Guarani Aquifer System (GAS): from knowledge to governance

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Environmental Protection and Sustainable Development of the Guarani Aquifer System Project






UNESCO – GEF 5th IWF' 2009
Cairns, 24-29 October 2009

Scenario before 2001

- Problem: Lack of social knowledge of GAS.
- Actors: dispersed institutions in each country
  - Water Resources
  - Environment
  - International Relations
- Context: Marginal place for groundwater in policy agenda and no place in public opinion agenda (invisibility and lack of knowledge that implied the spread of myths and fears).

Current situation (2009)

- Problem solved: social knowledge about GAS existence;
- Actors: Cooperation Framework, integration of national & sub-national institutions, with focus on local level (prerequisite for governance in GW);
- Context: repositioning of groundwater in public policy, governmental agendas and growing presence in public opinion agenda (prerequisite for civil society participation).

Huge advances in GAS knowledge

Before

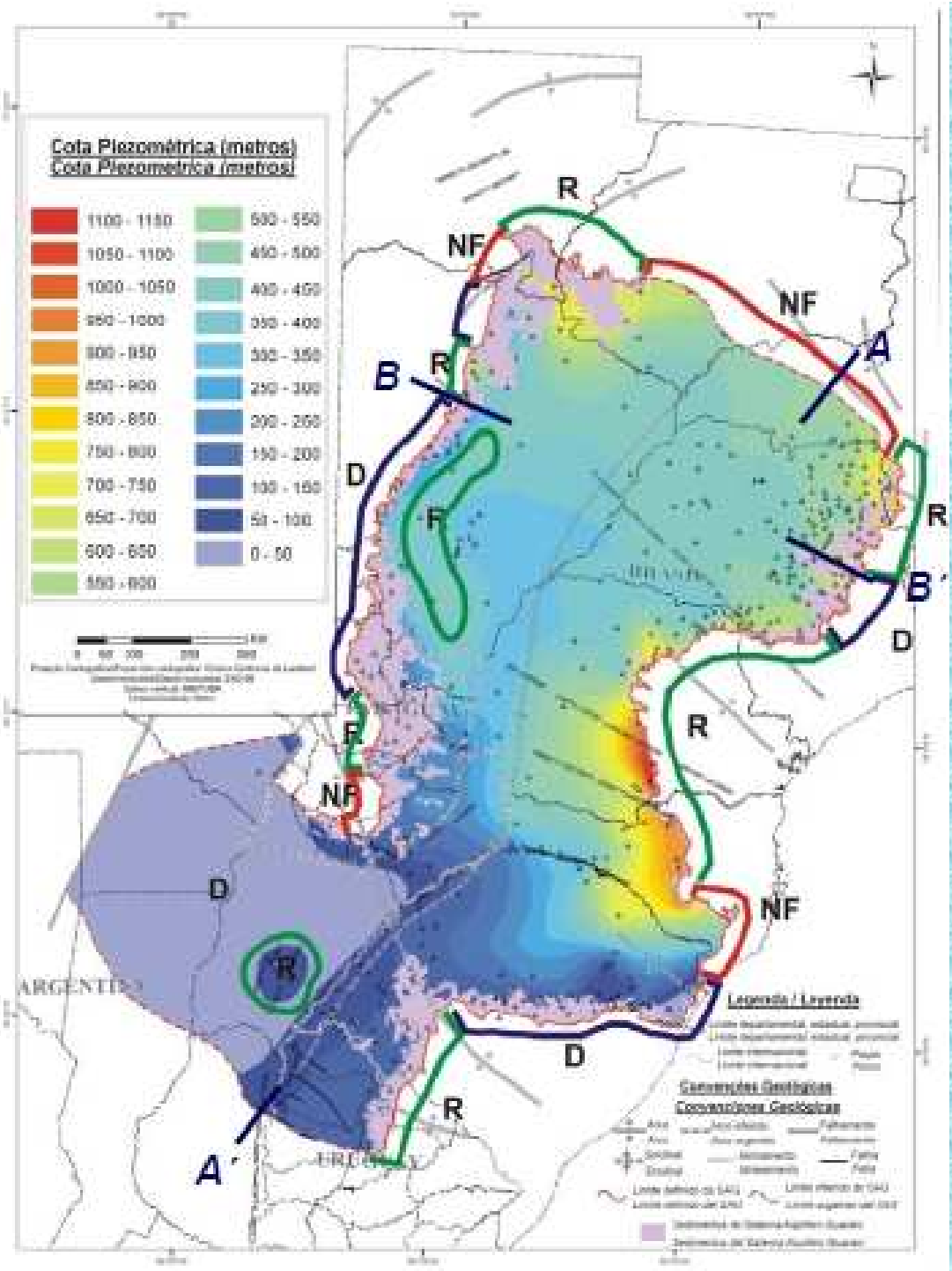
- Aquifer system with no strata delimitation;
- Database limited and with no consistency;
- Important transboundary fluxes;
- Unknown boundaries;
- Erroneous geometry;
- Flourish areas considered as recharge areas;
- Unknown discharge;
- No understood relationship between local and regional fluxes.

