

Transboundary Groundwater Management: The Guarani Aquifer System

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Presentation Outline

- Government vs Governance
- What kind of problem is TBA Management?
- Basics of the Guarani Aquifer System
- Coordinated Management Framework 2009
- The Agreement on the Guarani Aquifer 2010
- Comparative Analysis
- Conclusions and Recommendations

Government vs Governance

<h2>Government</h2> <p>of the People by the People for the people</p>	<h2>Governance</h2> <p>of the Organization through the People for the Purpose</p>
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- Decentralized governance of natural resources (UNDP)
- Renewed governance
- Koiman 2003: *the totality of interactions, in which public as well as private actors participate, aimed at solving societal problems or creating societal opportunities; attending to the institutions as contexts for these governing interactions; and establishing a normative foundation for all those activities*

Simple, Complicated or Complex?

Understanding the difference between complex and complicated systems is becoming important for many aspects of management and policy.

- **Simple Problems:** *cause and effect relationships are repeatable, perceivable and predictable*
- **Complicate Problems:** *one can define the problem and strategically develop actions, benchmarks and time-scales to predict outcomes within percentage error*
- **Complex Problems:** *cause and effect are difficult to predict outcomes consistently*

Simple, Complicated or Complex?

Simple, Complicated and Complex Problems		
SIMPLE	COMPLICATED	COMPLEX
Baking a Cake	Sending a Rocket to the Moon	Raising a Child
The recipe is essential.	Rigid protocols or formulas are needed.	Rigid protocols have a limited application or are counter-productive.
Recipes are tested to assure easy replication.	Sending one rocket increases the like lihood that the next will also be a success.	Raising one child provides experience but is no guarantee of success with the next.
No particular expertise is required, but experience increases success rate.	High levels of expertise and training in a variety of fields are necessary for success.	Expertise helps but only when balanced with responsiveness to the particular child.
A good recipe produces nearly the same cake every time.	Key elements of each rocket must be identical to succeed.	Every child is unique and must be understood as an individual.
The best recipes give good results every time.	There is a high degree of certainty of outcome.	Uncertainty of outcome remains.
A good recipe notes the quantity and nature of the "parts" needed and specifies the order in which to combine them, but there is room for experimentation.	Success depends on a blueprint that directs both the development of separate parts and specifies the exact relationship in which to assemble them.	Can't separate the parts from the whole; essence exists in the relationship between different people, different experiences, different moments in time.

Source: Westley, F., B. Zimmerman and M. Q. Patton, 2006, *Getting to Maybe: How the World is Changed*.

