"Gestión integrada de cuencas: la experiencia de Australia y su aplicación en el contexto nacional".

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Santiago, 10 de noviembre de 2014

Contenidos

- **¿Qué es CSIRO?**
- **La experiencia de Australia en la gestión integradad de cuencas: el caso Murray-Darling**
- **Proyecto para la Cuenca de Copiapó**

¿Qué es CSIRO?

What we do

Our Vision

Our science is used to make a profound and positive impact for the future of Australia and humanity.

Our Mission

We deliver innovative solutions for industry, society and the environment through great science.

CSIRO

People	6500
Flagships	9
Locations	58
Budget	$1B+

Top 1% of global research institutions in 14 of 22 research fields

Top 0.1% in 4 research fields

62% of our people hold university degrees

2000 doctorates

500 masters

With our university partners, we develop **650** postgraduate research students

Our Science Programs (Flagships)

AGRICULTURE

BIOSECURITY

DIGITAL PRODUCTIVITY

ENERGY

FOOD & NUTRITION

LAND & WATER

MANUFACTURING

MINERAL RESOURCES

OCEANS & ATMOSPHERE

Our track record: top inventions

1. Fast WLAN
Wireless Local Area Network

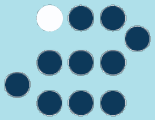
2. POLYMER BANKNOTES

3. RELENZA FLU VACCINE

4. EXTENDED WEAR CONTACTS

5. AEROGARD

6. TOTAL WELLBEING DIET



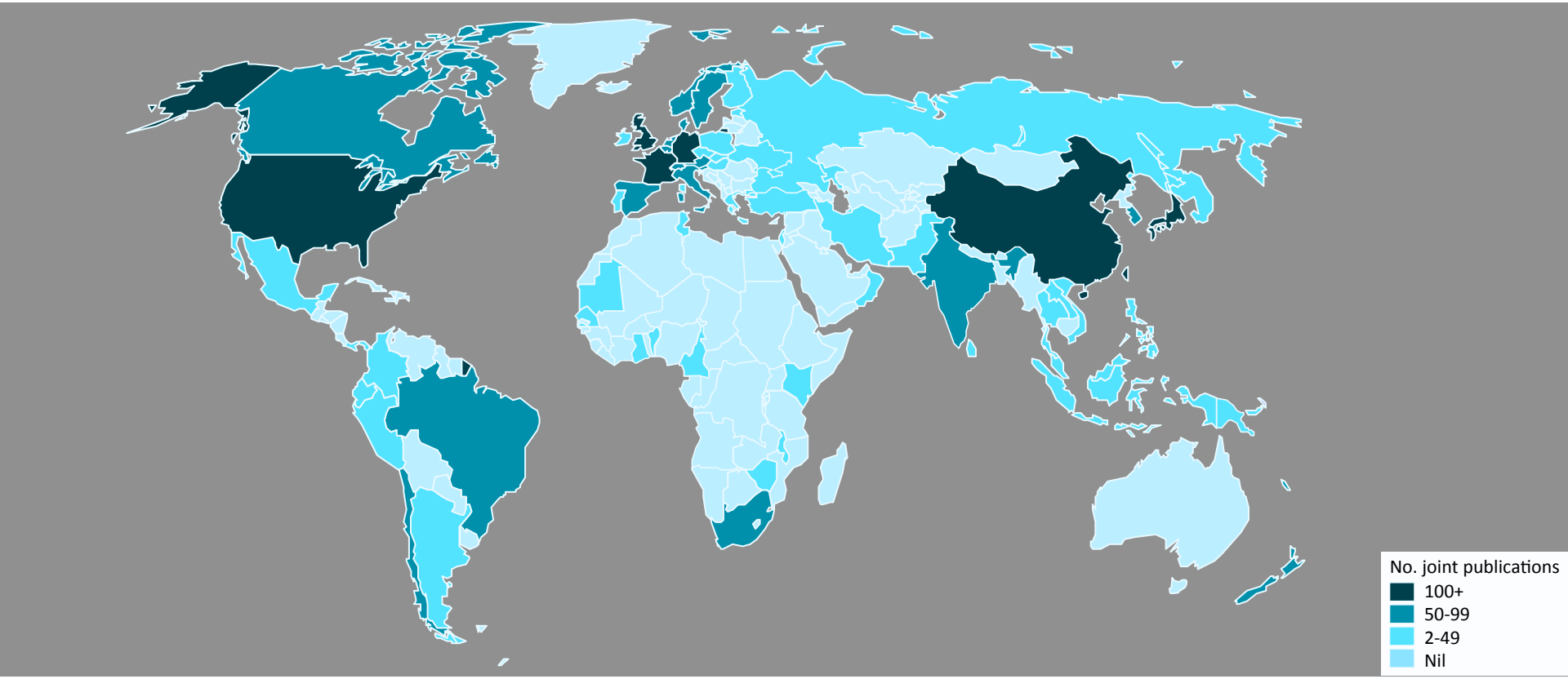
7. RAFT POLYMERISATION

8. BARLEYMAX

9. SELF TWISTING YARN

10. SOFTLY WASHING LIQUID

Global connections



We work with partners in over 80 countries

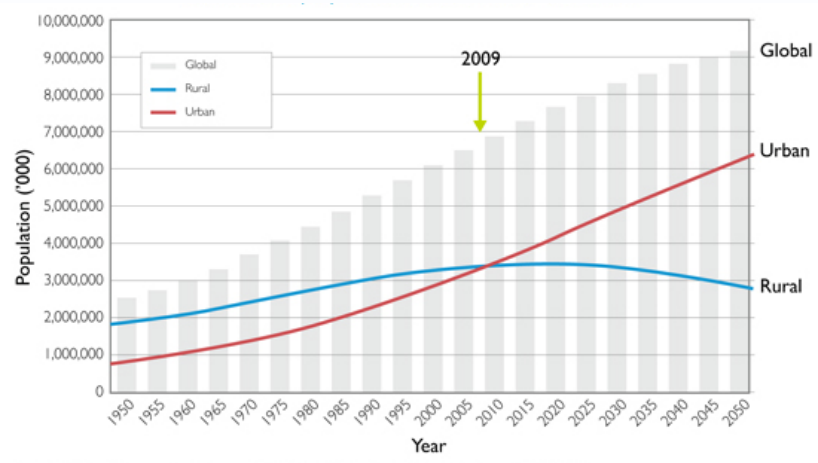
- Foreign governments
- Small to large companies
- Multi-nationals
- International foundations
- Leading scientific institutions
- Over 700 research activities