Today

- GAS stratum identified;
- Consistent database that supports mapping developments;
- Huge water reservoir, little magnitude of fluxes (locally limited) in the management scale;
- Boundaries determined (including SW perimeter);
- Geometry, recharge and discharge areas recognized;
- Relationship regional – local fluxes understood;
- GW management tools available;
- SAP to be implemented!

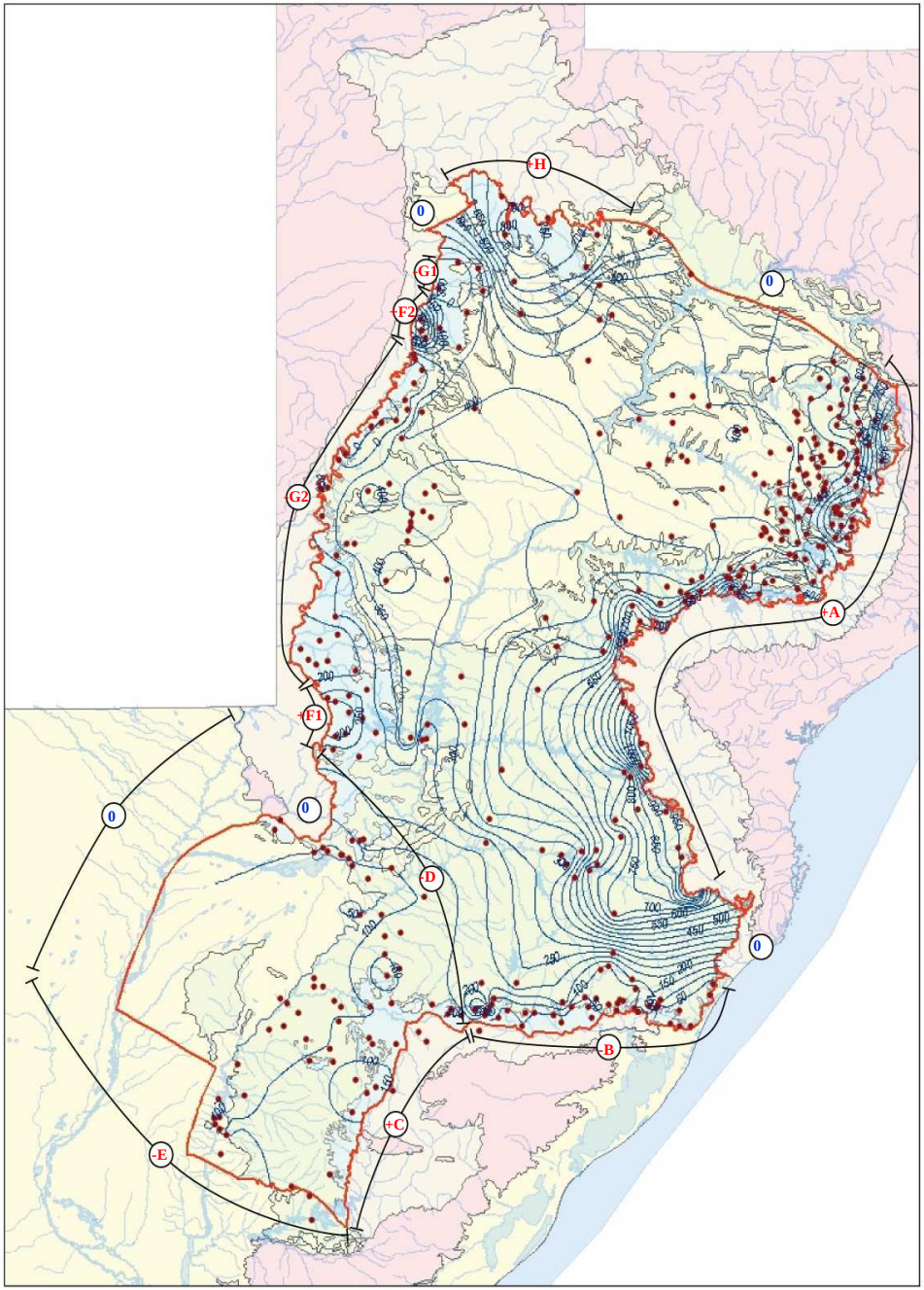
BASES FOR MANAGEMENT, ENVIRONMENTAL PROTECTION, AND SUSTAINABLE USE

Main SAG areas



Water availability

- Static reserves: 29551 km^3 (± 4000) (considering permeable volume as 90%)
