From little things, big things grow

Paul Kelly 1994

Water governance in Chile and Australia: a comparison

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The talk aims to:

1. Outline Chilean water governance and institutional arrangements
2. Compare these with Australia where useful
3. Indicate how the Chilean experience may have influenced Australia's approach to rights and water markets
4. Use the Copiapó Basin to explain how the Chilean system is impacting on water management issues
5. Outline how CSIRO may be able to assist with a project based on our experience

Acknowledgements: AusAID; Chile Ministry of Public Works – Water General Directorate (DGA); Jeff Connor and Alex Gardner (report review)

Chile location map

4,300 km long and average 175 km wide

The longest country in the world north to south

Chile and Australia – a brief comparison

Parameter	Chile	Australia
Area (m km^2)	0.76	7.6
Population (m)	17.40	23.01
GDP per capita (US$)	14,413	65,642
Gini coefficient (%) Larger = less income equality	52.1	30.5

Chile leads Latin American nations in human development, competitiveness, income per capita, globalisation, economic freedom and low perception of corruption

It is the only South American country in the OECD (34 countries)

The Leeuwin Current increases WA rainfall compared with comparable places in Chile and Africa

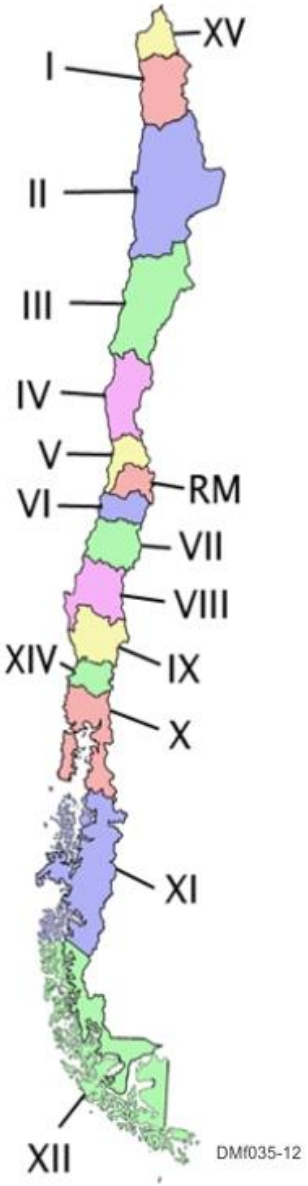
Chile	Rainfall mm/y	Australia	Rainfall mm/y	Africa	Rainfall mm/y
Copiapó 27°22'S	12	Geraldton 28°47'S	460	Alexander Bay 28°35'S	46
La Serena 29°54'S	96	Lancelin 31°01'S	599	Lambert Bay 31°40'S	140
Canela 31°24'S	170	Perth 31°96'S	868	Elands Bay 32°18'S	170
Valparaiso 33°03'S	462	Bunbury 33°33'S	871	Cape Town 33°55'S	515