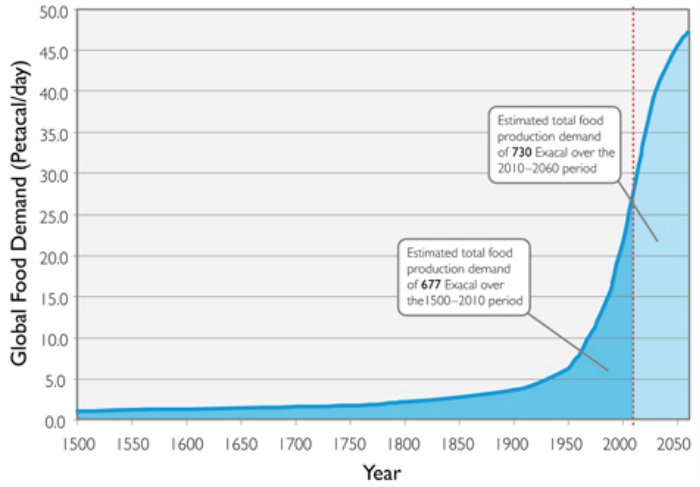
Global Contacts : impact of partnerships

Vestas
ABENGOA SOLAR
Deltares
Enabling Delta Life
MAX-PLANCK-GESELLSCHAFT
Johnson&Johnson
Vision Care
USDA
RioTinto
Lonza
NOAA
Australian Government
Centrelink
Idemitsu Kosan
NASA
中国华能集团公司
CHINA HUANENG GROUP
BOEING
中国科学院
CHINESE ACADEMY OF SCIENCES
Chevron
ITOCHU
PetroChina
Fraunhofer
PETRONAS
Universidad de Chile
BAYER
LOCKHEED MARTIN
China Australia Alliance for
New Energy Vehicle Innovation
Queensland
Government
NUCTECH
Australian Government
AusAID
Embrapa
CSD
COTTON SEED DISTRIBUTORS
woodside
bhpbilliton
ORICA
SANOFI

Water management – a global challenge

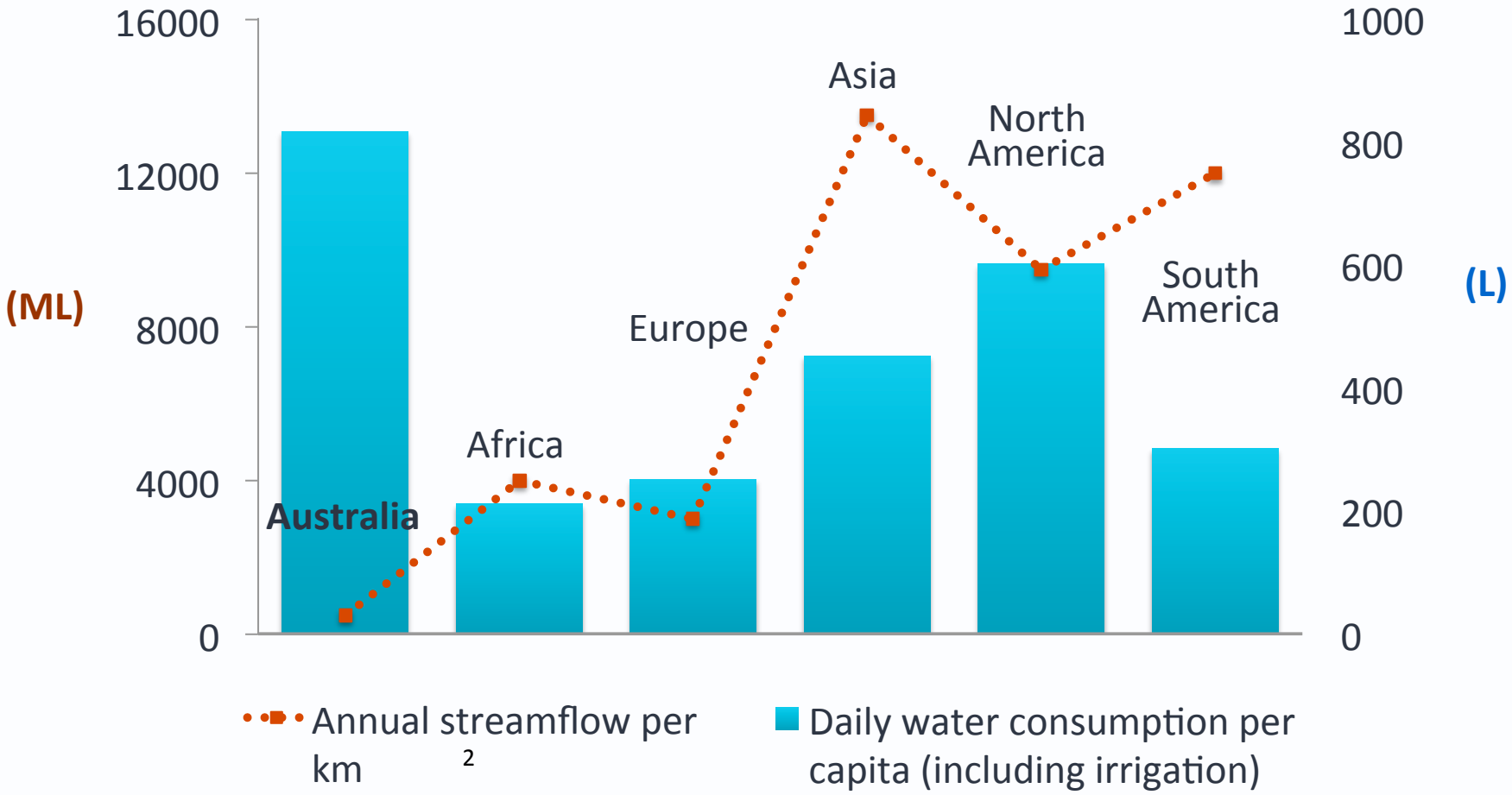
- Climate change complexities
  - Acceleration of the global water cycle
  - Redistribution of a limited resource
- Population growth
  - Additional 2.5 billion globally by 2050
- Urbanisation & industrialisation
  - Increasing demand for water, energy, resources, land and food
  - Increasing waste streams – sewage & industrial
- Global food security
  - Increasing demand for high protein diet
  - Increasing energy intensity for food production
- Environmental consequences
  - Changes in river and groundwater hydrology
  - Changes in water quality
  - Changes to biodiversity and ecosystem services



