

From little things,
big things grow

Paul Kelly 1994



Photo: Don McFarlane, 2 June 2012

Balancing Competing Demands from Industry in Copiapó Basin

A proposal for an integrated management approach

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Copiapó Basin Water Rights Scoping Study

Objectives

1. To summarize water use and stakeholder perspectives in the Copiapó Basin; and
2. To develop the terms of reference for a larger study into water management

Limitations

1. May – November 2012
2. No new data or detailed analyses – many excellent studies already
3. Language and units - including in these slides!

This talk touches on:

1. Basin hydrology
2. Industrial water use
3. Water rights governance framework
4. Stakeholder perspectives
5. Draft Terms of Reference

Project Process

Review

- Literature Review
- Visit and Engagement with key stakeholders in Chile
- Interviews

Analysis

- Development of draft findings
- Consideration of challenges, gaps and shortfalls
- Development of options

Validation

- Return Visit to Chile
- Dialogue and presentation with key stakeholders

Considerations of options for future change

Basin Hydrology

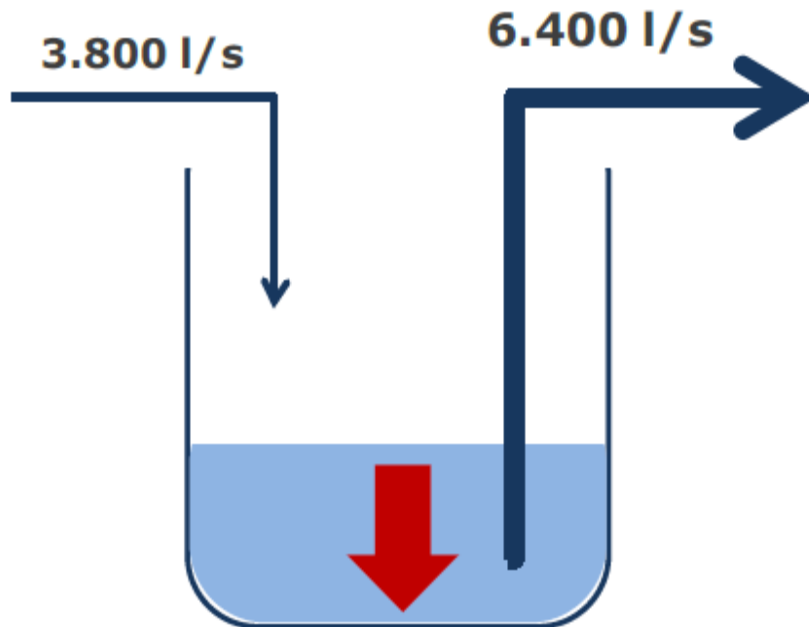
DGA (March 2012) estimate of imbalance

Rights issues exceed 19.000 l/s

Storage losses are 2.600 l/s

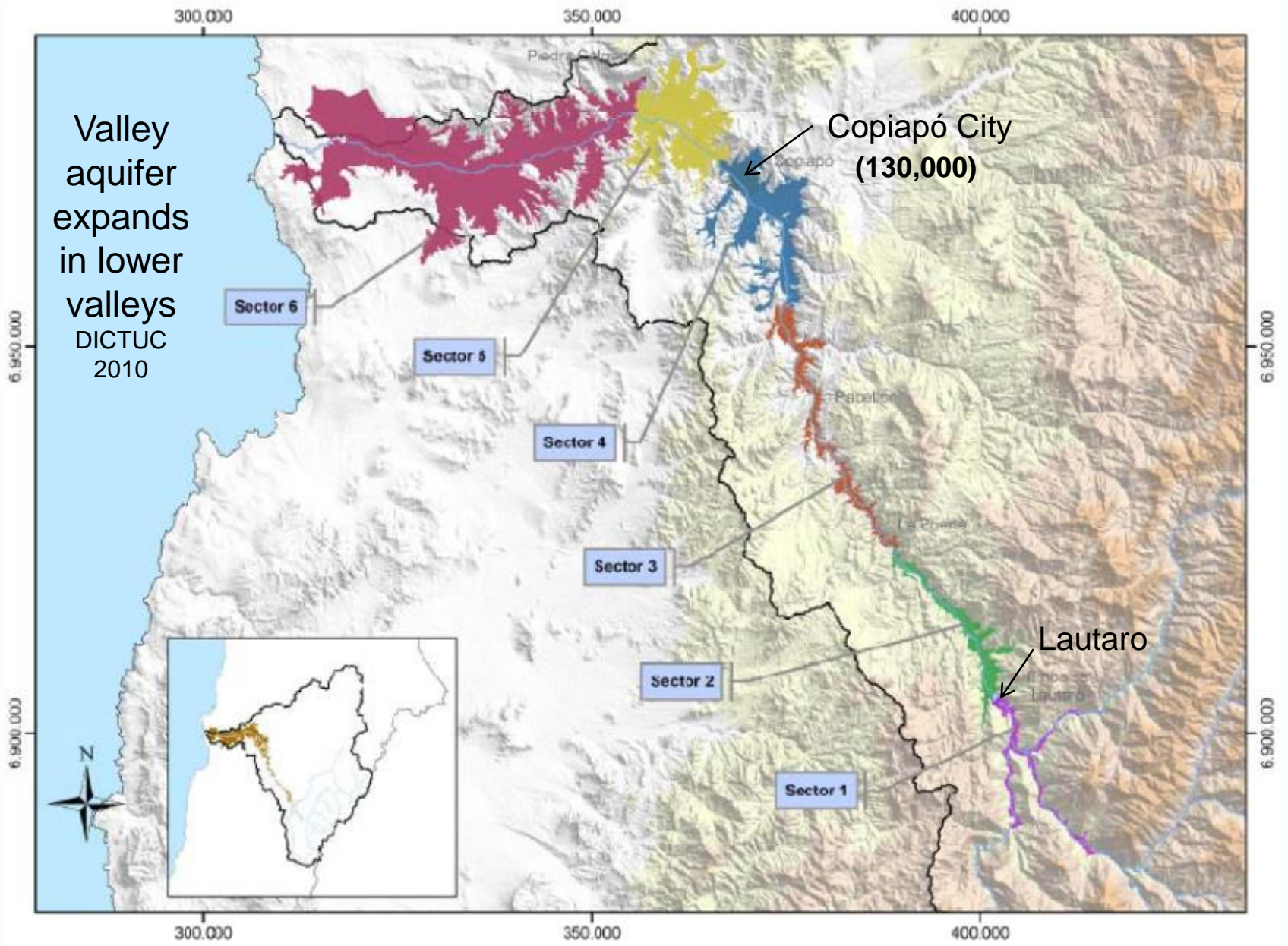
Most water rights are not used because of:

- 1) lack of water,
- 2) high cost of extraction,
- 3) poor quality
- 4) need for water supply security,
- 5) speculation ?