Regional framework for Chile

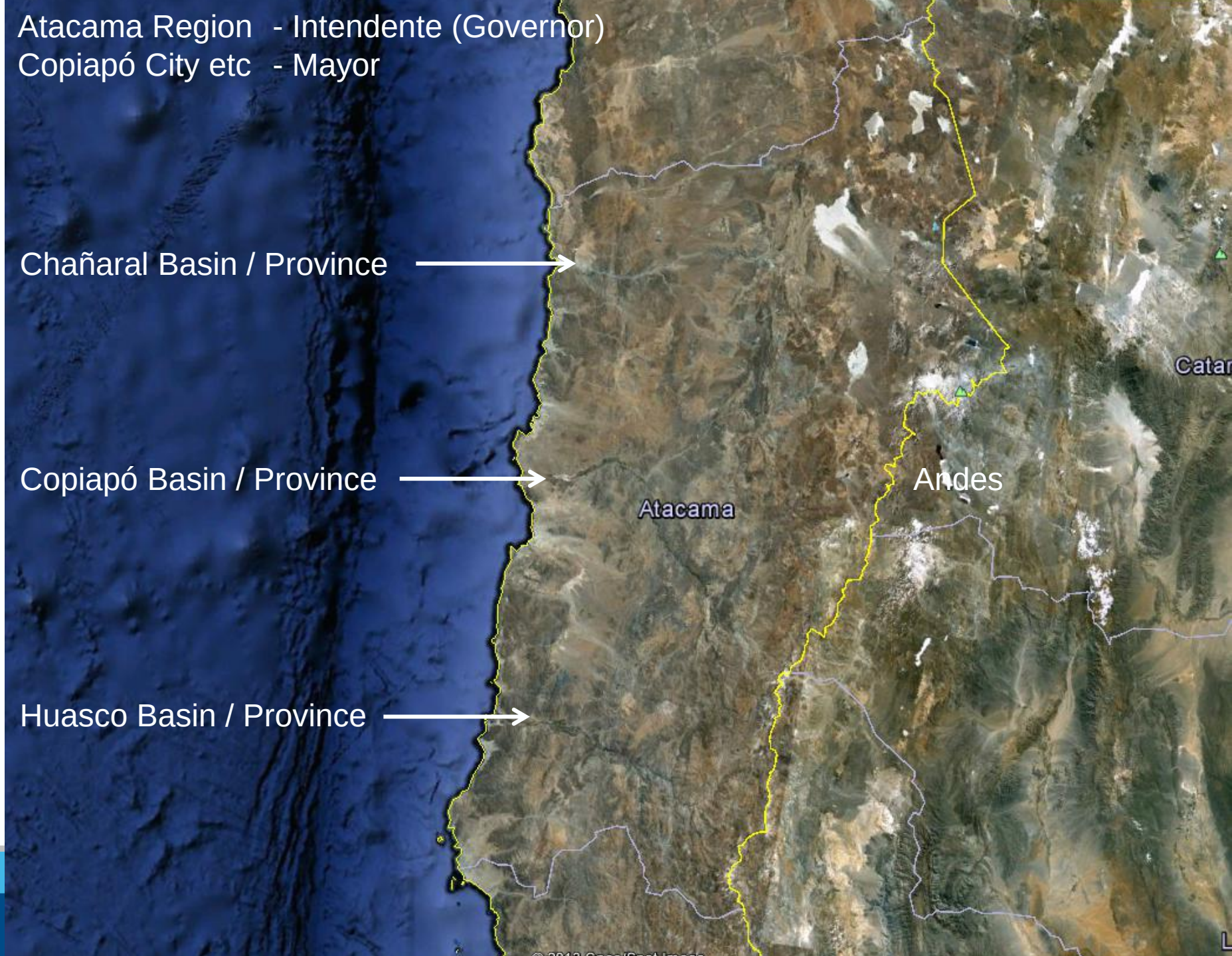
Atacama is Region III

RM is the Metropolitan Region around Santiago

National (centralised) management and appointment of leaders to the regional and government department level



I	Tarapacá
II	Antofagasta
III	Atacama
IV	Coquimbo
V	Valparaíso
VI	Liberator General Bernardo O'Higgins
VII	Maule
VIII	Bío Bío
IX	La Araucanía
X	Los Lagos
XI	Aysén of General Carlos Ibáñez del Campo
XII	Magallanes and Chilean Antarctica
XIV	Los Ríos
XV	Arica and Parinacota


Atacama Region - Intendente (Governor)
Copiapó City etc - Mayor
Chañaral Basin / Province
Copiapó Basin / Province
Huasco Basin / Province
Atacama
Andes

Some important dates with regards to land and water rights

1964 – 1970 Eduardo Frei, 28th President of Chile

1970 – 1973 Salvador Allende, 29th President

1973 – 1990 General Augusto Pinochet, 30th President

1980 New Chilean Constitution

1981 Water Code based on this Constitution

2005 Water Code reform (started in 1992)

Chilean Constitution (1980) and Water Code (1981)

Under the 1981 Water Code, water rights are:

i. private property

ii. separate from land

iii. can be freely traded

iv. subject to minimal state regulation, and

v. regulated by civil law

Some amendments were made to the Code in 2005 but the emphasis on private rights and restrictions on government's role is embedded in the Chilean constitution making them hard to change

The focus of water issues in 1980 and 1981 was surface water irrigators (the main water users at that time). The rights of others users (towns, mines) and groundwater users are less well supported

Australia and WA in comparison (1)

1. ‘Water’ management powers were retained by the states in the Constitution

   Section 100 Commonwealth of Australia Constitution Act

   The Commonwealth shall not, by any law or regulation of trade or commerce, abridge the right of a State or of the residents therein to the reasonable use of the ***waters of rivers for conservation or irrigation***

2. Early national intervention revolved around river navigation, large infrastructure projects (Snowy River diversion) and managing salinity (Murray Darling Basin)

3. In 1980/81 WA still had a separate water supply bodies in the country (Public Works Department) and metropolitan areas (Metropolitan Water Supply Sewerage and Drainage Board).

4. The MWSSDB became the Metropolitan Water Authority in 1982

5. The PWD and MWA combined to become the Water Authority of WA in 1985

   Conflicts of interest in water management and use were handled through:

   – Water Resource Allocation Committee within WAWA
   – WA Water Resources Council

Australia and WA in comparison (2)

6. 1994 CoAG agreement to separate water management and water supply roles resulted in the formation in 1996 of:
   - Water Corporation - Government Trading Enterprise for water service provision
   - Water and Rivers Commission - water manager and licensee
   - Office of Water Regulation - to license and regulate water service providers. Since merged to become the Economic Regulation Authority
7. The National Water Initiative (2004; WA in 2006) placed an emphasis on greater national compatibility in the way Australia measures, plans for, prices, and trades water, and a greater level of cooperation between governments
8. From the above timeline it is evident that some of our water reforms post-date the Chilean approach by 15 to 25 years

Background and strengths of the Chilean system (several sources)

- The Water Code strengthened private water rights , devolved decision making to irrigation groups and restricted the ability of government to intervene
- Water rights systems were influenced by the Chicago School of Economics which emphasised small government and letting the market decide
- The system has been promoted by the World Bank as being superior to heavy government intervention - economic inefficiency, corruption and cronyism
- The use of private markets has been successful where there is competition for water and a method exists to transfer water from seller to buyer
- The existence of rights and a system for reallocation has negated the need for an alternative system
- The overall approach has influenced the definition of water rights and water trading in Australia, USA etc

Perceived weaknesses (1) are:

- Basin-wide management of all water users is discouraged by vesting most power in Vigilance (Basin) and Canal (Local) surface water irrigation groups
- Coordination of multiple water demands and supply options is difficult because of this emphasis on surface water irrigators
- Emphasis on individual rights can make it hard to coordinate within user groups
- Basin management systems almost completely absent or fail due to a lack of trust and 'social capital'

- Emphasis on **economic** efficiency to the exclusion of social, environmental and governance aspects
- Social equity – limited power of small farmers and indigenous groups
- Environmental protection - only considered for new water rights issued after 2005
- Water quality is poorly protected except for point source polluters