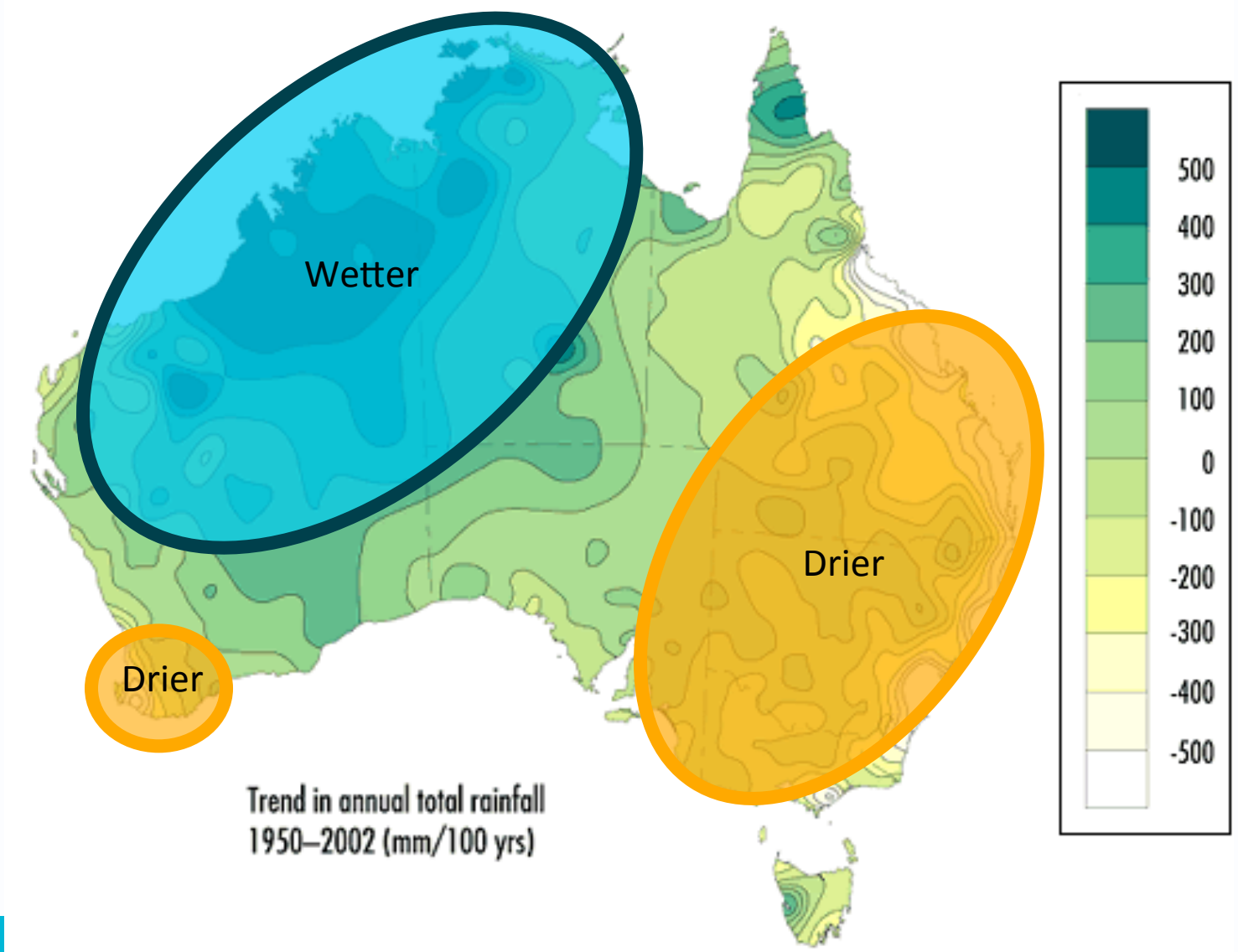


La experiencia de Australia en la gestión integradad de cuencas: el caso Murray-Darling

Australia – the driest inhabited continent
– with the highest per capita water use



Rainfall distribution has changed since 1950



Crisis in Australia forced the integrated water management process

- Science – evidence and decision support
- Trust – put down the guns
- Sharing of power – institutional reform; laws, policies & programs
- Time – 20 years
- Mandate – is the time right
- Resources – commensurate with the problem

