Managing Drought with Water Markets: The Murray Darling Basin Experience

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Talk overview

• Overview of MDB and genesis of current “operative drought”

• Institutional reforms facilitating water trade

• Trading patterns and price dynamics

• Economic benefits in the drought

• Environmental flow challenges

• Institutional settings to manage Trade-offs
Water Market as Drought Adaption

The Murray Darling Basin

1/7 of area of Australia

½ of value of crop production

70% of irrigation

Highly allocated – 56% of flow diverted
Total River Murray System Inflows (including Darling River) with post 1938 sequence imposed from 2002

Annual inflow <= 25 000 GL (GL)
Growing allocation in the wet 2nd half of the 20th century.

Total MDB major storage - 30,076 GL
Median Total Yield ~23,400 GL/annum
(River Murray ~9,000 GL/annum)

Full Development of Existing Licences

'93/94
CAP
Growth in diversion + drought = crisis

Inflows have dropped 68%
but use has only dropped 12%
Can water market help?

• Should reduce economic impact

• Necessary preconditions
  • Well defined, monitored, enforced water rights;
  • Low transactions costs market places;
  • Opportunity for all to participate in market;
  • No manipulation of market power;
  • Accounting for return flow and evaporation impacts of trades;
  • Accountability for water quality impacts of trades.
Institutional changes Leading to Water Markets

COAG - Water reform agenda / National Water initiative (late 1980’s early 90’s through today)
  • Incentive payments to State, coupled to reform agenda

Volumetric water rights
  • Entitlement – perpetual right to share of “pool”
  • Allocation – size of share in a given year
  • Metered
  • Tradeable (independently of land)
Entitlement (Permanent rights) trade

- Out of pasture, field crop districts (Goulburn, Loddon and Campaspe) -10% decline in entitlement (1997-2007)

- Into horticultural, viticultural districts (Murray, Victoria and Murray, South Australia) - 6% growth in entitlement (97-07)

- Recent large volumes to Commonwealth for environment

- Relatively limited volumes compared to annual lease
  - Some remaining restrictions
  - Value of holding an appreciating asset
Permanent water rights price trend

Price ($/ML)

Year


Murrumbidgee
Goulburn
Murray Vic
Murray SA
Annual lease (allocation) trade

• Low transaction cost, quick e-bay like trading

• Very large volume trading – especially in drought years
  • 2007-08 1/2 of all water allocations traded:
    • 82% within catchments; 18% between
    • From low value annuals to high value perennials
Between Catchment Allocation Trade Patterns

Water Allocations Trade Volume (ML/year)

-200000 -150000 -100000 -50000 0 50000 100000 150000 200000


Murrumbidgee  Murray NSW  Goulburn
Broken  Loddon  Campaspe
Wimmera-Mallee  Kiewa  Ovens
Murray Vic  Murray SA
Allocation Price Dynamics

90% of price variation explained by:

• Allocation level
• In season rainfall
Water Trade benefits

Peterson et al. (2004; 2005)
• $A 550 million benefit
• ($A 138 million) from trade across catchments.

Connor et al. (2009) drought with 38% avg. water cut
• 19% (Victoria) and 54% (South Australia) profit decline without
• 5% and 11% with water trade.
• >$300 million benefit

Dixon, et al. (2008)
• 2006-07 drought reduced Australian GDP 1.45%.
• The water trade in this year $A 1.3 billion benefit
• including regional economy follow-on impacts.
The Active MDB Water Market is driving greater irrigation efficiency gains than anywhere else.

Megalitres per hectare of irrigated land
– source OECD water use stats

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<th>1900-92</th>
<th>1995-97</th>
<th>2001-03</th>
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% change
1900-92 to 2001-03
Impact of water trade on irrigation efficiency

South Australia

- Drainage volume (short run)
- Drainage volume (long run)
Unintended consequences

Activation of “sleeper” water rights
• 60% of irrigators utilised water previously left in stream

“Water spreading”
• 20% irrigated land expansion (1995-6 to 2000-1)

Australian right to trade full level of water diversion

Reduced return flows and in-stream flow
Implications of diversion property rights

- **Scenario a**: buy efficiency savings & give half back to farmers
- **Scenario b**: buy efficiency savings and retain all for environment
- **Scenario c**: buy water on the market
- **Scenario d**: irrigator improves efficiency and uses savings to expand irrigation
A classic water right definition dilemma

(a) Define tradeable water US style = consumptive use
• protect third parties
• high transactions cost
• reduces water trade

(b) Define tradeable water Aussie style = diversion
• Simple to monitor
• Not easily contestable
• low transactions
• facilitates trade
• Doesn’t protect against “return flow” externalities

A third way?