- Lowering 400 m: drainable reserves is 2,014 km^3 (± 270) (6%) and only 25 km^3 compressible reserves (confined aquifer)
- Actual exploitation: 1.04 km^3/year (same as recharge)
- Outcrops: 124,650 km^2; Recharge area: 83,500 km^2; Total area: 1,087,879 km^2



Estimate of water that moves in GAS

Area	Q min ($10^3 m^3/d$)	Q max ($10^3 m^3/d$)
A+	342	3078
B -	100	600
C+	19	375
D(-)	45	405
E -	26	30
F +	40	540
G -	420	1440
H +	158	480

Recharge	559	4473
Discharge	-545	-2070
Diference	+134	+2403

General and Local Math Models (4 pilot areas)

Concordia-Salto (Ar-Uy)

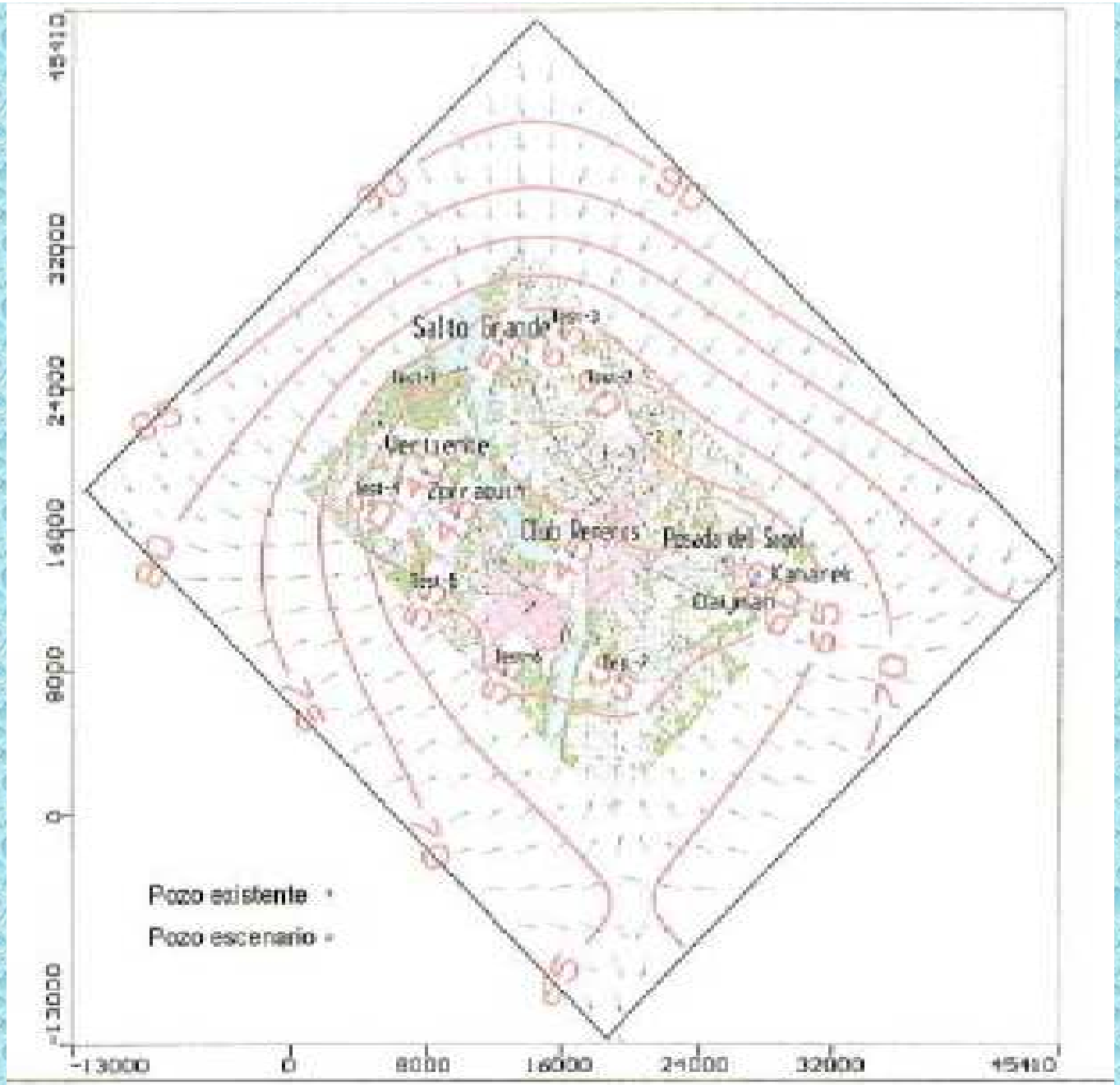
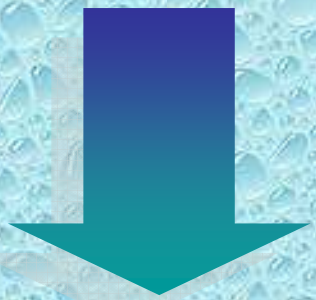


