Modelling the impact of environmental policy reforms on water markets and irrigation use in Australia

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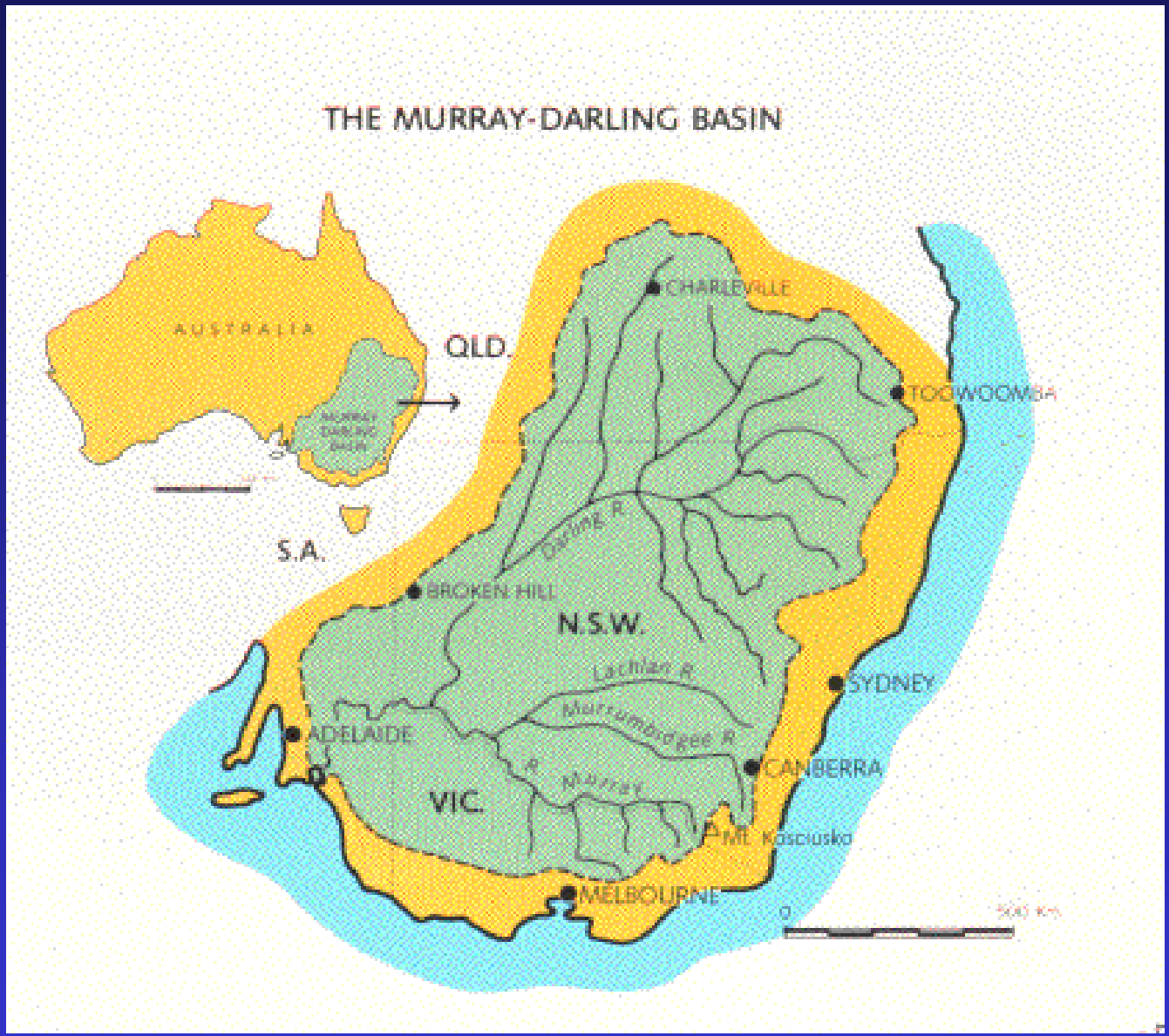
Pressures for water policy reforms in Australia include