Ongoing capacity building, consultation & communication

National Water Initiative –
a transformational policy response

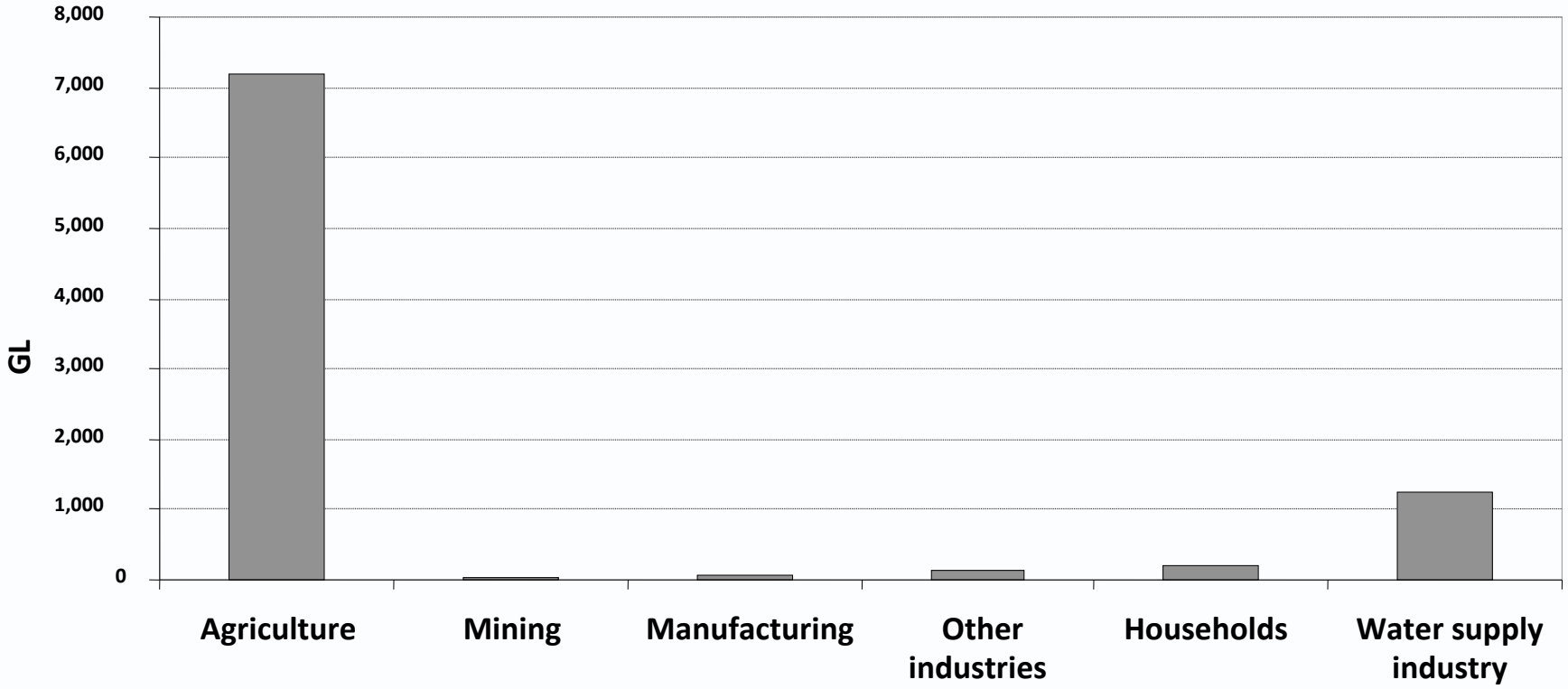
- Return all water systems to **sustainable levels of extraction**
- Provide **secure water entitlements** for **irrigators** and the **environment**
- Improve **security** and **management of urban water supplies**
- Improve water **data collection and accounting**
- Invest in **knowledge** and **build capacity**

The Murray-Darling Basin

- 14% of Australia (size of Spain & France)
- Directly supports 3 million people
- Feeds approximately 20 million people
- Significant environmental values
- Australia's three longest rivers
- 40% Australia's farmers
- Home to 34 major Indigenous groups

- There are six governments with responsibilities in the MDB:
  - Australian government,
  - the Australian Capital Territory,
  - New South Wales,
  - Queensland,
  - Victoria, and
  - South Australia.

Consumptive water use



The need for water reform

- Concerns about the state of the environment
  - water overuse,
  - salinity
  - nutrient pollution
- Plus a decade-long drought in the southern part of the basin that ended in 2010
- Resulted in major water reform and changes to governance structures over the past 15 years.