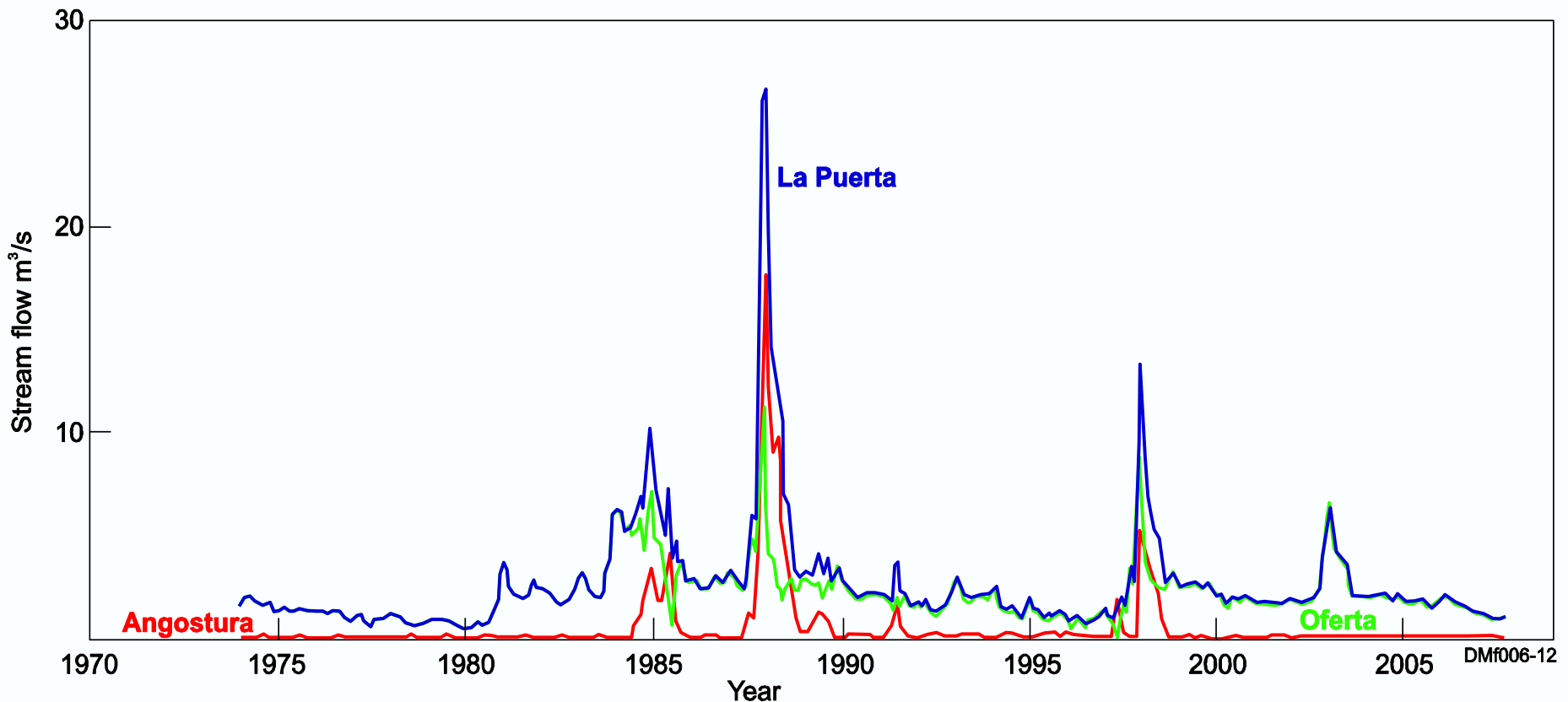


- **Agricultura:** 4.500 l/s → **71%**
- **Minería:** 1.430 l/s → **22%**
- **Consumo humano:** 400 l/s → **6%**
- **Otros:** 70 l/s → **1%**