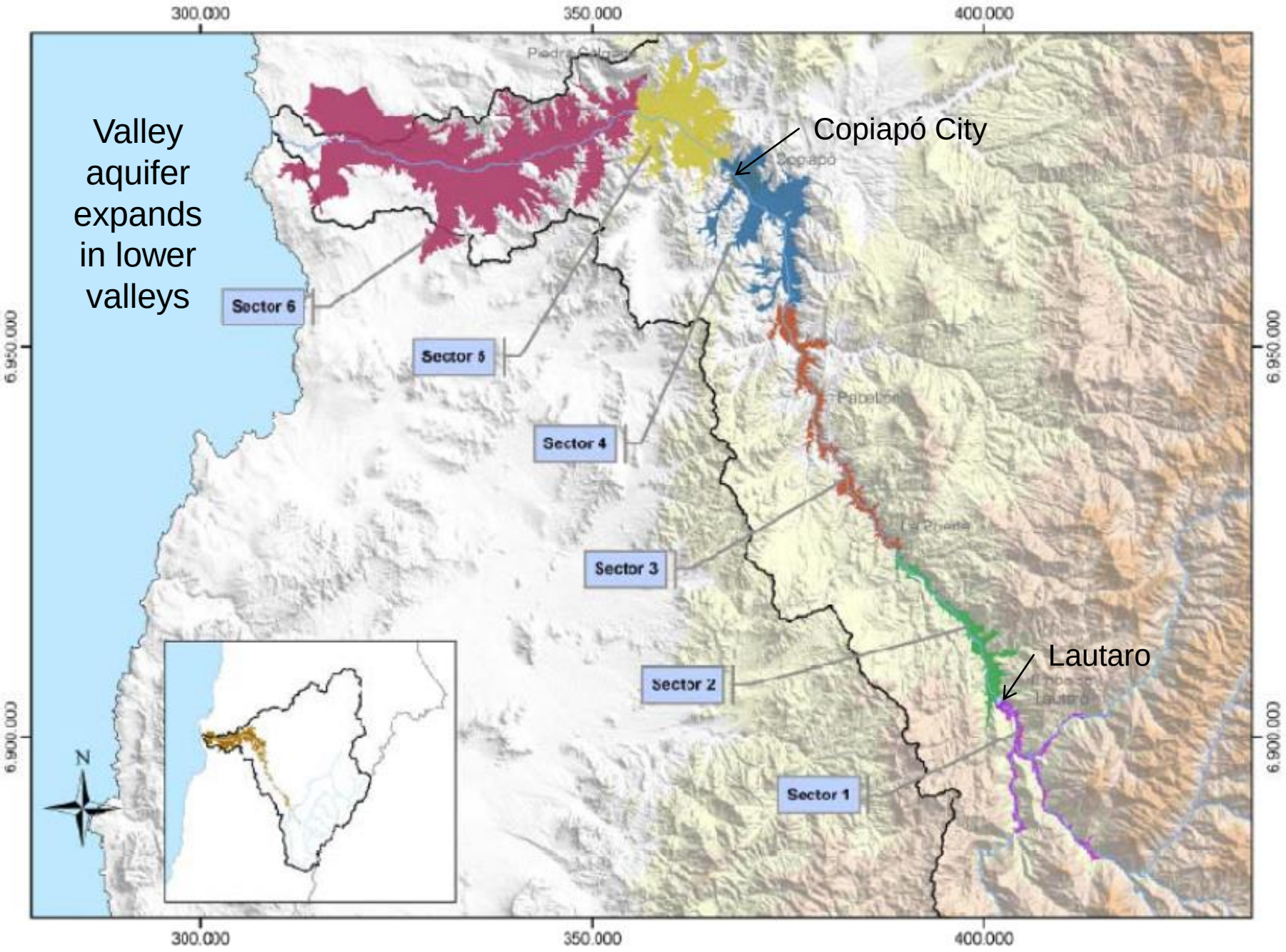
- Resolution of water conflicts by legal means is slow, expensive and absolute
- No cost of holding consumptive use rights encourages hoarding and speculation

Perceived weaknesses (2) are:

- Government's role is restricted to data collection and studies, enforcing user association rules, issuing rights within a specified time, keeping registers etc.
- If the government reduces access it is only under short-term emergency rules and all users must be treated equally

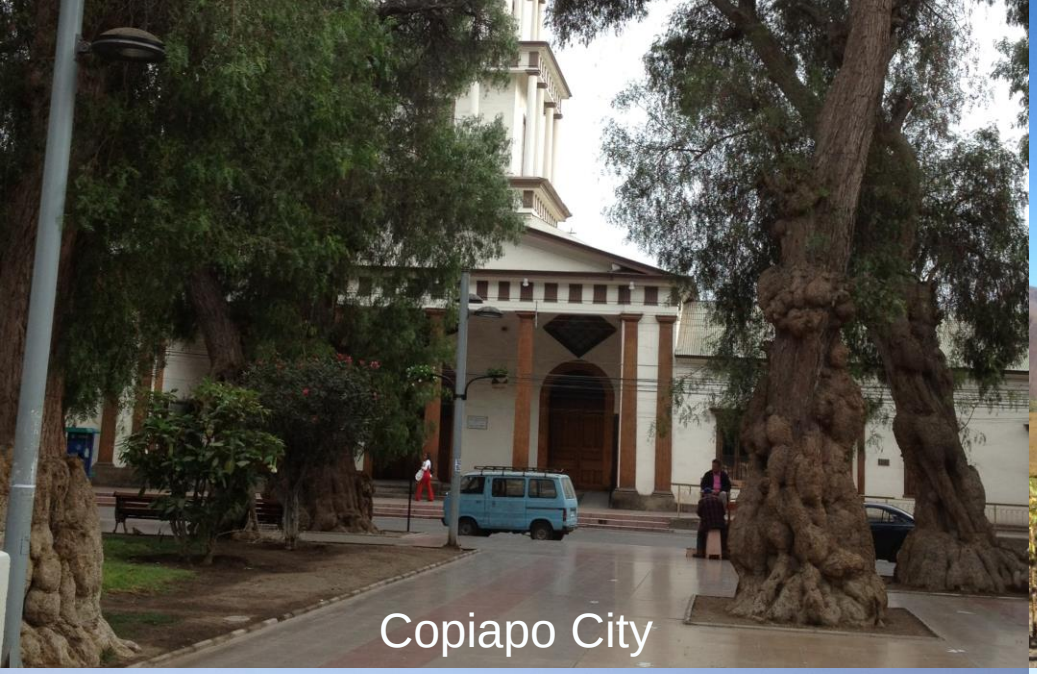
- Few trades, gridlock and lower infrastructure investment than expected
- High transaction costs for trading → 'swaps' instead of permanent sales
- Uncertainty of who holds water rights – no common registry, trades made by real estate agents, high cost of registering rights, passing of rights between generations is complex , relinquished rights may still be used, whether the right can be used is unclear ('wet' and 'paper' water)