Transboundary Aquifer Management

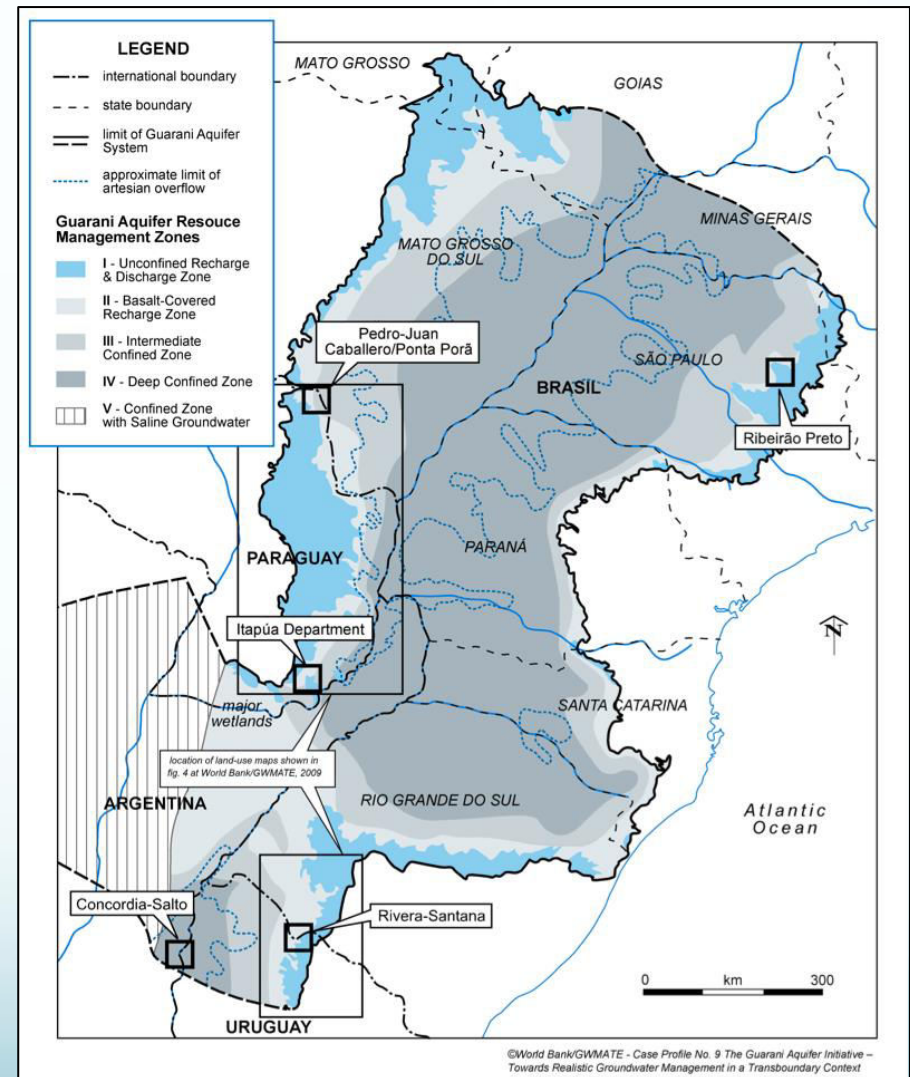
- Considerations in TBA Management
 - Resource Availability
 - Abstraction vs Recharge
 - National Priorities
 - Economic
 - Socio-Political
 - Environmental
 - Local?
 - Legal Traditions
 - Government and Governance Structure
 - Where is water?
 - Capacity

Therefore...

Is Transboundary Aquifer Management then Complicated or Complex?

The Basics: Guarani Aquifer System

- Physical Characteristics
- Member Nations
 - Argentina
 - Legal Tradition
 - Aquifers?
 - Water Governance
 - Brasil
 - Legal Tradition
 - Aquifers
 - Water Governance
 - Paraguay
 - Legal Tradition
 - Aquifers
 - Water Governance
 - Uruguay
 - Legal Tradition
 - Aquifers?
 - Water Governance