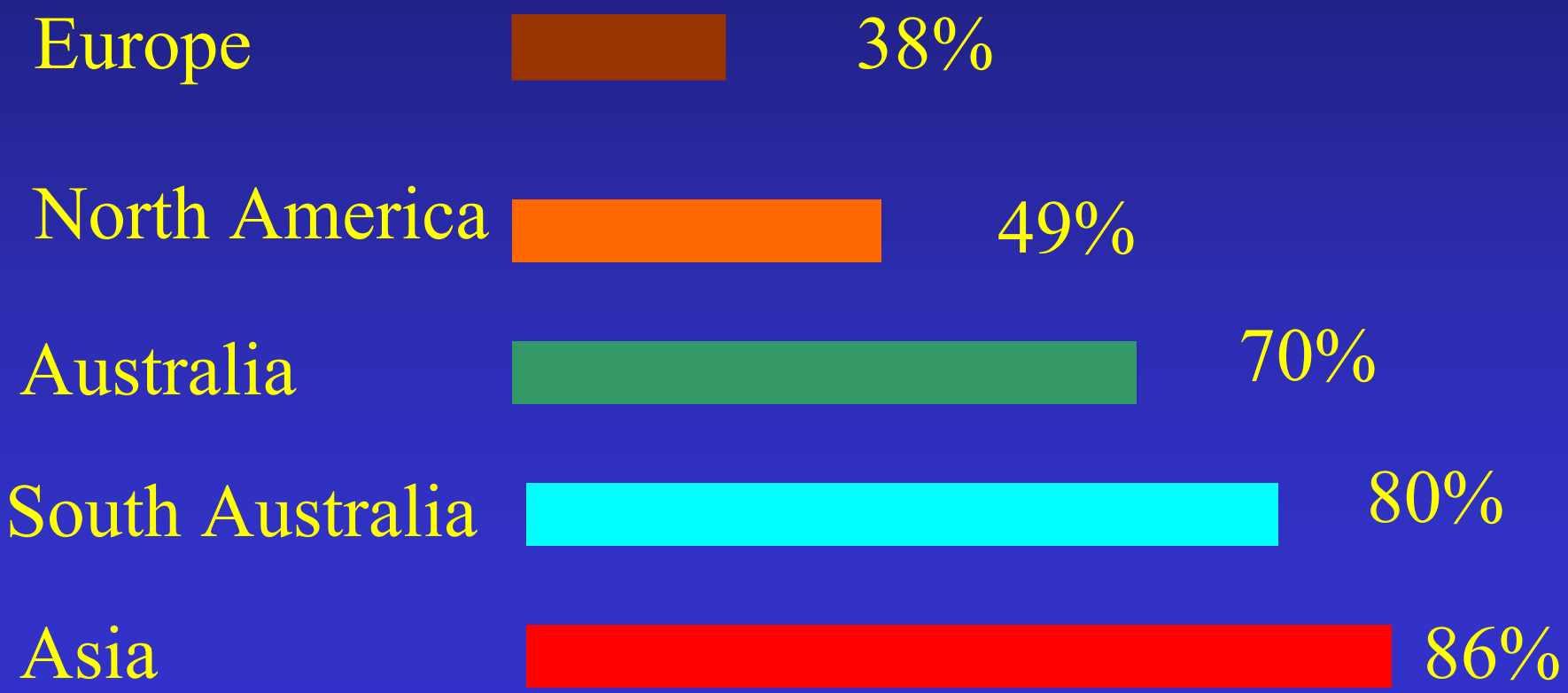
- Soldier settlement schemes: production far removed from price signals
- Importance of irrigated agriculture: competition for resources
- Blue-green algae outbreak
- International treaties
- Marketing attributes: clean and green