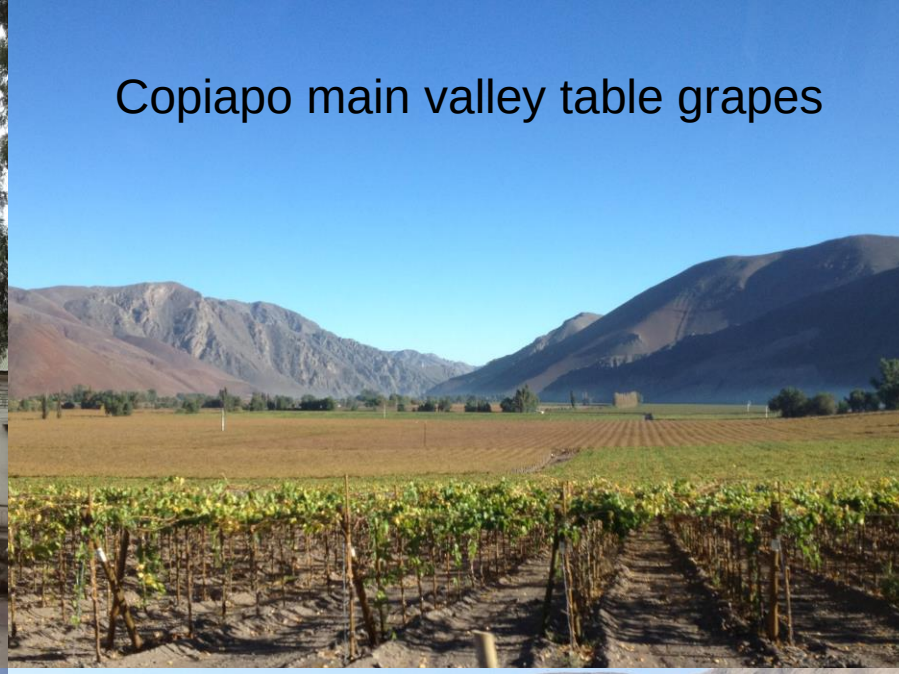
- Groundwater and surface water can't be jointly managed -> diversion of recharge and overuse of aquifers – see Copiapó example



Source: DGA (2010)

Flow in the Upper Copiapó River supports an export table grape industry, olives, vegetables, copper mines and *ca*. 170,000 people