The Basics: Guarani Aquifer System

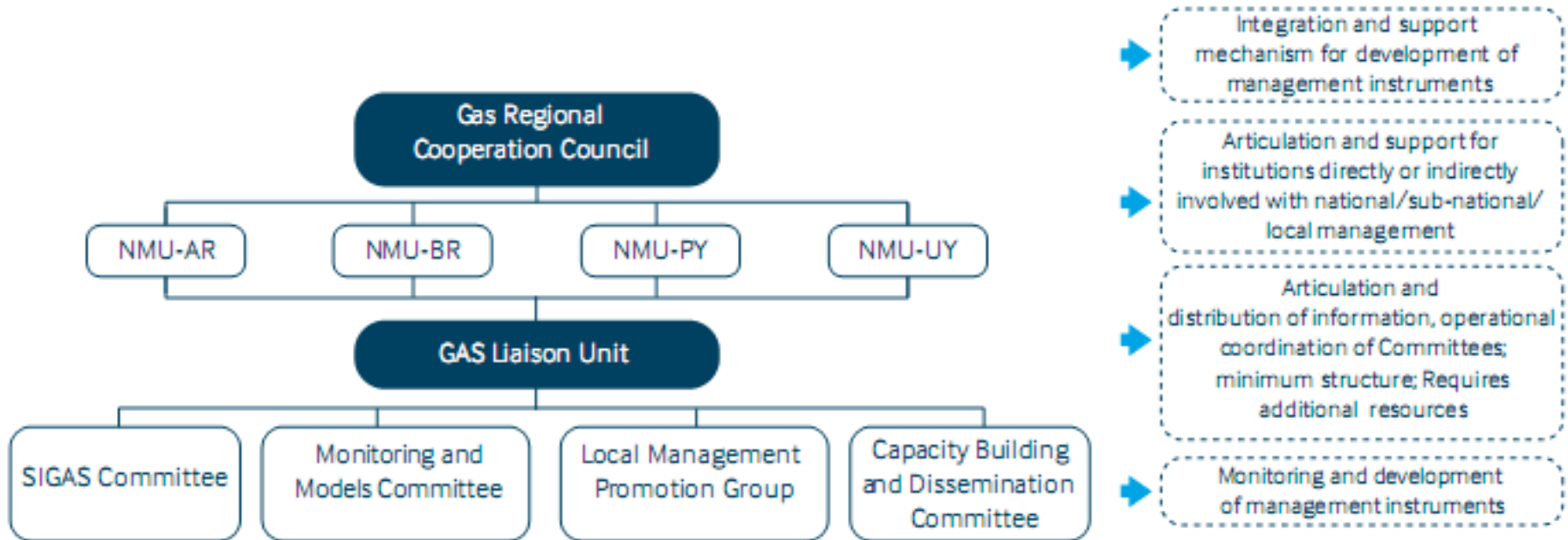
	Argentina	Brazil	Paraguay	Uruguay
Area within state (km ²)	225,500	839,800	71,700	45,000
Surface area (%)	5.9	9.8	17.6	25.3
Characteristics	Supply	Recharge and supply	Recharge and supply	Recharge and supply
Main environmental issue	<ol style="list-style-type: none"> 1. Potentially uncontrolled drilling and extraction 2. Subject to pollution effects from other countries 	<ol style="list-style-type: none"> 1. Point and nonpoint source pollution 2. Uncontrolled drilling and extraction 	<ol style="list-style-type: none"> 1. Point and nonpoint source pollution 2. Uncontrolled drilling and extraction 3. Subject to pollution impact from other countries 	<ol style="list-style-type: none"> 1. Point and nonpoint source pollution 2. Uncontrolled Drilling and Extraction 3. Subject to pollution impact from other countries

Source: (*Global Environment Facility, 2000, p. 4*)

The Guarani Aquifer System Project

- Unique
 - PSAG was proactive not reactive to regional conflict
 - Stakeholders beyond governments
- 7 Components focused on cooperation and sharing of information
- 4 Principles focused on substantive rules
- 6 Activities focused on procedural rules
- Key Bodies:
 - Regional Cooperation Council
 - National Management Units
 - Liason Unit
 - 4 Local Management Support Committees:
 - Argentina – Guarani Information System
 - Brazil – Monitoring and Evaluation
 - Paraguay – Capacity building and Dissemination
 - Uruguay – Local Management and Promotion

The Framework



Source: GS/GAS, 2008.

The Framework vs Agreement

Principles of International Law	Coordinated Framework	Guarani Agreement (August 2010)
Scope	SAG	SAG
Substantive Rules: <ul style="list-style-type: none"> • Equitable and Reasonable Use • No Significant Harm 	Principles of Framework	Article 4 Article 6
Procedural Rules: <ul style="list-style-type: none"> • Obligation to Cooperate • Prior Notification • Sharing Information 	Components actioned by Activities	Articles 8, 9, 10, 12, 13 Articles 5, 10 Articles 8, 9, 10, 12
Dispute Settlement	Mercusur/CIC?	Article 15, 17/La Plata Basin Treaty
Sovereignty	NA?	Article 1, 2, 3

Vertical and Horizontal Communication



Something Missing?

The Framework vs Agreement

	Scope	Substantive	Procedural	Dispute	Other
Framework	=	✓	✓	✗	✗
Agreement	=	✓	✓	✓	✓

And the winner is?

Conclusions and Recommendations

The Framework to the Agreement is great leap forward for treaty practice of groundwater in the international arena

However, still meager in comparison to surface waters mainly due to the limitations of sovereignty, the uncertainty and heterogeneity of aquifers

Process leading to an agreement n management should start, not end, with the sharing of information.

Governance more dynamic than the law therefore, need to have greater vertical and horizontal institutional coordination and communication for better governance of TBA's utilizing the subsidiarity principle to be more dynamic

Customary International Law versus the Governance of TBA still needs further research

Thank You

