design, construction and maintenance for different uses of groundwater.

INDICATOR#1 – Communications campaign: An intensive communication campaign was undertaken that reached more than 2.5 million people. The GAS is now well known not only within the four countries but in international circles as well.

INDICATOR#2 – Water quality threats identified and quantified: Potential water quality threats were identified through the preparation of a vulnerability map and analyses that identified lack of adequate wastewater and solid waste management, intensification of agriculture and unsupervised well drilling (well head contamination). However, an important finding of the Project is that in its present state, the Guarani aquifer water quality is essentially without contamination from human activities. Except for the finding that showed somewhat elevated concentrations of nitrates or other chemicals in some wells (still within acceptable limits) and areas with high natural salinity or arsenic, the general conclusion was that the Guarani aquifer has very good water quality through most of its extent and almost no contamination.

INDICATOR#3 – In the Concordia-Salto area, studies indicated that there is a potential for overexploiting geothermal water resources and measures were designed for limiting groundwater competitive extraction through well spacing and other relevant measures for new geothermal development.

## RESULTS: WATER RESOURCE AND ENVIRONMENTAL STATUS

INDICATOR#1 – The western limit of the aquifer was not clearly understood prior to the Project. Based on geological criteria, it is now has been better defined. As a result the aquifer area in Argentina was revised from an earlier estimate of 225,500 km<sup>2</sup> to 228,255.26 km<sup>2</sup>.

INDICATOR#2 – Conceptual and mathematical models that capture the hydrodynamic behavior and allow for the evaluation of different development, management and climate change scenarios were developed and are excellent tools for future management of the aquifer.

INDICATOR#3 – The quantity of water extracted annually from Guarani is estimated at 1.04 billion m<sup>3</sup>/year.

The Global Environment Facility (GEF) *International Waters Results Notes* series helps the transboundary water management (TWM) community share its practical experiences to promote better TWM. To obtain current *IW Results Notes* or to contribute your own, please visit <http://www.iwlearn.net/results> or email [info@iwlearn.org](mailto:info@iwlearn.org).