Useful, but the Copiapó Basin is not a bucket

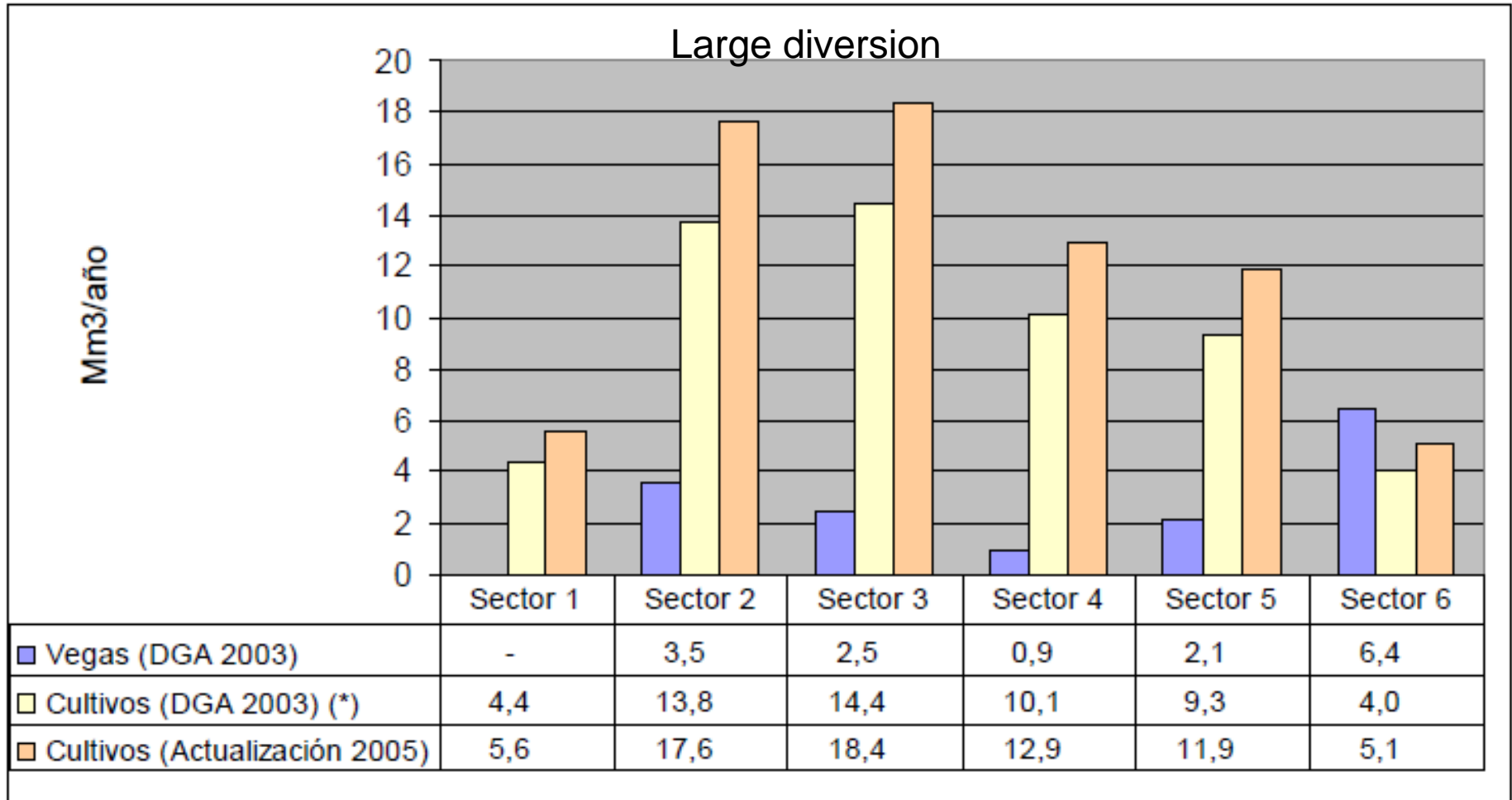


Streamflow hasn't reached Angostura since 1998 (14 years) Last major recharge of Basins 5 and 6 was in 1988 (24 years)



Why has there been a run of years drier than normal ? El Niño or climate change ?
If we get a wet year, will the basin produce as much streamflow ?
Will small and medium streamflows reach Sectors 5 and 6 ?

Evaporation by natural vegetation in the valleys is very small compared with agriculture Golder Associates 2006



Industrial Water Use

Agriculture

1. **Export table grapes** - mainly Sectors 1, 2 and 3

- Very professional and efficient businesses
- Extraordinary achievement in this dry climate
- Threats - water, labour, costs, energy, competitors (Peru), root zone salt
- Control water distribution in Basin through Vigilance Group