Copiapo City

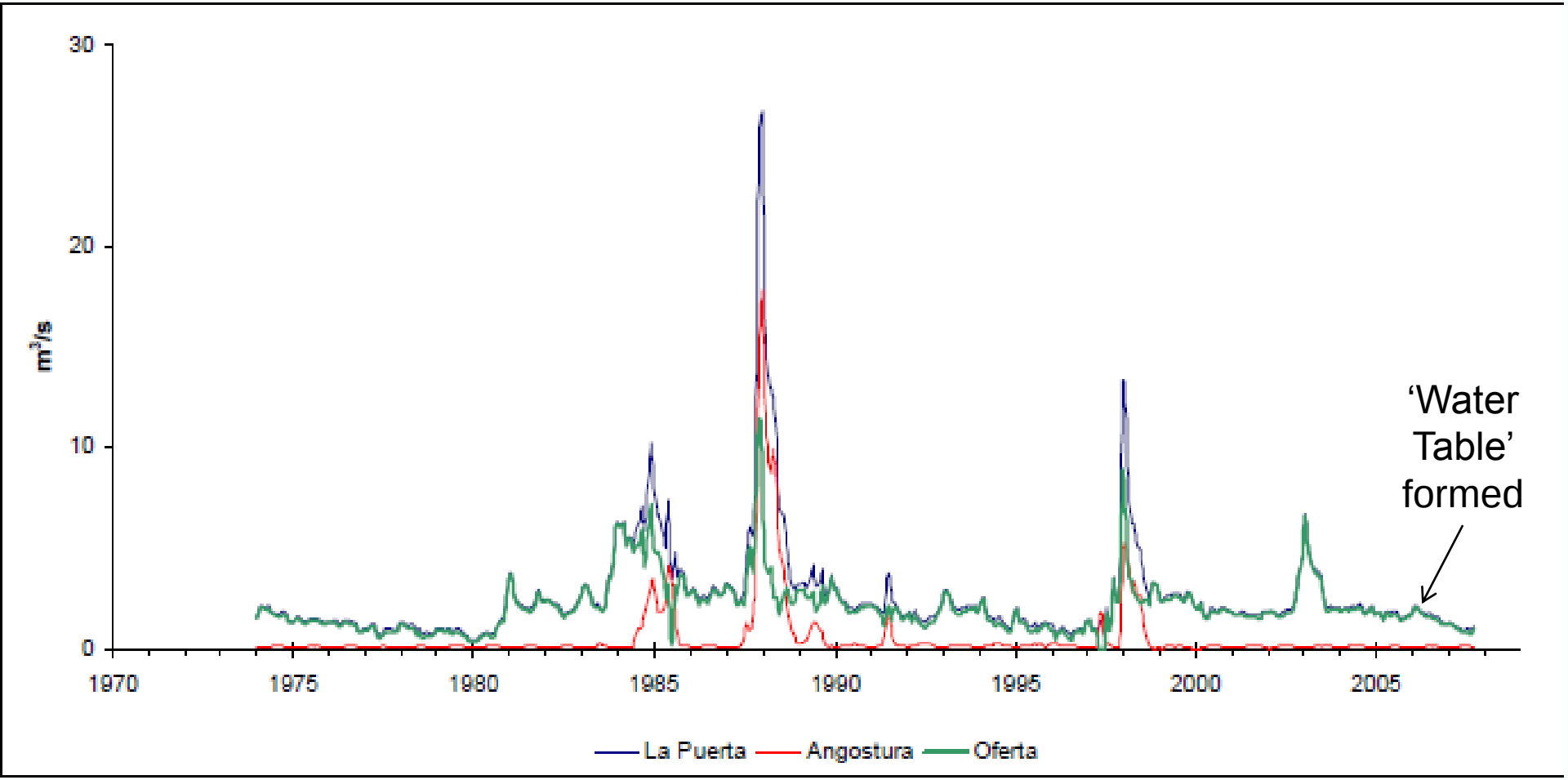

Copiapo main valley table grapes


Copiapo side valley table grapes


Candelaria copper mine

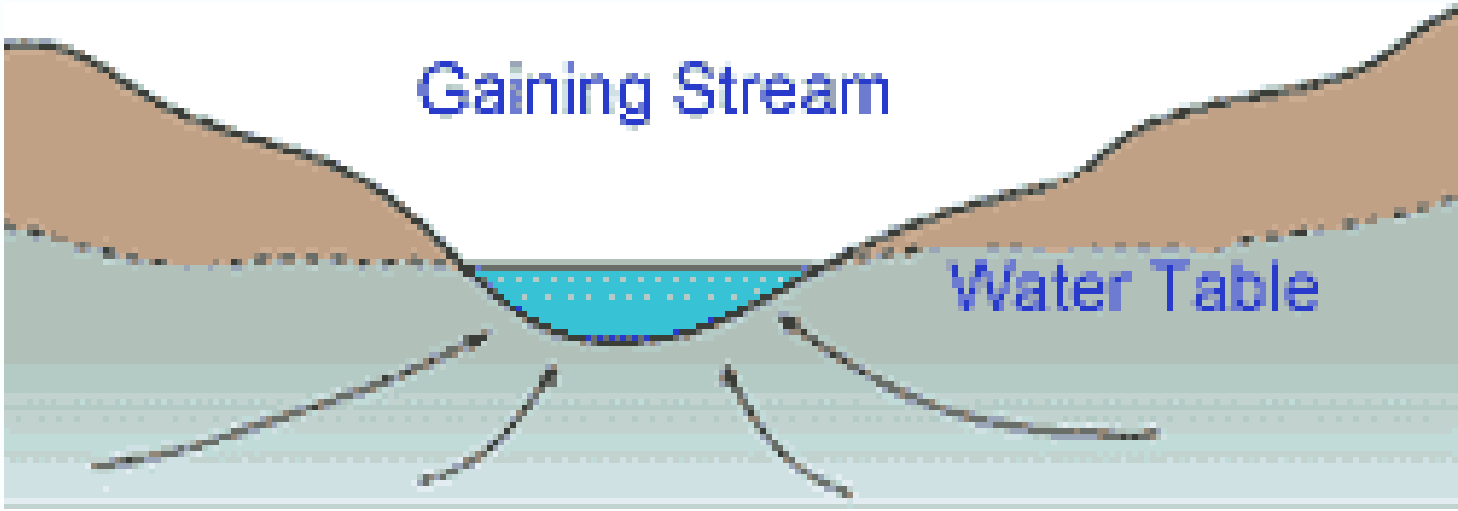
Upper - middle river flows (blue, green) and outlet flows (red)
River has ceased to flow to the ocean since 1998 (or 1988)
No flow because of less precipitation + more diversions = no lower recharge

Source: DGA (2010)

