Institutional Barriers to Water Conservation, Rio Grande Basin

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Road Map

• Water Conservation Economics
  – Conservation barriers
  – Conservation incentives

• Producer Survey
  – Identifies current / potential water use patterns
  – Some results

• Policy Implications
Water conservation concepts
Economic Principle of Conservation

- Voluntary water conservation requires the potential for economic gain.
- People will only reduce water use if their benefits exceed their costs.
Economic Incentives and Disincentives for Conservation

• Disincentive: do you own saved water?
  – Discourages water transfers
  – Discourages water conservation

• Incentive: what promotes transfers from ag to M&I?
  – Banking could provide cash for agriculture
  – Water is available when cash is on the table
  – Cities will pay top dollar for banked water in a drought
  – Barrier: Will fear of forfeiture to ‘non-beneficial use’ impair incentive to transfer?
What is water conservation in agriculture?

• Reduced on-farm use

• Increased water for basin
High on-farm use

Flood Irrigated Orchard
Reduced on-farm use

Drip Irrigated Orchard
Reduced applications v. net savings

• Guard against on-farm water savings that fail to save the basin’s water
  – A common belief: reduced on-farm water applications supply more water for basin
  – Switching from flood to drip may reduce on-farm application by X but also reduce return flows by X.
  – Good laws assign a water right to individual actions that increase the basin’s net saved water.
    • Reduced on-farm water application is nice
    • Reduced water losses to basin provide new supplies
Economics of Net Savings

• (net loss) Re-using on-farm return flows is not a net savings, since it reduces downstream supply.

• (net savings) Preventing seepage to uneconomical depths or to saline aquifers is a net savings.

• (policy) Economically sound policies will encourage net savings and make it easy to show.
Institutional Barriers

• **Surface-groundwater substitution**
  – Reduced surface water use may increase gw use
  – Good policies will encourage conjunctive management.

• **The uncertain duty of water**
  – NM OSE is making offers for irrigated land on lower RG
  – Duty of water: issues and future

• **Common Property Carryover Storage**
  – Some producers would carry over with right incentives
  – Common property carryover – 57% (NM), 43% (TX)
  – This year’s saved water is shared by all
Institutional Barriers: Interstate Compacts

- RGR Compact makes no provision for CO or NM to rent surplus water below Elephant Butte (under-deliver for cash)

- 1906 U.S. Mexico Treaty makes no provision for NM/TX to over-deliver to Mexico for cash.
Institutional Barriers: The Price of Water

• Buying price may influence water conservation
  – EBID membership charge
    • 0-2 af/acre = $50 / acre cost = $0 cost for water
    • 3rd af/acre = $18 / af
    • Low buying price may lock water into agriculture and discourage conservation

• Selling price may influence water conservation
  – Would producers respond to opportunity to market any of those 1-3 acre feet outside agriculture or outside the state?
Summary: Potential Institutional Barriers to Agricultural Water Conservation

• Overriding role of economic incentives
  – On farm savings that save no water basin-wide
  – Difficulty of securing rights to conserved water
  – Groundwater substitution for conserved surface water
  – Lack of clear titles to water rights
  – Common property carryover storage
  – Interstate compact constraints
  – The buying/selling price of water
Producer Survey
Some Questions

• Identify Acreage Farmed
  – Land ownership status
  – Number and size of fields
  – Fragmentation

• Identify water use patterns by crop
  – Crops in 3 largest fields
  – Water source
  – Timing and amount of water applied

• Water use patterns
  – current
  – potential
## Barriers to Reduced Water Use

<table>
<thead>
<tr>
<th>Barrier</th>
<th>Yes (pct)</th>
<th>No (pct)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I need all the water I receive</td>
<td>62.81</td>
<td>37.19</td>
</tr>
<tr>
<td>Water conservation is too expensive</td>
<td>18.18</td>
<td>81.82</td>
</tr>
<tr>
<td>Build up of salts in the soil</td>
<td>14.91</td>
<td>85.09</td>
</tr>
<tr>
<td>No financial incentive to conserve</td>
<td>11.67</td>
<td>88.33</td>
</tr>
<tr>
<td>Water conservation takes too much labor</td>
<td>13.22</td>
<td>86.78</td>
</tr>
<tr>
<td>On-going adjudication</td>
<td>8.33</td>
<td>91.67</td>
</tr>
<tr>
<td>The distribution system restricts me from conserving.</td>
<td>7.02</td>
<td>92.98</td>
</tr>
<tr>
<td>I cannot find a buyer for saved water</td>
<td>0.83</td>
<td>99.17</td>
</tr>
</tbody>
</table>

Sample = 121 NM Irrigators
## More Results

<table>
<thead>
<tr>
<th>Could sell this year’s allotment $100 / a-f</th>
<th>Could sell indefinitely at $100 / a-f</th>
<th>Could sell this year’s allotment $200 / a-f</th>
<th>Could sell indefinitely at $ 200 / a-f</th>
</tr>
</thead>
<tbody>
<tr>
<td>▪ Reduce water use</td>
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</tr>
<tr>
<td>▪ apply less water to less land</td>
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<td>▪ plant some water-saving crops</td>
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<td>▪ Lease less land</td>
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- Could sell this year’s allotment $100 / a-f
  - Reduce water use
  - apply less water to less land
  - plant some water-saving crops
  - Lease less land

- Could sell indefinitely at $100 / a-f
  - Reduce water use
  - apply less water to less land

- Could sell this year’s allotment $200 / a-f
  - Reduce water use
  - apply less water to less land
  - plant more water-saving crops
  - Lease no land

- Could sell indefinitely at $200 / a-f
  - Reduce water use
  - apply less water to less land
  - plant more water-saving crops
  - Lease no land
  - leave farming
Policy Implications
Can water be managed equitably, efficiently, and sustainably?

• Agriculture (maintain or improve farm income)
  – Adjudication
  – Storage
  – Groundwater development

• M&I Uses
  – Price basic needs cheaply
  – Price discretionary uses => Marginal cost
Summary: The West’s Water

- A few good people

- And…