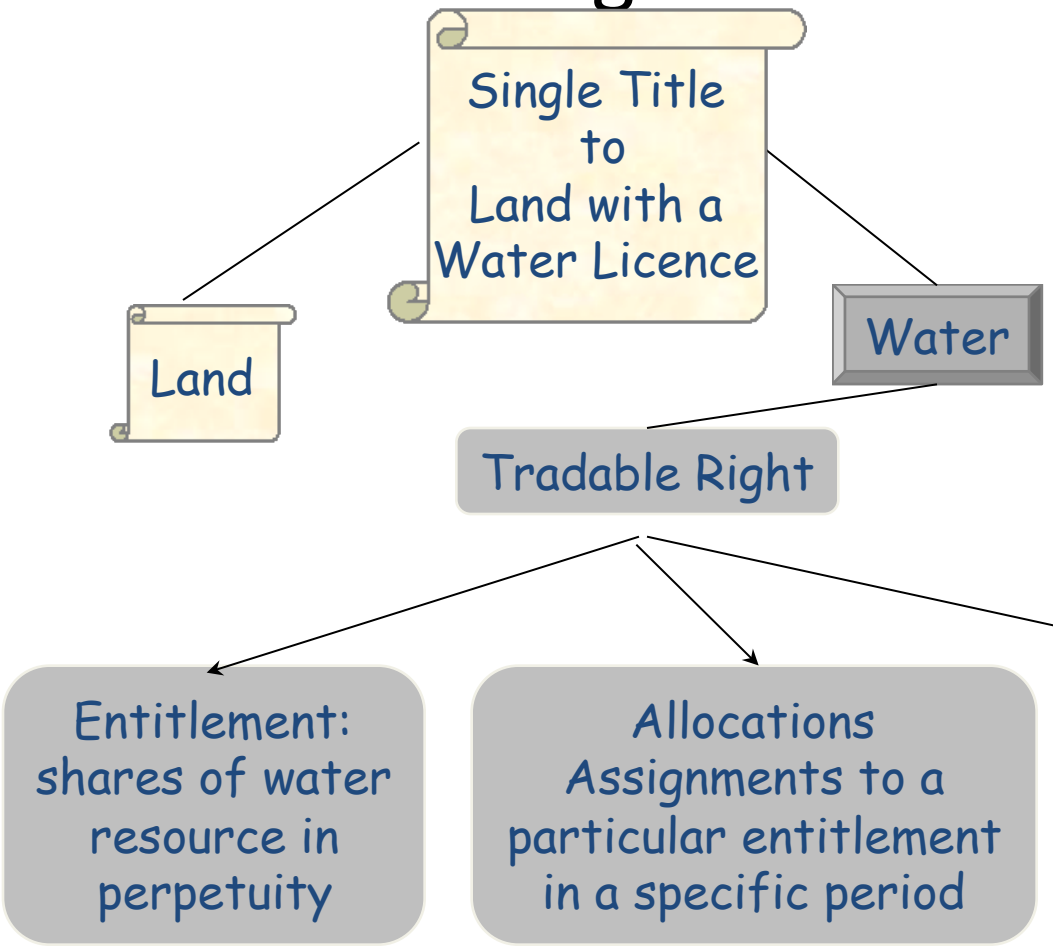
The need for water reform

- Return extraction of water to a more sustainable level
- Support ecological health of the Basin
- Build a more certain future for communities
- Sustain economic output over long term
- Manage water resources for future generations
- What's the right balance?: Trade-offs: optimise economic, social and environmental outcomes
- Measuring the benefits and the costs
- Set environmental thresholds

Major elements of the reform

- Promotes water trading
  - Unbundling of water rights from land ownership in 1994
  - Difference between water “entitlements” and water “allocations” (both can be traded)
- Establishment of a cap on total surface water abstraction:
  - Limits withdrawals
  - Rules out ne claims on water resources
- Governments take action to secure flows for the environment:
  - US$ 450 millions in 2004
  - US$ 2,700 millions in 2007
- Establishment of the Murray-Darling Basin Authority in 2007.