Figura 11 Carga piezométrica – Escenario 2
(Con 7 pozos adicionales)

Focus regional / local

Technical knowledge produced at regional level (no interference + very slow flux velocity) determines



Necessary local management
(build upon existing institutions)

Recent advances at countries' level

Four countries: Water as Public Good;

Argentina: 5/6 provinces rule the use and protection of groundwater;

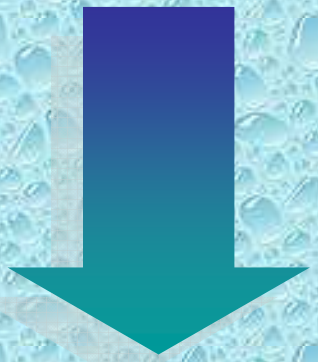
Brazil: in 7/8 states the state policy on water resources present specific norms and two national programs for support and funding;

Paraguay: Water Resources Law under regulation process;

Uruguay: national water plebiscite and regulation proposal with SAG unit.

Amplify local /regional

Local management requires cooperation to build knowledge, develop tools, frames, and above all institutionalization (prerequisite for governance)



Can only been developed from a regional perspective and framework

Recent advances at local-pilot level

Concordia (Ar) – Salto (Uy): minimum distance between wells (2 km-Uy and 10 km-Ar proposal);

Ribeirao Preto (Br): GW restriction/exploitation zones defined to mitigate static level lowering;

Itapua: creation of the Capibary Watershed Committee supported by Pilot Commission;

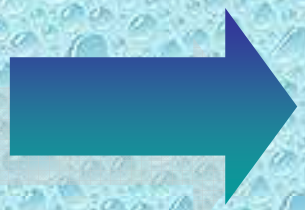
Rivera (Uy) – Santana (Br): students and teachers participation process.

Transboundary Diagnostic Analysis – TDA
Strategic Action Program – SAP

Seed of governance process.