2. **Other crops** – olives, pomegranates, vegetables - mainly Sectors 5, 6

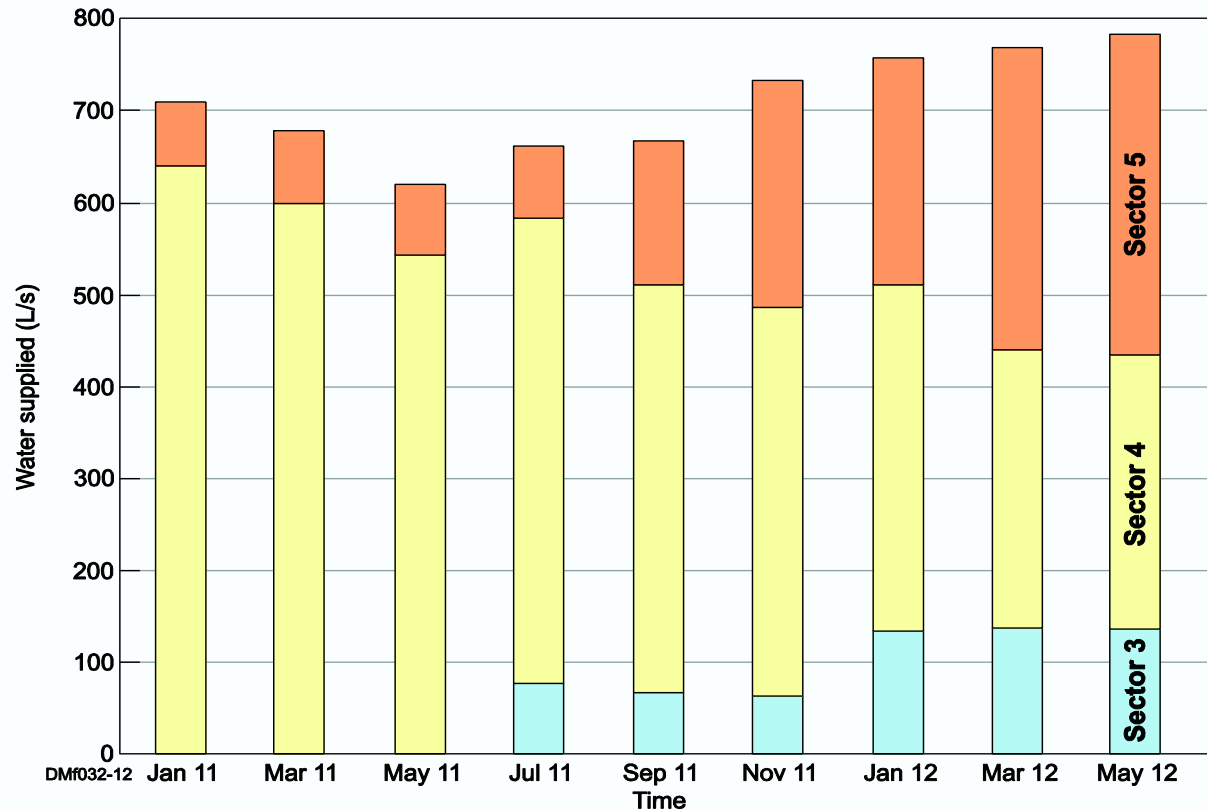
- Often smaller, mixed profitability and water use efficiencies, aging growers
- Groundwater quality getting worse, competition with domestic use
- Major increases in pumping costs, soil toxicity.
- CASUB a unique body within Chile

Mining

- Mainly Cu, with Au, Mo and some base metals
- Saw the water shortage coming and invested in reuse, desalination, increased efficiency
- It is possible that the new mines are world's best practice in terms of water efficiency
- Future decline in ore grades may increase water use
- Workforce is increasing domestic water demand and wage costs
- Is under-using and relinquishing/lending its water rights
- High elevation mines cannot afford desalination of seawater
- Saltwater use possible for some processes

Town water supplies and wastewater

1. Bores dry or of poor quality forcing a move from Sector 4 to 3 and 5 - not a long term solution without fresh recharge
2. Move to desalination to improve supplies, reliability and quality through mixing has been proposed
3. Impact of desalinated water on tariffs
4. Demand growth
5. Wastewater options



Water Rights Governance

Water rights and governance

1. Chile has very strong private ownership rights in water with a lesser role of government and a reliance on the courts to adjudicate disputes
2. This has empowered users and meant that the government hasn't had to build alternative methods and bodies
3. The process is slow, costly and can favour the individual over the group
4. A whole-of-Basin management group could potentially:
 - Consider all water users and locations in the Basin (upper, lower)
 - Plan for the longer term – including climate change
 - Raise awareness, understanding
 - Help identify causes – climate, pumping, stealing etc. Attribution issues are a major cause of conflict and waste

Comments

1. Copiapó Basin water users can be proud of what they have built on such a limited resource
2. The system would still be over-allocated and over-used, even if the climate had been wetter in the past 14 -24 years
3. Without major reductions in use and/or major new supplies the system will fail
4. The Basin could become a role models and economic driver for Chile if its water use problems
5. The 'do nothing different' option is not appealing