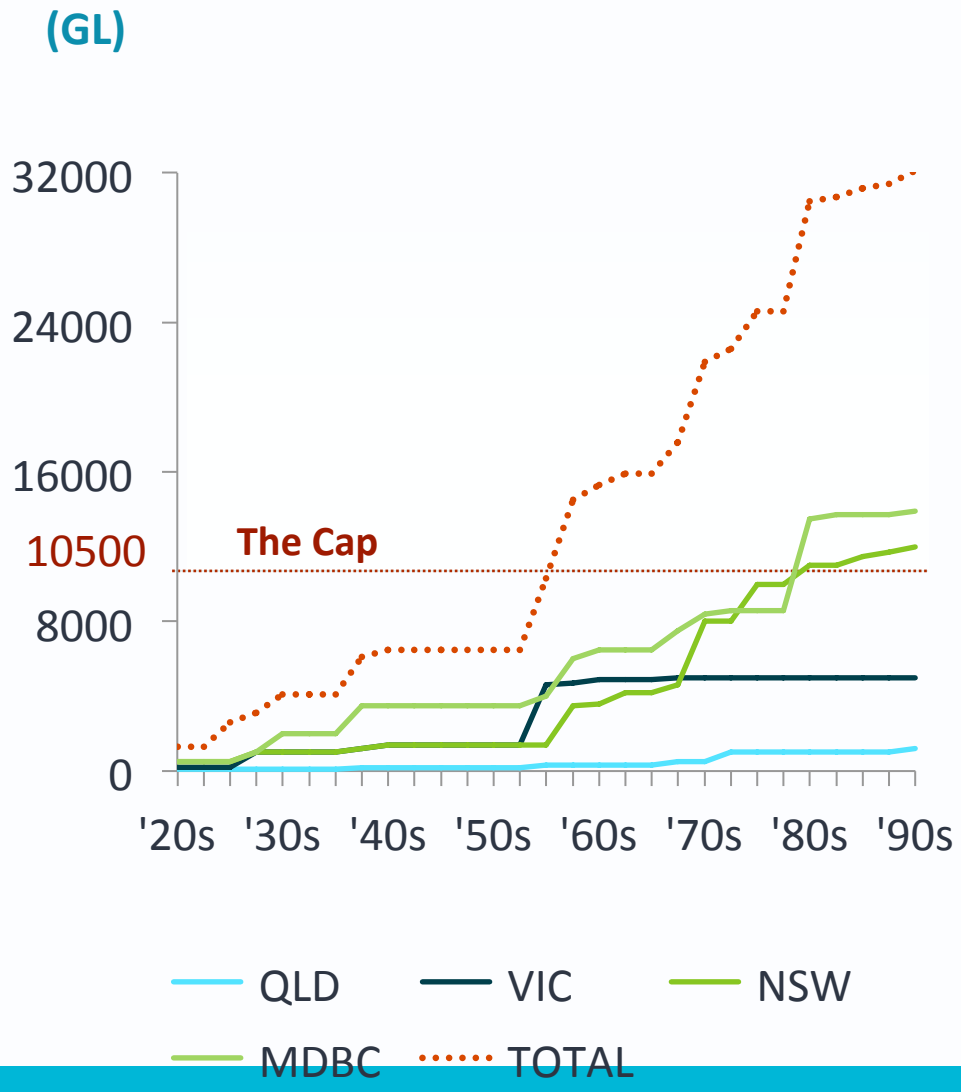
Water Rights Reform & unbundling



National Competition Policy 1993/94 Plus Cap

National Water Initiative 2004

The Murray-Darling Basin

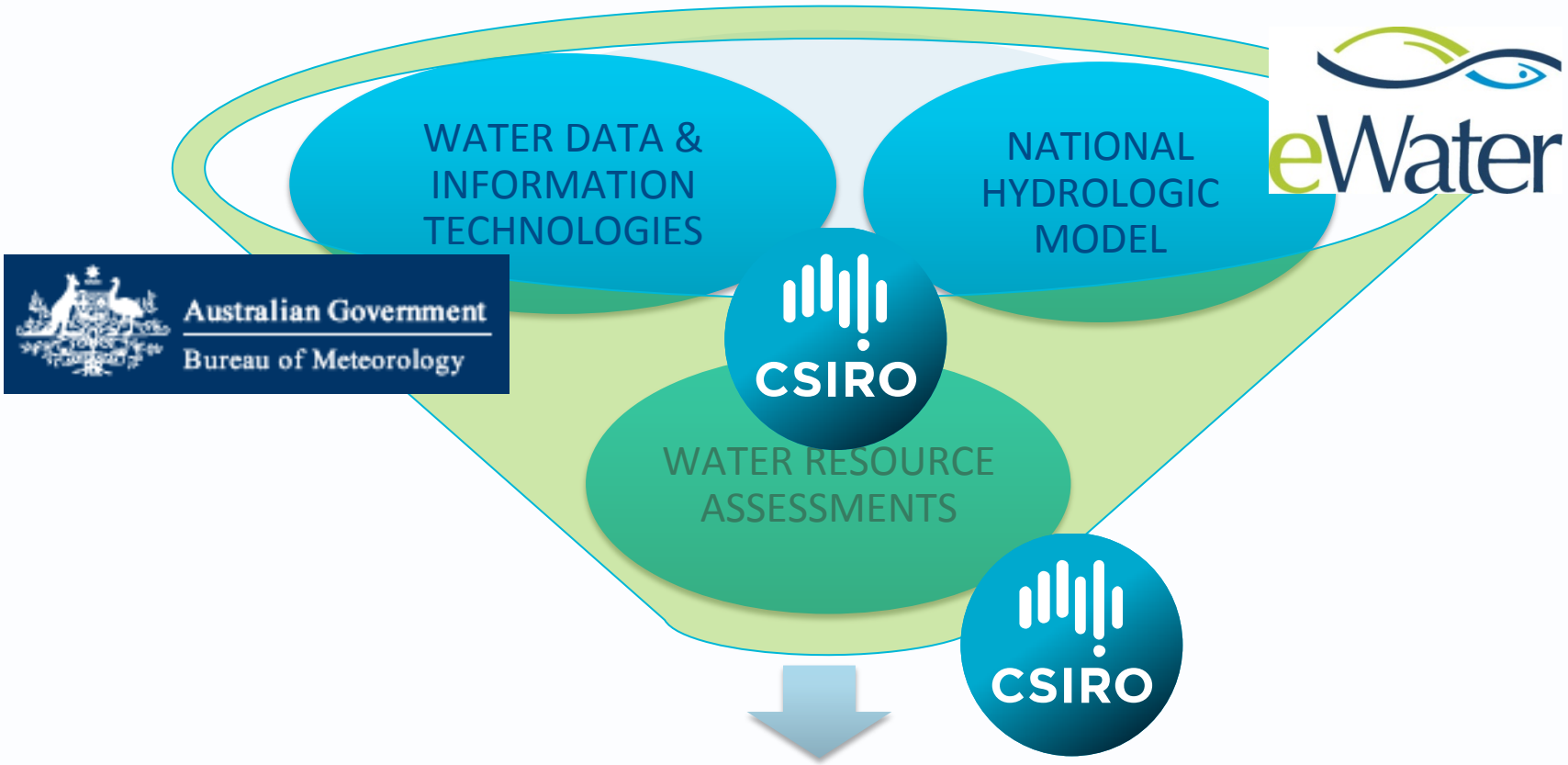


- **70%** of Australia's irrigated agriculture

However...

- Serious **over-allocation** of water between 1960s-1980s
- **Driving Philosophy:** You can't manage what you can't describe and measure
- Must move from **perceptions to fact**

In 2005, >$600M government investment into Water Information, Knowledge and Tools

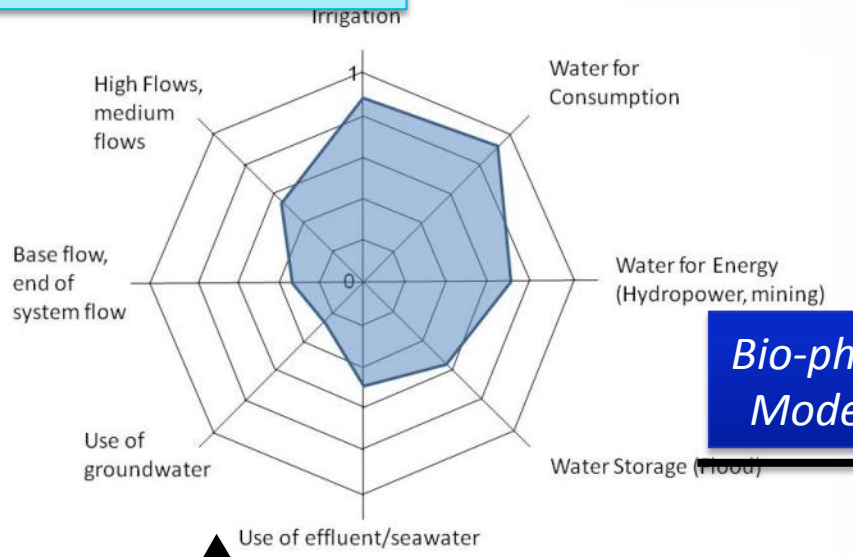


National technological capability to support basin-scale water resources planning and management under climate change