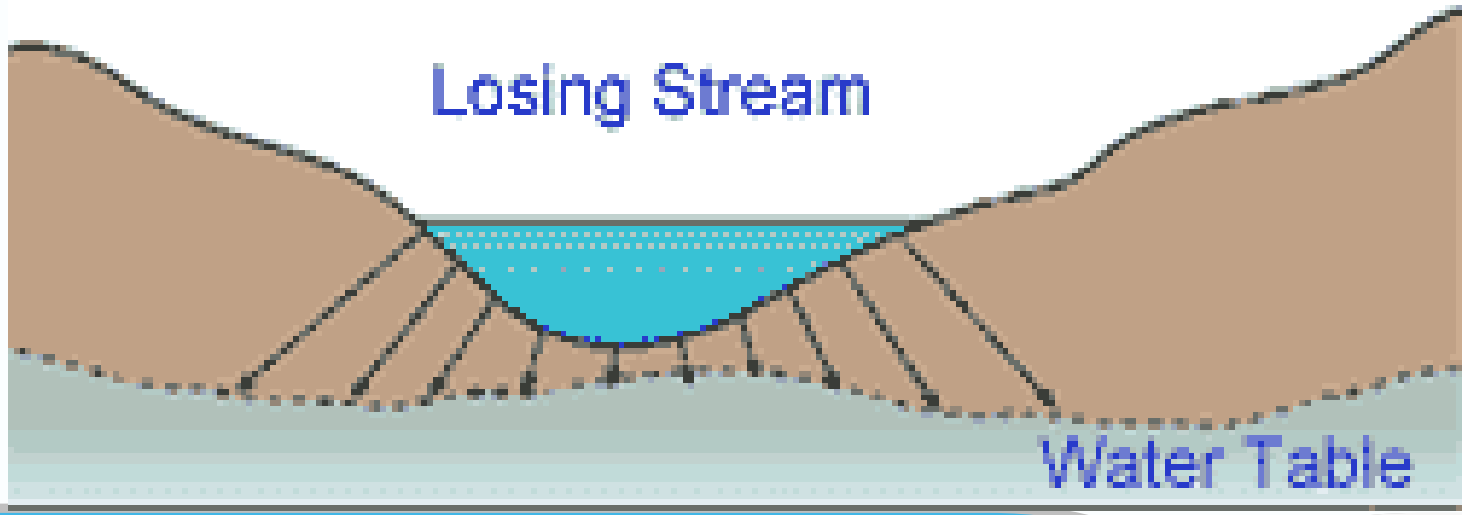


Stream and groundwater interactions in Copiapó

Above
La Puerta



Sectors
4, 5 and 6



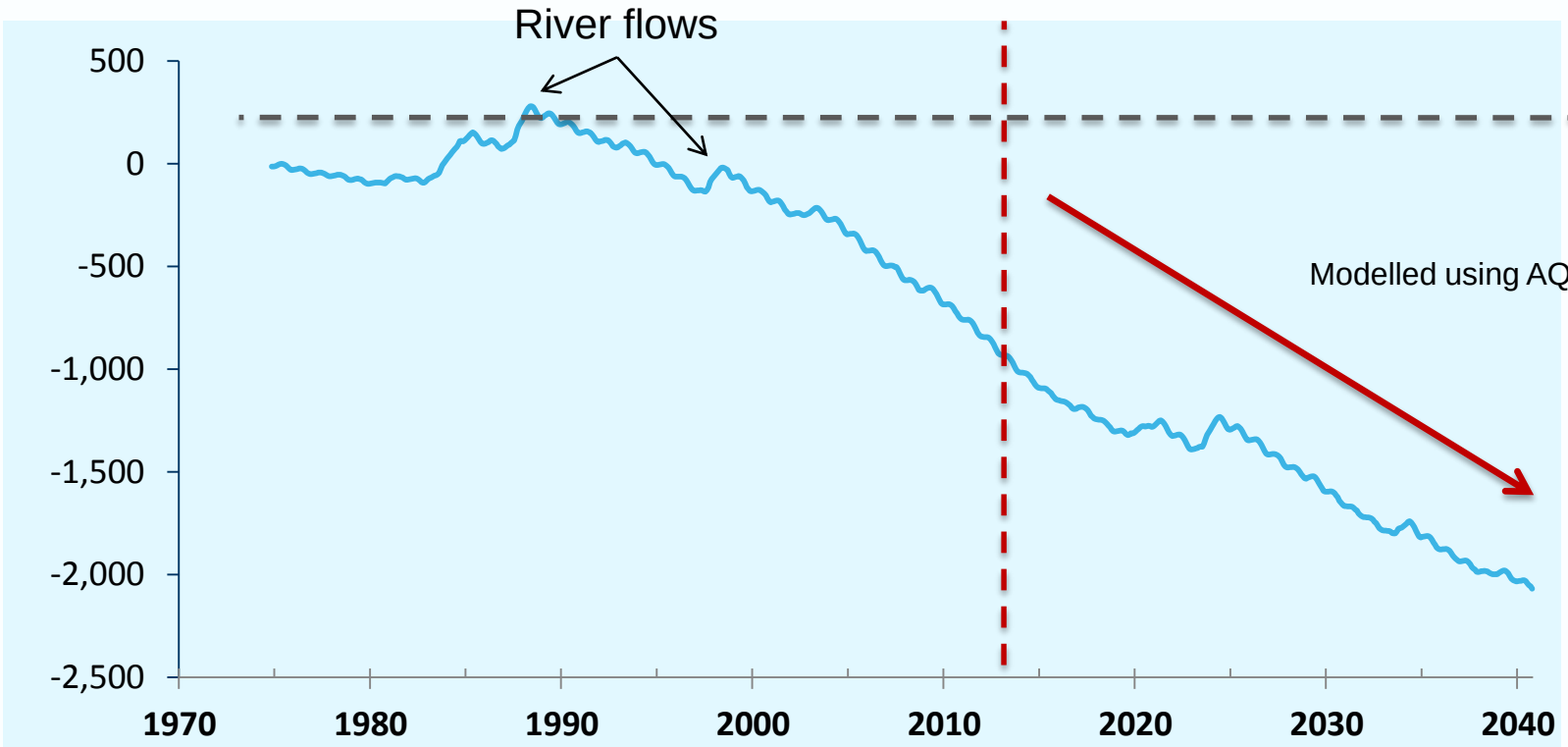
Lower Copiapó River is diverted into a concrete-lined channel in Sector 4 to prevent ‘leakage’ (= recharge)

Aquifer storage change since 1975 in Sectors 3 to 6

Average reduction of about 50 GL/y is equivalent to twice drinking water consumption

Source: GDA(2012)