Irrigation in Australia

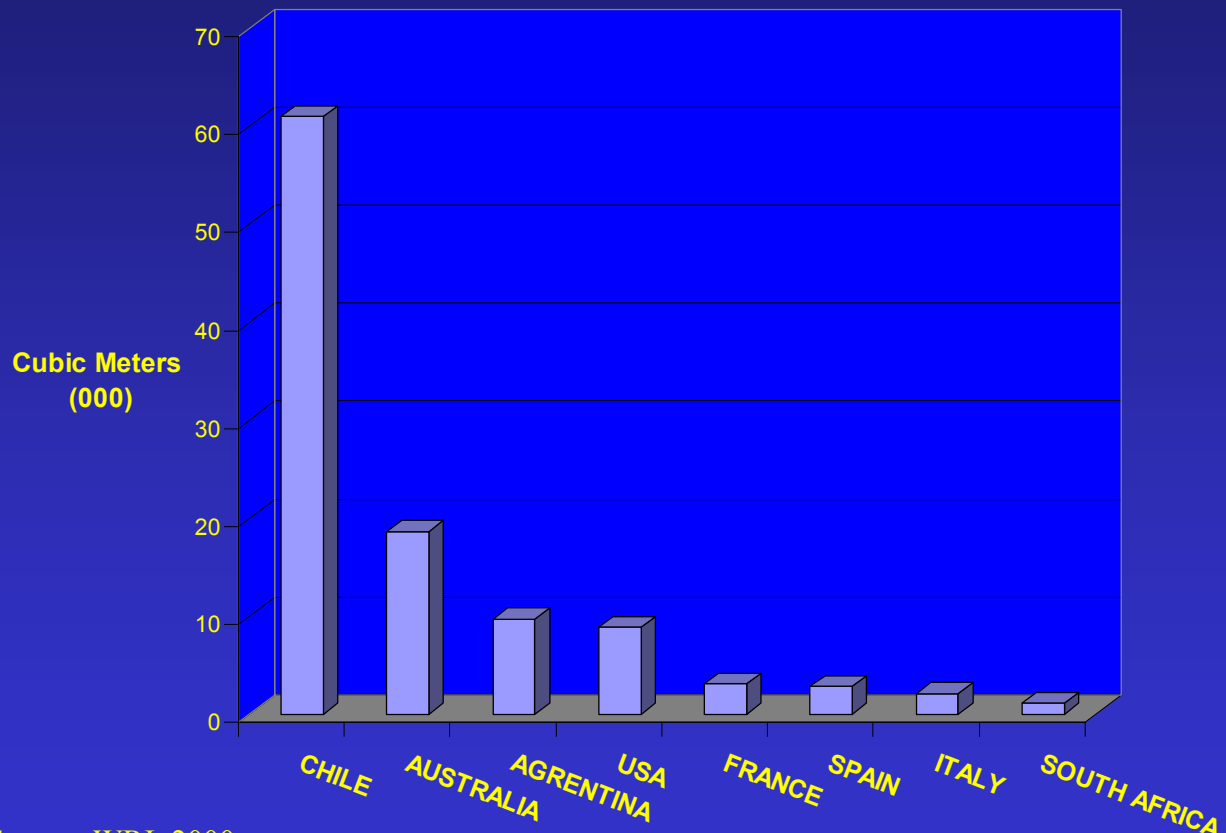
- Accounts for more than 70% of water use
- Is used on less than 0.5% of agricultural land (12% of crop land)
- Accounts for 35% of value of agricultural production
- Murray Darling Basin is the bread basket


THE MURRAY-DARLING BASIN
AUSTRALIA
QLD.
S.A.
CHARLEVILLE
TOOWOOMBA
Darling R.
BROKEN HILL
N.S.W.
Lachlan R.
Murrumbidgee R.
SYDNEY
ADELAIDE
R. Murray
CANBERRA
VIC.
Mt. Kosciusko
MELBOURNE

