Household Behavior and Homeowner Education Strategies

Water Conservation: half-empty or half-full?

Regional Webinar Series

March 22, 2011
Water Rates

Tatiana Borisova, PhD, Assistant Professor and Extension Specialist, Water economics and policy
Questions from Webinar Participants

- How to educate people about the true value of water?

- What is the most important motivator for the majority of homeowners?

- How do you collect behavior change data after the educational sessions? Especially long-term data?
“True Value” of Water in Economics

- When the well's dry, we know the worth of water.
  - Benjamin Franklin

Source: http://www.freakyweather.com/content/freaky-drought-has-florida-wildfire-alert
TOTAL ECONOMIC VALUE

Use values

Direct use values

Ecological function values

Non-use values

Future option values

Existence values

Bequest values

Marketed outputs
- crops
- meat/fish
- timber
- renewable energy
- industrial

Unpriced benefits
- recreation
- landscape
- aesthetics

Benefits
- flood control
- carbon storage
- water storage
- waste assimilation
- ecological diversity

Benefits
- future drugs
- potential gene pool
- recreational options

Benefits
- satisfaction from knowing the resource exists

Benefits
- passing benefits to future generations

Full-Cost Pricing for Water

Full Cost Pricing

- Martin et al. (1984): Tucson, AZ.
  - failure to include the increasing costs related to declining groundwater levels resulted in water prices to be underpriced by 58%

- Renzetti and Kushner (2004): Niagara Region utility
  - cost of water supply and sewage treatment is substantially understated by a factor of 16%-55%
Full-cost pricing

- Economically-efficient (full-cost) pricing would lead to re-allocation of water resources among different sectors to achieve maximum societal benefits

- **But**: economically-efficient full-cost pricing is too information intensive (and may not be politically feasible)

- **Solution**: combination of water resource management strategies

What is the most important motivator for the majority of homeowners?

- It really depends on local conditions

- Consider some evaluation results for:
  - Water rates
  - Education measures
  - Watering restrictions
Water Rates

- **Price Elasticity of Demand**: % reduction in amount purchased in response to % change in price
Price Elasticity of Residential Water Demand

- Estimates vary from study to study
- Dalhuisen et al. (2003):
  - 314 price elasticity estimates from 64 studies (published in 1963 - 2001)
  - Mean of elasticity estimates are -0.41
  - 10% increase in price will decrease demand by ~4%
  - Range of estimates: from -7.47 to 7.90

Florida: Long-run Price Elasticity of Residential Water Demand

<table>
<thead>
<tr>
<th>Profile</th>
<th>Assessed Property Value</th>
<th>House Size (Ft²)</th>
<th>Price Elasticity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>$57,890</td>
<td>1,350</td>
<td>-0.39</td>
</tr>
<tr>
<td>2</td>
<td>$84,330</td>
<td>1,727</td>
<td>-0.51</td>
</tr>
<tr>
<td>3</td>
<td>$126,932</td>
<td>2,197</td>
<td>-0.84</td>
</tr>
<tr>
<td>4</td>
<td>$197,400</td>
<td>2,841</td>
<td>-0.56</td>
</tr>
</tbody>
</table>

Determinants of Price Elasticity of Residential Water Demand

- Price of water from alternative water sources;
- Climate/weather;
- Cultural norms;
- Initial water rates/usage;
- Income;
- Type of use (e.g., indoor vs. outdoor);
- Short-run versus long-run;
- Home and household characteristics;
- Customers’ knowledge of their water rates;
- Rate structure; wastewater and fixed charges;
- Presence of other conservation/education programs;
- Environmental attitudes.
Educational Measures

- Reduce demand by 2 - 5%

- Effect varies depending on your target audience and specific methods used

Mandatory Watering Restrictions

- **Colorado**: 18 – 56% per capita water use reductions (Kenney et al. 2004)

- **California**: 29% reduction in household water use (Renwick and Green 2000)

- **Florida** (Olmsted 2008):
  - Hillsborough and Orange Counties: 17 – 18% (by utilities)
  - Seminole County - no reductions
  - South Florida – up to 21.5% (one day/week watering restrictions)
Main Determinants of Household Water Use

- **Indoor**
  - Household occupancy,
  - Income,
  - Type of water intensive household appliances installed

- **Outdoor**
  - Climate / evapotranspiration
  - Plot size
  - Irrigation method
  - Cultural norms

What is the most important motivator for the majority of homeowners?

- Collection of household-level data about factors affecting household water demand is important in targeting management strategies
  - Affect saving potential, and therefore, relative return from implementation of conservation programs

How do you collect behavior change data after the educational sessions?

- Work with your water utility
- Think about main determinants of household water use
- Collect water use data for program participants and non-participants
- Collect water use day before and after your session (~12 months)
How do you collect behavior change data after the educational sessions?

- Work with your water utility
- Collect water use data for program participants and non-participants
- Collect water use day before and after your session (~12 months)
- Collect water use for participants and non-participants
- Think about main determinants of household water use
Thank you!
Tatiana (Tanya) Borisova
Assistant Professor,
Food and Resource Economics Dept., IFAS
University of Florida

tborisova@ufl.edu, 352-392-1881 ext. 317