Stakeholder Perspectives

Stakeholder perspectives

The Project Team conducted semi-structured interviews and discussions with more than 100 stakeholders in Santiago and Copiapó City, including:

- Government ministries and departments
- mining industry
- agriculture industry (large and small producers)
- other industries (e.g. construction)
- water user groups
- community members
- Colla
- NGOs
- water utilities (Santiago and Copiapó City)
- universities



What we heard - The nature of the basin

1. Growth and strain
 - Community, then grapes, then mining
2. Problem attribution: "Dressing a saint by taking the clothes of another saint"
 - " we all blame each other"
3. "Looking for their own solution"
 - Agriculture: drip feed irrigation
 - Mining: desalination
 - Lower irrigators: Water Bank
 - Some community groups:
 - Centralised resource management
 - Utility: more bores



CSIRO, 2012

What we heard - Barriers to change

1. Knowledge and values around water

- Technical integration and trust in data
- Consumption

2. Legislation

- Frustration
- Limits to government power/role

3. Capacity to collaborate

- Variable
- Water Table

4. Power differences

- Different experiences
- Different solutions



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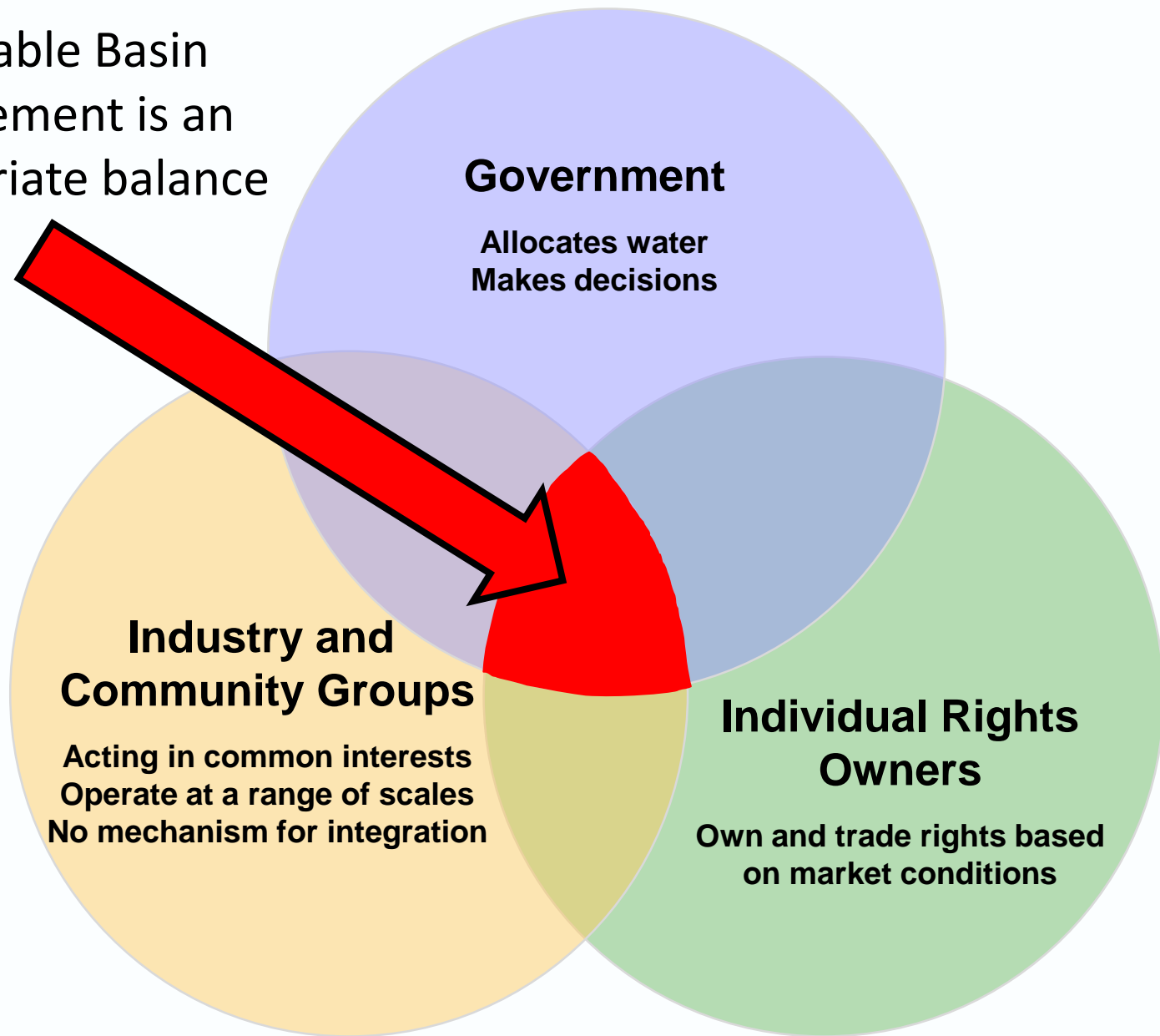
Opportunities