Agriculture as a proportion of total water usage

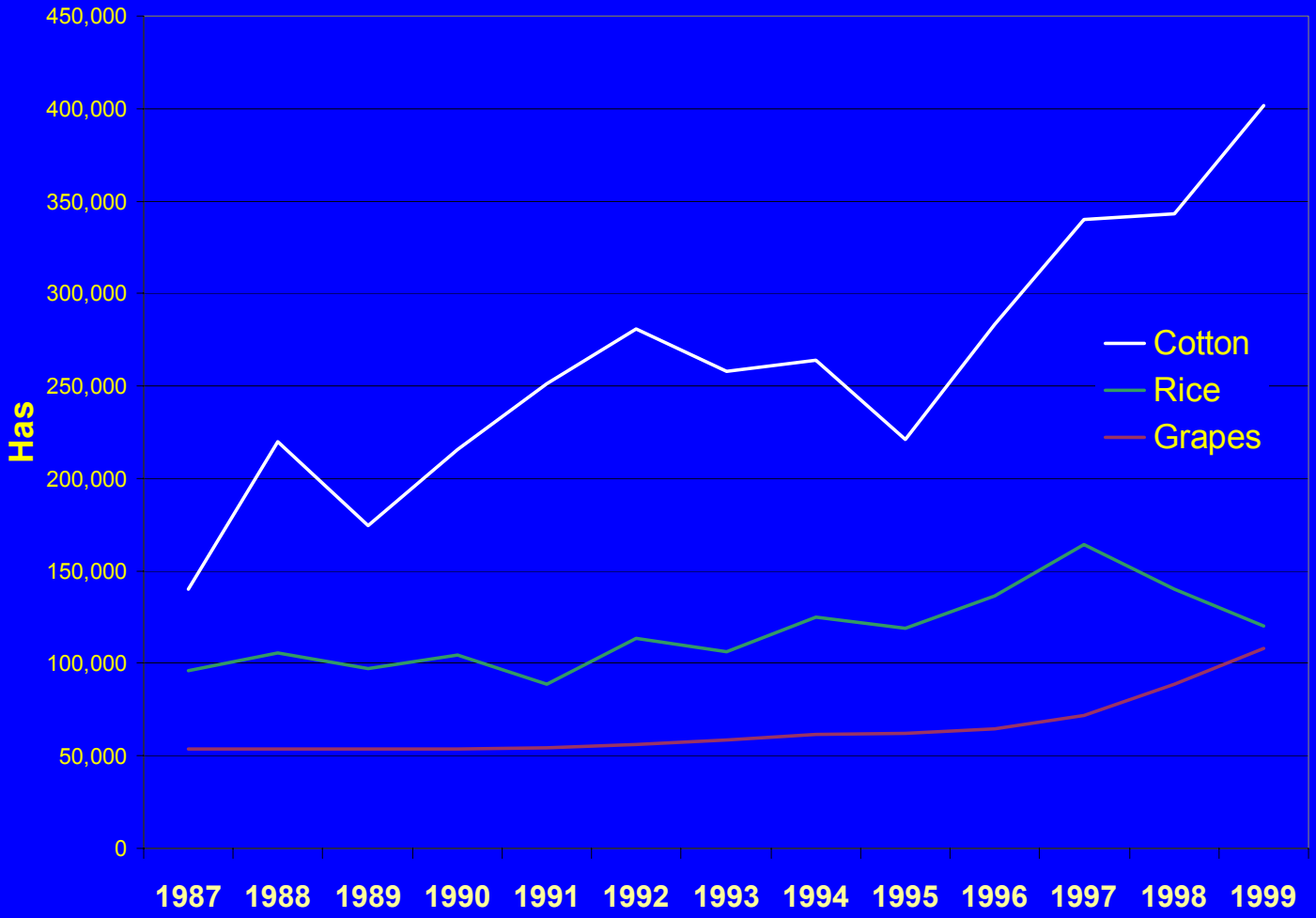


Per capita water availability: Australia and elsewhere



Source: WRI, 2000.

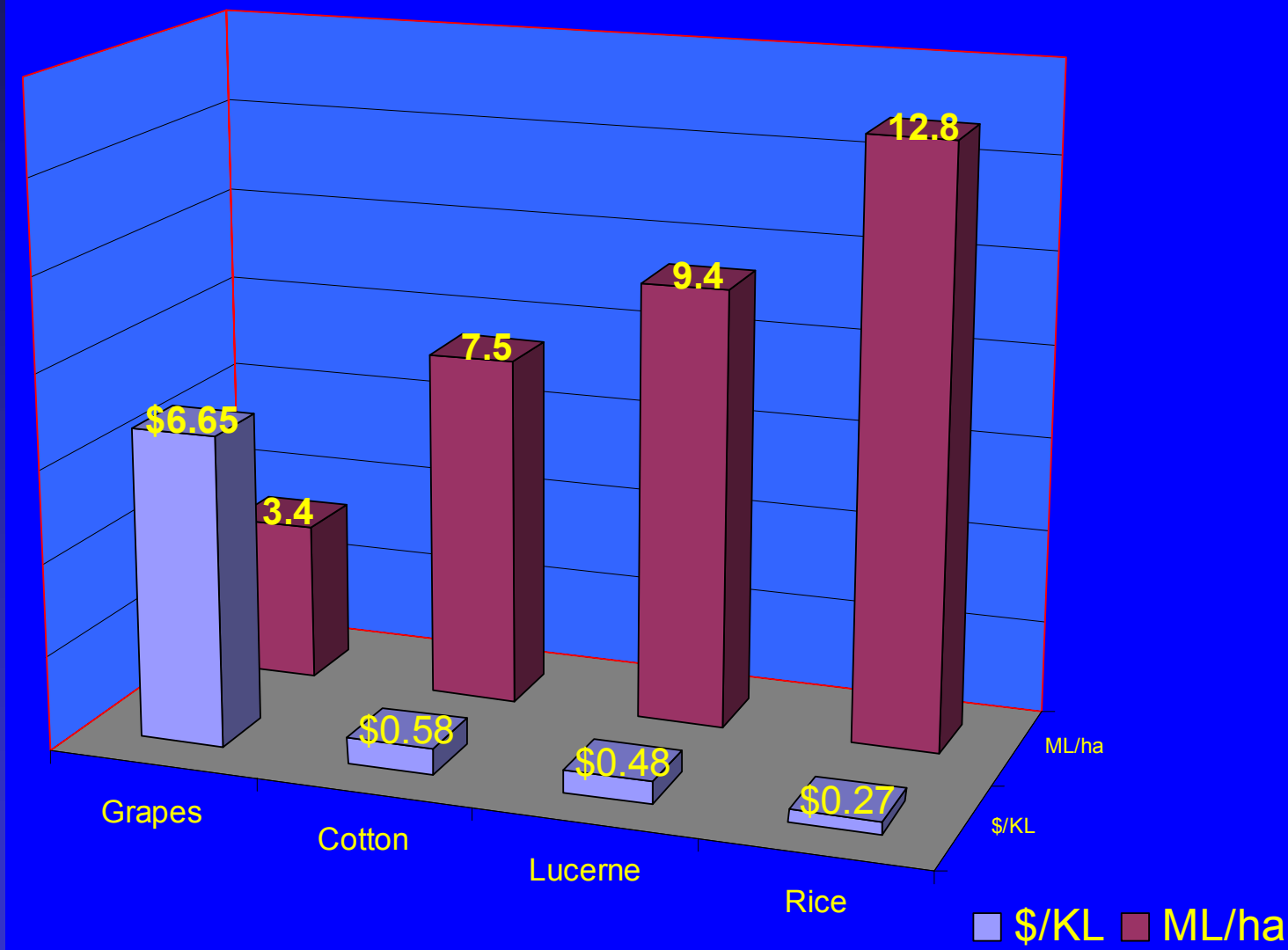
Growth in Irrigated Area: Grapes, Cotton and Rice