TDA

Agreed and joint needs identification



SAP

Selected priorities to public policy development

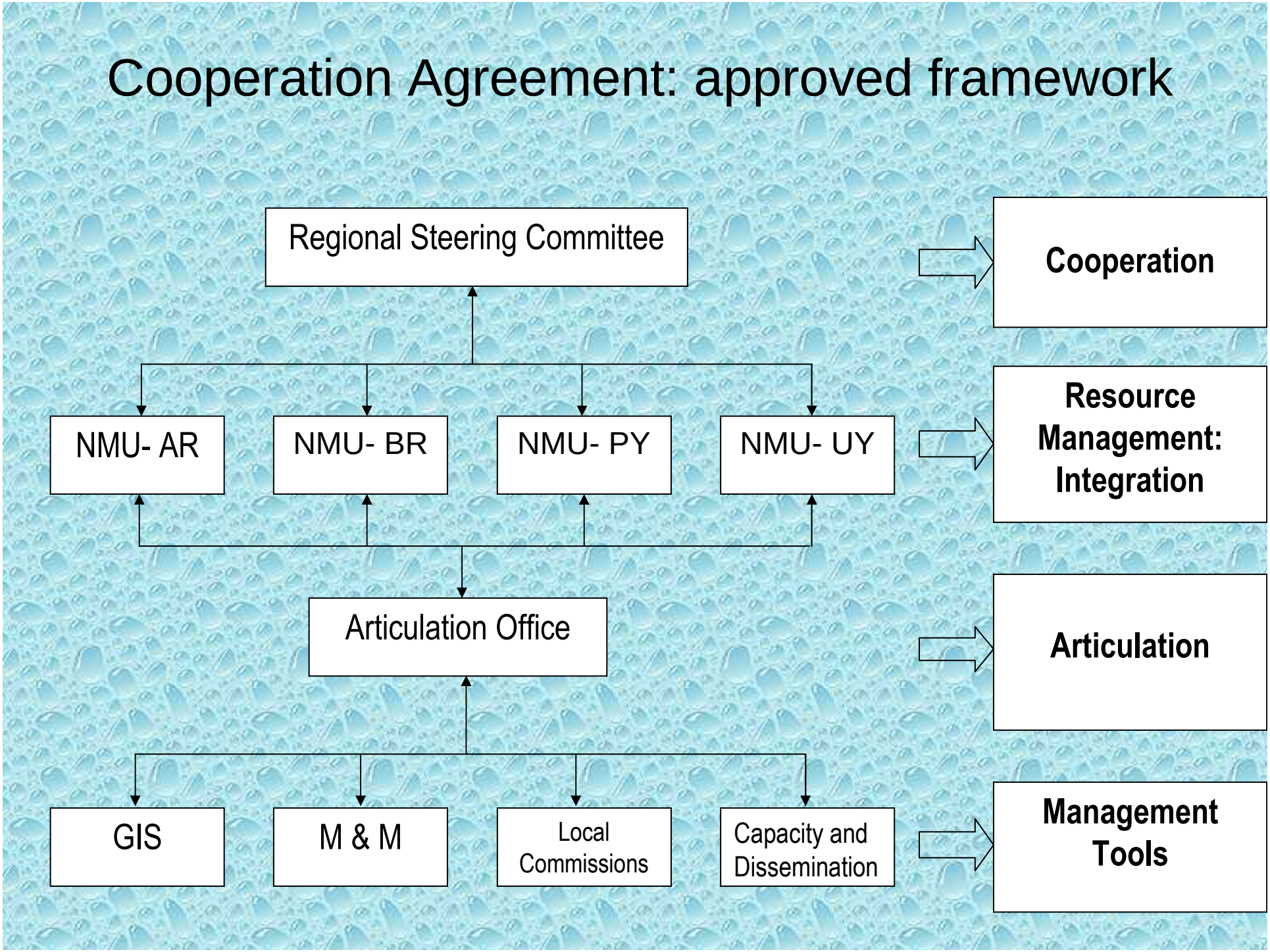
Strong participatory process

Major SAG management tools and the need of continuity

- GAS GIS
- Basic map
- HDB
- Monitoring network
- Numerical modeling
- Local Committees
- Information dissemination

- ✓ Maintenance and up dated
- ✓ Functioning
- ✓ Recognition and support by countries
- ✓ Capacity building

Cooperation Agreement: approved framework



	Argentina	Brazil	Paraguay	Uruguay
GIS	responsible			
M&M		responsible		
Local Committees	Concordia (AR)-Salto (UY)	Ribeirão Preto (BR)	Itapúa (PY)	Rivera (UY)-Santana (BR)
Capacity			responsible	
Headquarter				responsible

National responsible institutions

- Argentina: Subsecretaría de Recursos Hídricos del Ministerio de Planificación Federal, Inversión Pública y Servicios
- Brazil: Secretaria de Recursos Hídricos e Ambiente Urbano do Ministério do Medio Ambiente
- Paraguay: Dirección General de Protección y Conservación de Recursos Hídricos de la Secretaria del Ambiente
- Uruguay: Dirección Nacional de Agua y Saneamiento del Ministerio de Vivienda Ordenamiento Territorial y Medio Ambiente

Agreement: Plata Watershed Treaty (CIC); an SAG specific treaty has being considered

Final comments

- Project catalytic cooperation (regional, national and sub-national)
- Management instruments have being internalized by countries
- Institutional difficulties to start up a new phase supported by the countries
- Local dimension is difficult to achieve but much more sustainable
- SAP implementation support

Thank you for your interest

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