1. Examples of collaborative solutions in other industries/parts of Chile
2. Everyone sees the need for action and wants to be part of the solution
3. Government is committed
4. Previous work completed:
 - Hydrological (DGA, industry, Golder Associates etc)
 - A vision for the future (FAO)
 - Water Table
5. A model for water management in Chile



Terms of Reference

Sustainable Basin Management is an appropriate balance of all



Terms of Reference for change

Social Terms

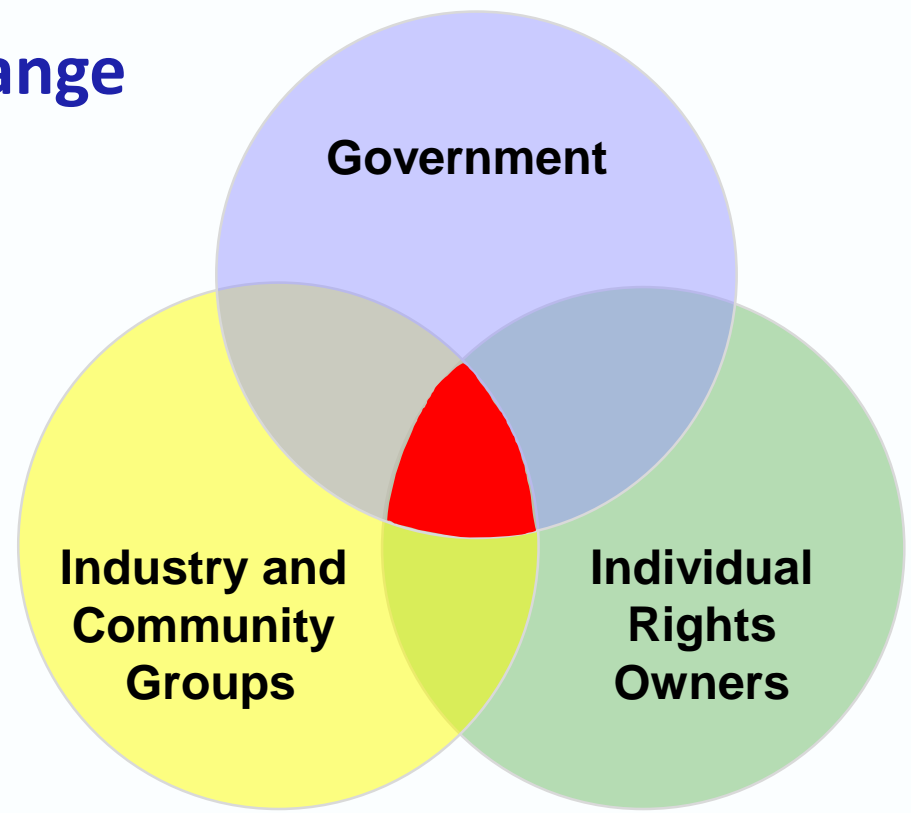
- A participatory system (leadership!)
- A shared vision
- Building stakeholder capacity
- Demographic trend analysis
- Cultural and heritage assessment

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



Transparent Information Platform

Governance Terms

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

Next Steps

- **Chilean government is reviewing the Terms of Reference**
- **CSIRO stands ready to assist if required**

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