Average water costs as per cent of production costs

Crop	Water costs as % of total costs
Grapes	9
Citrus	10
Cotton	14
Potatoes	19
Rice	22
Pasture	23

Water Performance



The Salt Issue

- Salinity is a growing problem in Australian agriculture
- By 2020 water supplied to Adelaide will exceed the WHO threshold for drinking water by 20%
- More than half the increase in salinity arising from MDB irrigation is from salt intrusions within South Australia

Recent Water Policy Reforms

- A cap on water taken from the Murray
- Environmental flows
- Water markets
- Interstate trade pilot project


SOUTH AUSTRALIA
Broken Hill
Menindee Lakes
Darling River
Ivanhoe
NEW SOUTH WALES
Lachlan River
Lake Victoria
Morgan
Renmark
Waikerie
Mannum
ADELAIDE
Goolwa
Lake Alexandrina
Mildura
Euston
RIVER MURRAY
Hay
Murrumbidgee River
Balranald
Nyah
Swan Hill
Kerang
Deniliquin
Echuca
Bendigo
Seymour
VICTORIA
MELBOURNE
Pilot Project

Interstate Trade Outcomes

- More than $10 million water traded
- Trade represents less than 1 percent of water use
- Virtually all (99%) of the water sold was not being used by sellers
  - going to high value uses --more than two thirds to vines
  - reforms induce state-of-art technology

Modelling water distribution across boundaries

- We are only dealing with interstate, not international boundaries
- Notions of freehold water resource ownership have prevailed until the past decade
- Interstate cap on water usage: a rule still made to be broken

Issues raised by interstate trade

- High transactions costs
- Long processing delays
- Cheaper to pay the fine for exceeding one's allocation than to buy water on the temporary market

Quantitative approach

- What are the implications for regional industries of water pricing and allocation reforms?
- Who are the winners and losers in agriculture?

General equilibrium approach

- There are water users other than commercial irrigators
- Households included in CGE framework
- Global demand swings will also influence allocation
- We attempt to account for the environmental costs of irrigation

Version of FEDSA

- 24 sectors including six irrigation industries
- South Australia and ROA, but the latter has specific regional sectors (Grape NSW)
- Based on a 1999-00 database projected from the published 1996-97 ABS table

Early inferences

- Pricing reform that alters relative prices to irrigators helps SA more than NSW or VIC
- Raising prices to users to account for externalities + water-saving technologies: moves irrigators away from relatively water-intensive activities

Extending the database/model

- At Centre of Policy Studies, we are developing a 144 sector database for 8 regions (& 57 statistical divisions with meaningful agricultural data)
- Scope for closer analysis: e.g. Rice in MrmbidgeeNSW
- Scope exists for a more detailed environmental module in MMRF

Possible outcomes

- If water prices between irrigators in different regions merge, there could be transfers of irrigation activity
- But all users may pay more if water is diverted to the environment
- If the rate of uptake of water-saving technologies exceeds rate of diversion to environment, output can still grow