AQUIFER VOLUME LOSS BETWEEN LA PUERTA AND ANGOSTURA (GL)
ACTUAL UNTIL 2011 PROJECTED TO 2041

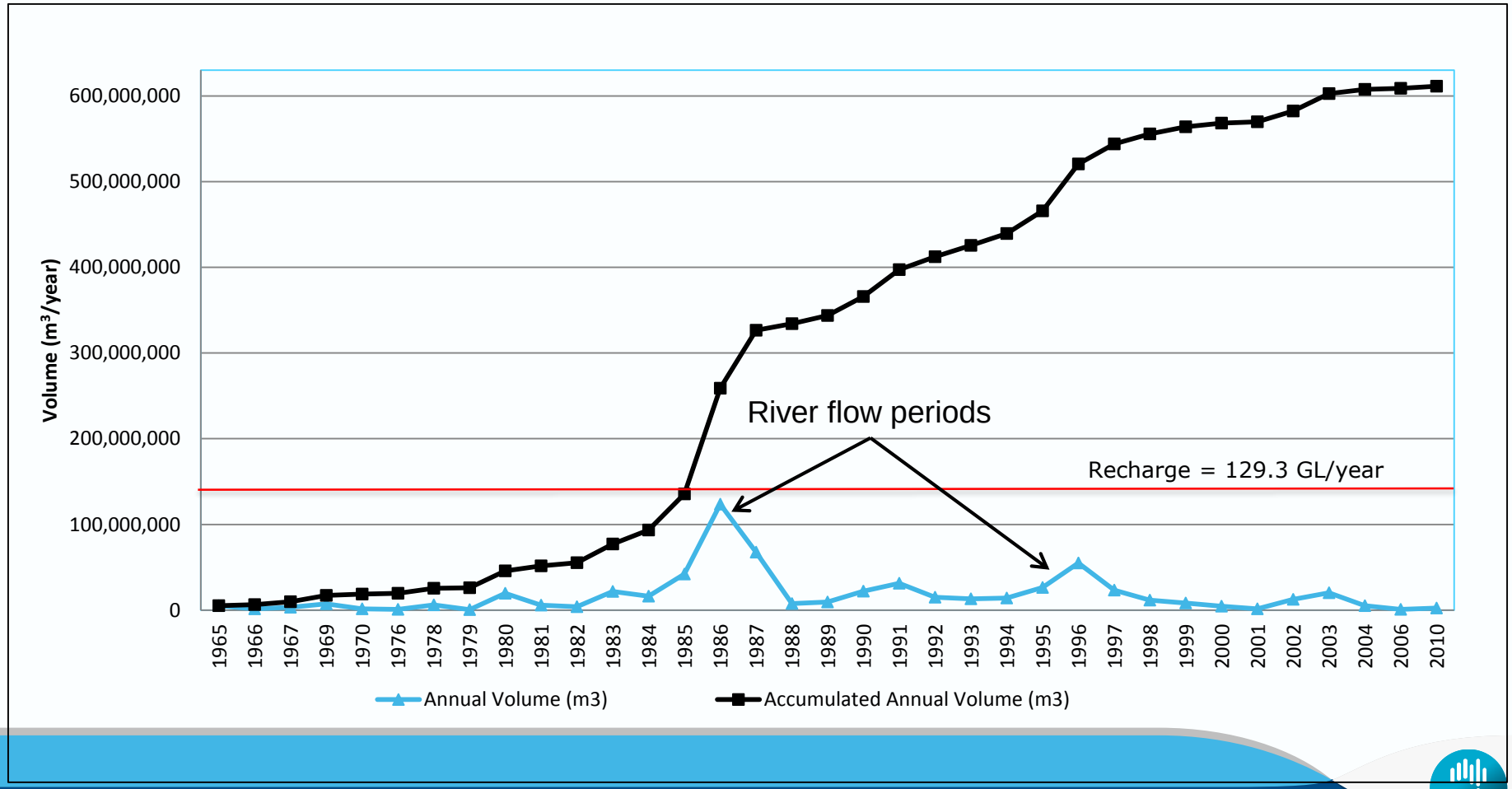


* Rate of decline is volumetrically similar to the Gnangara Superficial Aquifer

Constitutional water rights allocated per year – annually and cumulative

Source: DGA 2012

- Alamos y Peralta (1987) indicated that there was still groundwater available; levels were stable or rising
- Surveys indicated that agriculturalist were not using all of their rights
- Return irrigation flows were issued as new rights
- There is a legal requirement for the DGA to issue rights in a timely manner if water is available
- Agriculturalists started swapping their 'unused' water with miners when this was profitable



Total demand and supply in Copiapó Basin

Source: DGA May 2012

Total inflows: *ca*: 120 - 130 GL/y; Rights = 600 GL/y OVERALLOCATED

Demands*

• Agriculture	142 GL/y	71%
• Mining	45 GL/y	22%
• Drinking water	13 GL/y	6%
• Other	2 GL/y	1%
• TOTAL	202 GL/y	100%

OVERUSED

Potential annual deficit: *ca*. 70 - 80 GL/y

Aquifer storage loss: *ca*: 50 GL/y

- Rights are not all used due to:
  - lack of water
  - poor water quality
  - some users hold rights for water security purposes

Unused rights are helping to stop even worse over-use. Supply reliability is not usually reported

Coordination of water supplies and demands

- A basin ‘Vigilance Group’ has powers over water distribution but confines its interests to surface water irrigators in Sectors 1 to 4
- A groundwater irrigator group (CASUB) managers irrigators in Sectors 5 and 6
- Despite the need for river flows to recharge lower aquifers, the Vigilance Group and CASUB do not meet to discuss water sharing
- There may be illegal water diversions in the upper Sectors but there are no means to investigate. All rights are not equal, it depends on your industry and closeness to the water source
- A public-private ‘Water Negotiation Table’ met between 2007 and 2010 after the Lautaro Reservoir effectively emptied.
- There is no federal or regional government body with the authority and funds to resolve conflicts

How water and natural resource management issues are managed with Copiapó and the Murray Darling Basin as comparisons