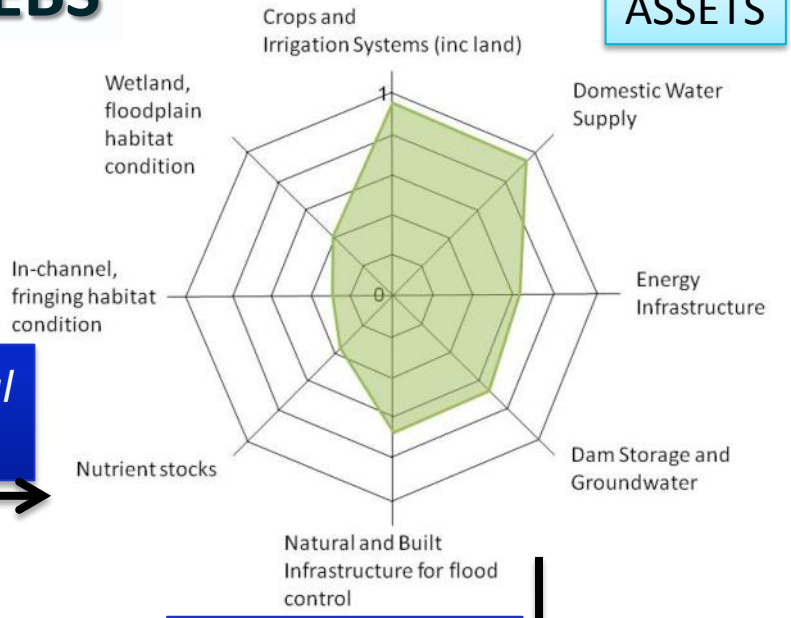
Integrated modelling – systems nexus

NEXUS WEBS

SYSTEM, e.g. WATER



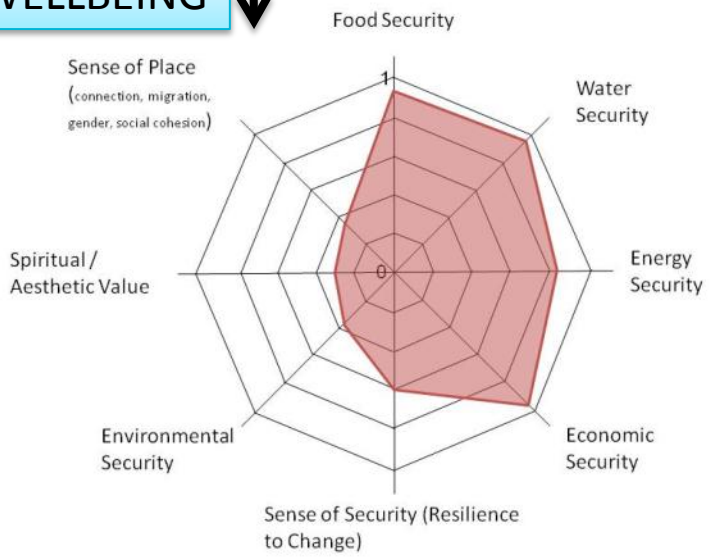
ASSETS



Bio-physical Modelling

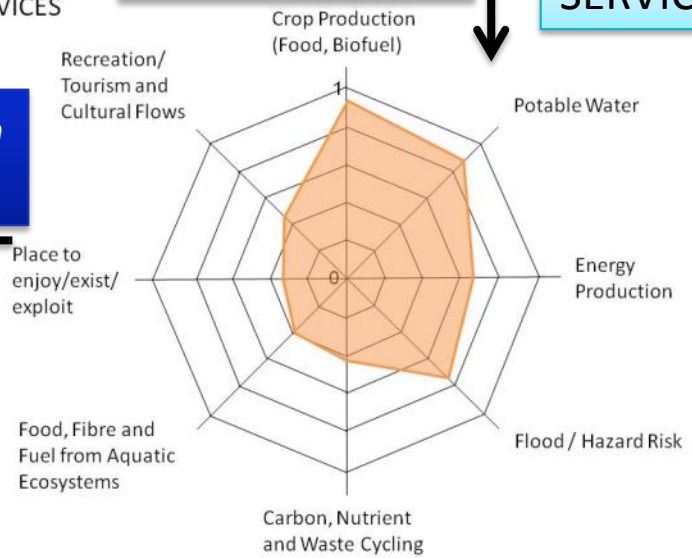
Socio-economic Modelling

WELLBEING



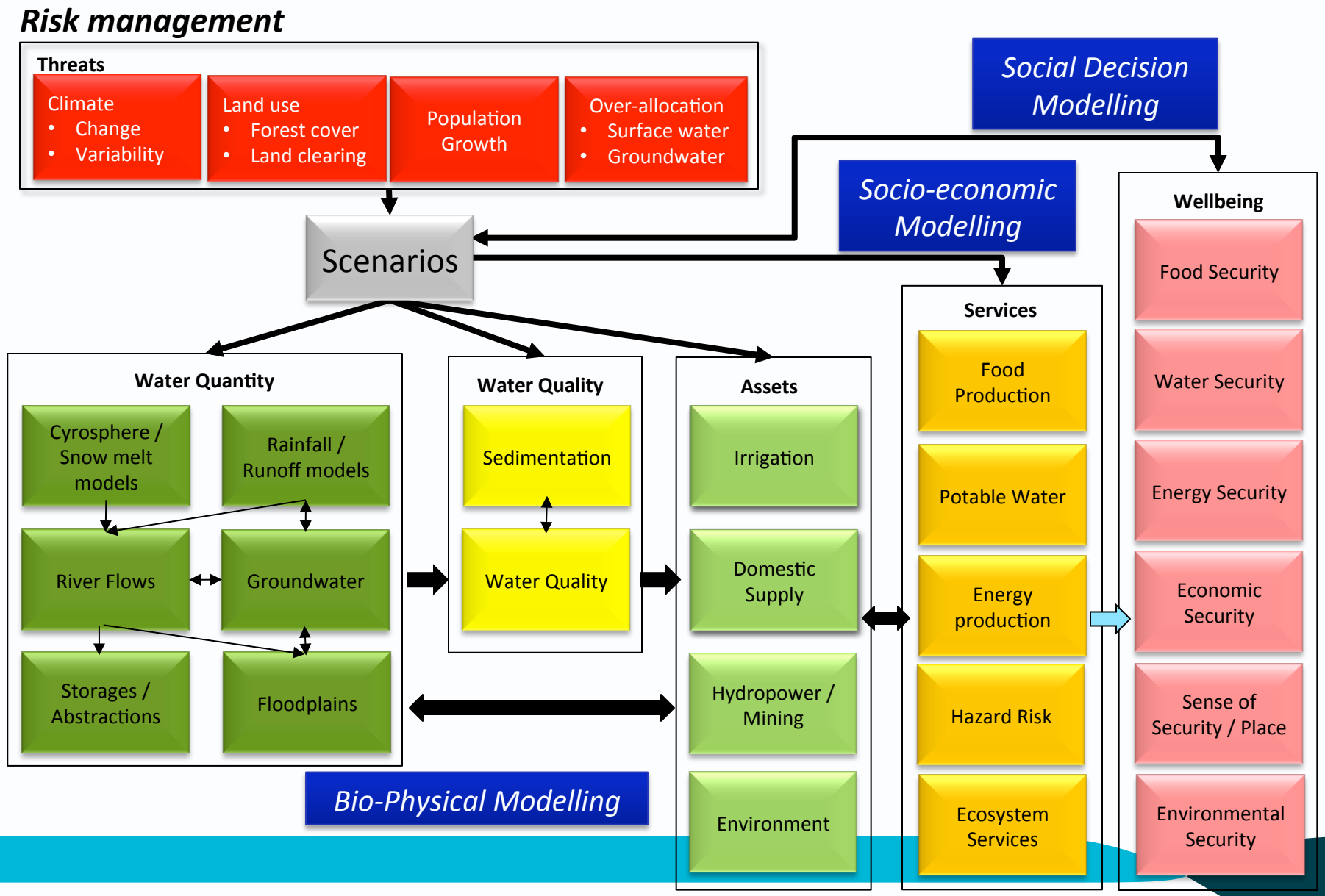
Social Decision Modelling

SERVICES



Source: Peter Wallbrink

Conceptual Integration Framework



Proyecto para la Cuenca de Copiapó

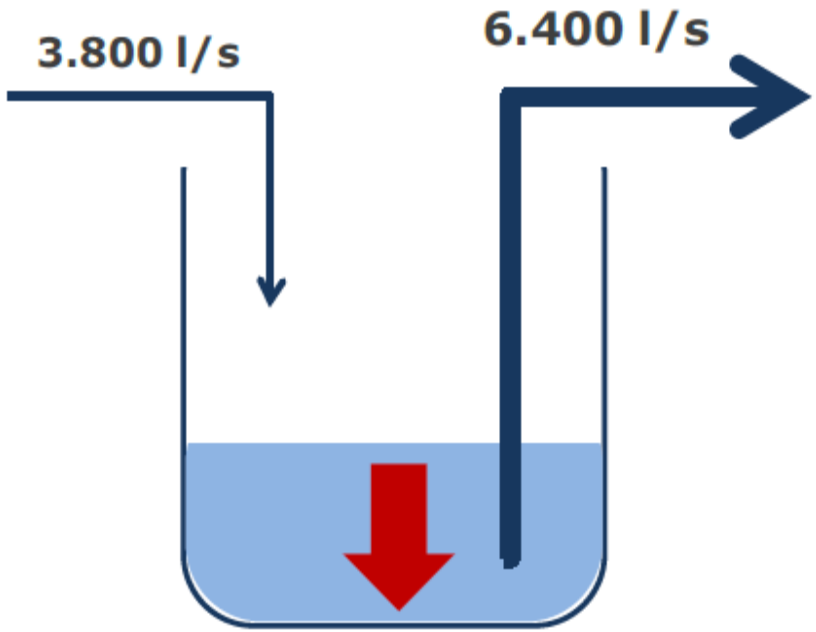
DGA (March 2012) estimate of imbalance

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%**

All demands are increasing

Plan de gestión integrada para la cuenca de Copiapó

- Una Estrategia de desarrollo para la cuenca de Copiapó, establecida de común acuerdo entre los diferentes actores participantes, qué considere los valores de la minería, la agricultura, el medio ambiente y los valores sociales.
- Un marco y una metodología general para una planificación integrada de cuencas, adecuada para aplicarse a nivel nacional, la cual debe estar alineada con la Estrategia Nacional de Recursos Hídricos.

Plan de gestión integrada para la cuenca de Copiapó

- **Fase 1**
  - Bases del proyecto
  - 6 meses
- **Fase 2**
  - Implementación del proyecto
  - 2,5 - 3 años

Resumen Fase 1

- **Diseño del proyecto**
  - **Estructura de gobernanza y actores clave**
- **Aumentando la participación**
