Urban Water Conservation along the Rio Grande

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February 2005

Research Sponsors

- Rio Grande Basin Initiative
  - US Department of Agriculture
- Texas Water Resources Institute
- Texas A&M University System
- New Mexico State University

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Water Demand – Key Findings for 2000-2050

From 16.5 to 20.95 million acre-feet/year

- Per capita water use decreases from 181 to 159 gallons/capita/day (22)
- Municipal water demand increases 67%
- Manufacturing water use increases 47%
- Irrigation demand declines by 12%

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Meeting Water Demand in Texas in 2050

Existing Supply 60%
Conservation 12%
Reuse 3%
New Sources 3%
Unmet Irrigation Demand 17%
20.95 Million Acre-feet/year

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Rio Grande Urban Water Conservation Study Goals

- Phase I: Develop an inventory of city water conservation practices.
- Phase II: Determine:
  - Definitions of water conservation
  - Barriers to water conservation &
  - Preferences of water conservation strategies.

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Survey

- 30 Rio Grande cities
  Texas & New Mexico
- Mayors, City Councils &
  City Staff - conservation or water managers

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Survey Questions

- Definitions: Do you agree or disagree?
- Barriers: Are these important or not important?
- Preference: Is this a preferred conservation strategy and is it feasible?

Define Water Conservation

- Use water more efficiently
- Eliminate waste
- Minimize waste
- Reduce total amount used
- Use water for essential needs
- Use less water during droughts

Definition Response

<table>
<thead>
<tr>
<th>Efficient Use</th>
<th>Minimize Waste</th>
<th>Eliminate Waste</th>
<th>Use Less During Drought</th>
<th>Reduce Total</th>
<th>Use for Essential Needs</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.5</td>
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<td>3.0</td>
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<td>3.0</td>
</tr>
</tbody>
</table>

Neutral | Strongly Agree

Definition: Results

Highest Agreement

- Efficient use
- Minimize waste
- Eliminate waste

Lower Agreement

- Reduced total
- Essential needs

Barriers to Conservation

- Cost to implement
- Increases price of water
- Loss of revenue
- Lack of expertise
- Public opposition
- Lack of political will
- Developer/ opposition
- Lack of public awareness
- Requires change in fee structure

Barriers to Conservation: Response

<table>
<thead>
<tr>
<th>Revenue Loss</th>
<th>Cost</th>
<th>Increased Price</th>
<th>Lack of Awareness</th>
<th>Public Opposition</th>
<th>Council Opposition</th>
<th>Change in Fee</th>
<th>Lack of Political Will</th>
<th>Lack of Expertise</th>
<th>Developer Opposition</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.5</td>
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</tr>
</tbody>
</table>

Somewhat Important | Very Important
Barriers: Results

• Revenue Loss
• Cost of program
• Increased price of water
• Lack of awareness
• Public opposition

Residential Water Use

![Pie chart showing residential water use]

Barriers: Results

- Revenue Loss
- Cost of program
- Increased price of water
- Lack of awareness
- Public opposition

Selected Conservation Options

- Water audits
- Increase price
- Offer rebates
- Leak detection program
- Public education
- Reuse wastewater
- Restrict landscapes
- Residential graywater
- Irrigation schedules
- Require drip irrigation
- Rainwater harvest
- Outdoor water-use restriction
- Drought tolerant landscapes
- Fugitive water

Preference-Feasibility Grid: Results Display

<table>
<thead>
<tr>
<th>Preference-Feasibility Grid</th>
<th>Results Display</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work on improving feasibility</td>
<td>Adopt</td>
</tr>
<tr>
<td>Acceptable but work on both preference and feasibility</td>
<td></td>
</tr>
<tr>
<td>Work on improving performance</td>
<td></td>
</tr>
</tbody>
</table>

Water Conservation Options: Preference and Feasibility

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Preference</th>
<th>Feasibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Encourage drought-tolerant landscape</td>
<td>4.49</td>
<td>4.28</td>
</tr>
<tr>
<td>2 Public education campaign</td>
<td>4.30</td>
<td>4.08</td>
</tr>
<tr>
<td>3 Provide residential water audits</td>
<td>4.08</td>
<td>3.80</td>
</tr>
<tr>
<td>4 Use graywater for landscape watering</td>
<td>4.05</td>
<td>3.59</td>
</tr>
<tr>
<td>5 Require drip irrigation as appropriate</td>
<td>4.03</td>
<td>3.67</td>
</tr>
<tr>
<td>6 Reusing treated municipal wastewater</td>
<td>3.99</td>
<td>3.77</td>
</tr>
<tr>
<td>7 Outdoor watering restrictions</td>
<td>3.95</td>
<td>3.66</td>
</tr>
<tr>
<td>8 Restrictions on watering schedules</td>
<td>3.86</td>
<td>3.59</td>
</tr>
<tr>
<td>9 Rainwater harvest programs</td>
<td>3.79</td>
<td>3.59</td>
</tr>
<tr>
<td>10 Provide low-flow showerheads</td>
<td>3.59</td>
<td>3.43</td>
</tr>
<tr>
<td>11 Restrict water run-off</td>
<td>3.54</td>
<td>3.33</td>
</tr>
<tr>
<td>12 Leak detection for water lines</td>
<td>3.37</td>
<td>2.93</td>
</tr>
<tr>
<td>13 Offer rebates</td>
<td>3.24</td>
<td>2.90</td>
</tr>
<tr>
<td>14 Restrict landscapes and planting</td>
<td>3.02</td>
<td>2.93</td>
</tr>
<tr>
<td>15 Increase price to reduce use</td>
<td>3.00</td>
<td>3.03</td>
</tr>
</tbody>
</table>

Results

Adopt
- Encourage drought-tolerant landscape
- Public education campaign

Less Feasible
- Provide low-flow showerheads
- Restrict water run-off
- Leak detection for water lines
- Offer rebates
- Restrict landscapes and planting
- Increase price to reduce use
Staff/Elected Officials Compared

- Staff/Elected Officials
  - Adopt Treatments
  - Encourage drought-tolerant landscape
  - Public education campaign
  - Provide residential water audits - E
  - Reusing treated municipal wastewater – E

  Work on Feasibility
  - Leak detection for water lines
  - Offer rebates - S
  - Restrict landscapes and planting
  - Increase price to reduce use - E

Summary

- Define Water Conservation:
  - Efficient use
- Barriers to Water Conservation:
  - Financial
- Most acceptable programs:
  - Voluntary
- Greatest water savings: Landscapes

http://texaswater.tamu.edu