# The demand for irrigation water in historical perspective

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# Introduction (1)

- Irrigation water pricing and allocation were undertaken by state governments for much of the twentieth century
- A vast literature suggests the net costs of government administration are high (eg: Anderson and Snyder, 1997; Harris, 2007; Howitt et al 1980; Kanazawa, 1993).
  - Governments tend to price water below marginal cost to ensure expansion of the agricultural sector
  - Assumption is that irrigation water demand responds to price changes like any normal good

# Introduction (2)

- But what if water demand does not respond to prices in the theoretically expected way?
  - One reason this may be the case is because output price regulation distorts production mix in favour of crops with low 'water use efficiency'
  - Low water use efficiency crops produce a lower tonnage of dry matter per megalitre of water
  - This leads water demand to remain high regardless of price
    - Environmental consequences of this include salinisation of water ways
- If this is the case then long held fears by governments that pricing at MC would reduce agricultural sector growth were unfounded

# Two case studies (1)

- For Victoria we used data from the State Rivers and Water Supply Commission Annual Reports (26 irrigation districts between 1910/11 to 1983/84)
- For NSW we used data from the Water Conservation and Irrigation Commission data from Annual Reports (16 irrigation areas between 1940/41 to 1975/76)
- Variables included price per megalitre, aggregate water rights allocated, sales water purchased, acreage sewn of specific crops, fallow land, and supply
  - Annual rainfall from BOM and crop prices from ABS
  - Ranked crops from high to low WUE
- Sales water data is the dependent variable
  - This was the annual volume of water purchased by farmers above their seasonal allocation (perpetual volume entitlement)

# Two case studies (2)

- General Results
  - Victoria
    - Water price was significant (1%) and positively related to quantity demanded
    - Cereals and pasture were also positive and significant (at 10% and 1% respectively)
    - Vineyards positive and significant (10%)
    - Rainfall negative and significant (5%)
  - NSW
    - Water price positive and significant (1%)
    - Vineyards positive and significant (10%)
    - Rainfall negative and significant (1%)
    - Average total cost negative and significant (1%)

# Conclusion

- In both studies water price and quantity demanded moved in the same direction
  - Implication: marginal cost pricing would not have hampered agricultural expansion
  - In part, this may have been the result of price stabilisation schemes that favoured low WUE crops and distorted production in their favour
  - Social costs may also have been reduced (eg: salinisation)
- Water markets may go part way to redress these historical distortions and lead to climate change adaptation by users in the face of rainfall reductions as well as potential geographical changes of rainfall location
  - Infrastructure constraints may hamper this somewhat because
    - Initial system design to deliver set volume to specific geographical area
    - Dams may not be located in optimal areas reducing storage volumes