Scale / Issue	Chile	Australia
National	**Dirección General de Aguas (DGA)** – national management role in water but powers are limited	**Department of Sustainability, Environment, Water, Population and Communities (SEWPaC)** – national coordination and funding role National Water Commission provided research and policy advice especially on implementation of the national water reform policy. Now the OWS
State / Region	**Atacama region** – limited role in water management	**State water departments** – major water planning and management roles
Basin – water allocation planning and mgt	**Vigilance Committee** coordinates irrigation water use in the upper basin. **CASUB** in the lower basin	**Murray Darling Basin Authority** (chaired by Australian Government) coordinates overall river operation and irrigation systems
Basin – natural resource management	No group	**Catchment Management Authorities / Boards** often with sub-regional, catchment or landcare groups
Irrigation district	**Canal groups**	**Irrigation cooperatives**
Water service provision to towns	Privatised water service providers, some like **Aguas Chañar** are still quasi-national government bodies	**Government trading enterprises** attached to state or local government with many services contracted out to the private sector

Other comparisons with Australia

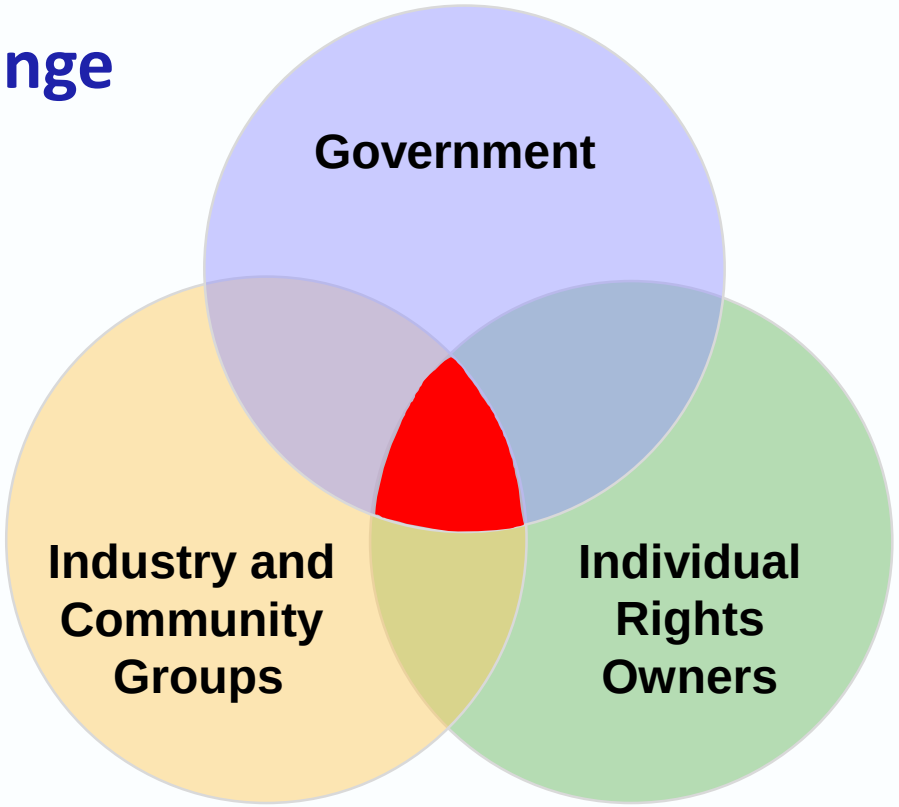
1. The importance of surface water – groundwater interactions is becoming better accepted in planning and licensing
2. Increased water efficiency measures has resulted in less water to allocate and contributed to over-used systems. Licensing systems did not respond quickly
3. The desire to have water resources used and not horded has resulted in policies that make it more costly to hold water entitlements through water resource management charges
4. Systems would fail in both countries if all water right were used. Getting overallocated and overused systems back into balance under a changing climate is very difficult
5. Some user groups have had privileged water access for historical reasons and later users are often forced to use expensive new sources rather than affect industries such as irrigated farming

Terms of Reference for change

Social Terms
- A participatory system
- A shared vision
- Building stakeholder capacity
- Demographic trend analysis
- Cultural and heritage assessment

Water Terms
- A water information system
- Basin hydrogeological understanding
- Alternative water sources

Industry Terms
- Agricultural trends analysis
- Mining trends analysis
- Urban water use management
- Synergistic water use options



Governance Terms
- Governance improvement
- Review of water allocation and trading mechanisms
- Integrated Basin Management Plan

Conclusions

1. For historical reasons, Chile has a strongly privatised system but there are moves to strengthen government's abilities in basin management, to manage conflicts and to consider the environment
2. Australia is increasing the role of the private sector and markets in water management although progress has been slow
3. Both seem to be seeking a 'sweet spot' of private – public participation from different starting positions
4. There is a strong centralised approach to governance in Chile that may be a feature of Chile's Spanish heritage
5. In Australia there has been a shift towards more centralised control at the national level which has resulted from the need for uniform systems and reflects the stronger taxing powers of the central govt
6. At the state level, the move to establish Water Resource Management Committees with some delegated planning powers has started

Project reports

1. McFarlane, D. and Norgate, T. (2012). Summary report on Copiapó water yields and demands. Report to AusAID and Chilean stakeholders from the Minerals Down Under Flagship, CSIRO. 54pp **= 2012 SEMINAR**

2. McFarlane, D., Trefry, M., Moffat, K. and Lacey, J. (2012). Summary report on the current water rights framework in Chile. Report to AusAID and Chilean stakeholders from the Minerals Down Under Flagship, CSIRO 28pp **= THIS SEMINAR**

3. Moffat, K. and Lacey, J. (2012). Summary report on stakeholder perspectives on Copiapó water management issues. Report to AusAID as part of the study: 'Copiapó River Basin – Analysis study of shortfalls in water rights, industrial usage and social requirements' from the Minerals Down Under Flagship, CSIRO.

4. Trefry, M., Keyworth, S., Littleboy, A. and Jupp, P. (2013). Copiapó River Basin Water Management: Terms of Reference for Future Governance and Research Activities. Report to AusAID and Chilean stakeholders from the Minerals Down Under Flagship, CSIRO

Thank you

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