  - **Consultas con actores clave**
  - **Desarrollo de "Visión Compartida"**
- **Difusión del proyecto**
  - **Identificación y reuniones con posibles fuentes de financiamiento**
  - **Delegación a Australia**
- **Desarrollo de TdRs para la Fase 2**
  - **Modular: US$ 2 millones v/s US$ 2+ millones**

Visión Fase 2

Phase	Stage/timeframe	Year 1	Year 2	Year 3	Year 4 +
Two	**Underpinning studies**				
	Establish vision & baseline				
	Identify sustainable yields				
	Identify options (1st pass)				
	Develop and analyse options				
	Decision support tools				
	Refine and select options				
	Pilot 1				
	Implementation				
	Review & improve				
Three	**Phase 3 - Pilot 2 (scaled out)**				

Potenciales productos de la Fase 2

- **Específicos**
  - Estado de la cuenca
  - Escenarios futuros acordados (derechos y límites)
  - Plataforma de información sobre recursos hídricos (accesibilidad)
  - Procesos y modelo para fortalecimiento de capacidades

- **Generales**
  - Plan de gestión integrada para la cuenca de Copiapó
  - Marco general de aplicación a nivel nacional

Pilotos

- Principios
  - Win-win
  - Sin arrepentimiento
  - Arrepentimiento bajo
  - Balance público-privado
  - Triple bottom line considerations

- Ejemplos
  - Infraestructura (reutilización de aguas urbanas/mineras)
  - Water trading (cap and trade; auction; buy back)

Gracias