

### Water Markets: Opportunities and Reforms

- Growing freshwater scarcity and increased demand
- Need for more effective water management and allocation.
- Australia` s Murray Darling Basin and the Southwestern US
- Focus on the US, although conditions quite similar

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### Water Markets

- Benefits of water markets:
  - Allocate water to highest valued use
  - Provide information on water values in different uses
  - This information important for regulators, legislators, judges
  - This information also provides incentives for rights holders to conserve and invest in water and trade unused portions
  - Can be smoother, more timely, and less contentious than arbitrary reallocation

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### Water Markets

- Water markets require clear water rights and an infrastructure for trade.
  - US west: Appropriative rights based on prior possession.
  - Surface water rights better defined than groundwater rights.
  - Groundwater is effectively an open access resource.

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## Water markets

- Regulation of water rights
  - Use it or lose it—incentives for low-valued uses
    - Problem of status of conserved or salvaged water
  - Return flows
    - Interconnected users—Changes in time, nature, and place of diversion
  - Water substitution
    - Groundwater
  - Transaction costs
    - Review process. Legitimate and hold up.
  - Public Interest and environmental flows
    - Federal and state law, Endangered Species Act, Water trading for flow maintenance.

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## Water Markets

- Nature and benefits of trades
  - Prices reveal differences in marginal values
- Differences in trade across the states—supply, demand, and institutional-regulatory setting
- Patterns of trading
- Contract type used
- Still limited, perhaps 2% of water consumed.

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**Water Transfer Prices (\$/ML) by Sector 1987-2008**

	Agriculture-to-Urban Leases	Agriculture-to-Agriculture Leases	Agriculture-to-Urban Sales	Agriculture-to-Agriculture Sales
Mean price (\$)	\$440	\$65	\$5,672	\$3,239
Median price (\$)	\$70	\$16	\$3,745	\$1,872
Number of observations	228	237	1,127	216

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**Water Transactions by Type and State**  
1987-2008

	Total Transactions	Number of Sales	Number of One-year Leases	Number of Multi-year Leases
Arizona	230	158	45	16
California	637	100	311	77
Colorado	2,144	1,804	98	43
Idaho	147	31	110	3
Montana	46	3	14	26
New Mexico	143	73	49	14
Nevada	187	145	4	4
Oregon	118	21	56	26
Texas	314	89	141	67
Utah	84	60	15	8
Washington	56	23	23	9
Wyoming	62	6	41	5
<b>Total</b>	<b>4,168</b>	<b>2,513</b>	<b>907</b>	<b>298</b>

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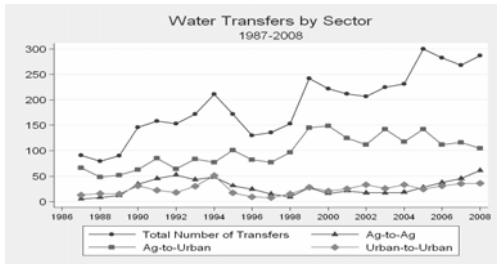
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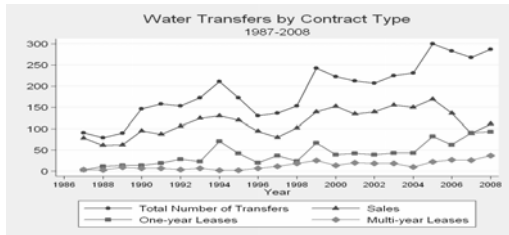
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## Water Markets

- Benefits: Reallocation
- Price differentials
- Tucson example
- Imperial Irrigation District/San Diego

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## Water Markets

- Reform
  - Specify water rights: surface and groundwater
    - Local settlement agreements
    - Adjudication
  - Registry of water rights and amounts
  - Coordination across agencies
  - Clarify position of rights holders within water supply organizations—Irrigation Districts
  - Clear regulatory process—limits on protests, standing
  - Clarify meaning of reasonable use, no injury, no harm
  - Commitment to use water markets and rights

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## Water Markets

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- Conclusion
  - Water markets for information
  - Water markets for incentives
  - Water markets for wise use
  - Water markets for reallocation
  - Water markets for informed policy
  - Water markets for less contentious water management

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