DROUGHT DEMAND MANAGEMENT: ONE SIZE DOES NOT FIT ALL

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DROUGHTS ARE MORE THAN ONE TIME EVENTS

A 200-year drought?

Evidence from tree rings shows that drought was historically much more widespread in the American West than now, while the 20th century was wetter than normal. Percentage of the West affected by drought from 800 A.D. to 2000:

- **Medieval megadroughts**: The West experienced two abnormally dry periods lasting close to 200 years each during the Middle Ages.
- **1850**: California becomes state

Source: E.R. Cook et al, Earth-Science Reviews

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DROUGHT IMPLICATIONS

- **Supply**
  - Reduced supplies
    - Increased competition
  - Allocation reductions
    - More expensive supplies used to meet demands

- **Demand**
  - Conservation
    - Legislation
  - Demand management
DROUGHT RESPONSE OPTIONS

Supply Management/Augmentation

- Access to additional sources of water can mitigate susceptibility to supply interruptions
- Capital and operations costs can be prohibitively high

Demand Management

- Customer water demands reduced via adopted policies
- Relatively low cost
- Yield public welfare maximizing outcomes
WHAT IS DEMAND MANAGEMENT?

- Pricing
- Pleading
- Mandating
- Rebating
- Educating
- Plastering
METHODS OF DEMAND MANAGEMENT
PLEADING/MANDATING/EDUCATING/PLASTERING

- Voluntary calls for conservation
  - 5% - 7% demand reductions
- Mandatory end-use restrictions
  - Ordinances to target specific types of usage
  - Effectiveness dependent on enforcement

WATER OUTDOORS
NO MORE THAN
2 TIMES
PER WEEK

LET'S GET FRIENDLY
THIS SUMMER
This Fall

LIVE WITHIN YOUR BUDGET
CALIFORNIA FRIENDLY. SAVE WATER. SAVE TIME.
Let your lawn stay dry this summer and give it a break from this heat wave. Consider switching your outdoor water use to drought-tolerant plants. For more information, visit www.ca.gov/wr.
Targeted drought conservation programs
- Rebates for efficient devices and less water-intensive activities
  - Reductions achieved without changing customer behavior
METHODS OF DEMAND MANAGEMENT
CONSERVATION PRICING

- Drought rate increases
  - Price signal to customers
- Rate structure changes
  - Tier widths/rates adjusted to reflect drought
- Penalties
  - Changes to rates may not elicit required reductions
ECONOMICS – TRUE VALUE OF WATER

- Efficient allocation of scarce resources via prices
- Rate structure design encourages customers to report true value
  - Inclining tiers
  - Water budget
- Customers adjust demand
ECONOMICS – DEMAND ELASTICITY

- **D1**: Inelastic use
  - e.g. indoor water use
- **D2**: Elastic use
  - e.g. outdoor water use

- Quantity reductions for inelastic use
- Price increases for elastic use
DROUGHT RESPONSE PORTFOLIO

**Policy Options:**
- End Use Targeted Drought Rates
- Outreach
- Mandatory Restrictions
- Financial Recovery Drought Rates
- Penalties
- Optimize Public Welfare

**Policy Options:**
- Outreach
- Mandatory Restrictions
- Penalties targeting end use

**Policy Options:**
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- Financial Recovery Drought Rates
- Penalties

**Policy Options:**
- Outreach
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CASE STUDY: ALAMEDA COUNTY WATER DISTRICT

- Supply
  - 40% California State Water Project (SWP)
  - 0%-5% of SWP allocation received in 2014
- Implemented efficiency ordinances
- Prohibited excessive irrigation runoff
- Limited allowable irrigation days
  - June – Sept: 2 days
  - Oct – May: 1 day
- Utilized existing rate stabilization fund and implemented drought surcharge
- Educated customers via web-based drought surcharge calculator

- 35.3% cumulative savings (June – Aug 2015 compared to June – Aug 2013)
CASE STUDY: IRVINE RANCH WATER DISTRICT

- Developed alternative demand management plan
  - 1 of 2 agencies in CA to have plan approved by State Water Resources Control Board

- Plan utilized IRWD’s existing water budget rate structure
  - Reduced indoor water budget from 55 GPCD to 50 GPCD

- Messaged customers by including a comparison of customer usage to neighborhood usage with water bill

- 17.8% cumulative savings (June – Aug 2015 compared to June – Aug 2013)
CASE STUDY: CITY OF SANTA CRUZ

- **Supply**
  - 95% from local streams
  - 5% from groundwater

- 25% reduction in available supply due to drought

- Implemented a combination of drought demand management, water use restrictions, and revenue stabilization strategies
  - Increasing penalties for usage over allotment
  - Water waste fines
  - Water conservation school
  - Monthly meter surcharge to recoup lost revenue

- 30.7% cumulative savings (June – Aug 2015 compared to June – Aug 2013)
CASE STUDY: MOULTON NIGUEL WATER DISTRICT

- Water budget-based rate structure
  - Usage tiers calculated to reflect efficient indoor & outdoor use
- Extensive outreach campaign
  - Weekly postcards
  - Online drought bill calculator
- Rebates for turf removal/replacement and efficient appliances
- Alternate plan approval by SWRCB
  - 1 of 2 in California
- Water Shortage Contingency Plan (WSCP)
  - Resolution adopted Feb. 2015
  - Stage 1 implemented June 2015
    - Voluntary calls for reduction
  - Stage 2 implemented July 2015
    - Penalties for usage in excess of budget
CASE STUDY: MOULTON NIGUEL WATER DISTRICT

• 23.5% cumulative savings (June – Aug 2015 compared to June – Aug 2013)
CLOSING REMARKS

- Supply-based drought responses are time and capital intensive
- Demand-based management strategies address supply scarcity while maximizing public welfare
- Critical issues for drought-response policy:
  - How much information is available
  - How quickly the information is needed
  - Whether the utility is positioned to gather, process, and analyze the information
- The most effective responses are often a combination of policies
- No one-size-fits-all approach to drought response
FURTHER INFO

- “Drought Demand Management: One Size Does Not Fit All”
  - AWWA Journal, January 2015
- “A Portfolio Approach to Drought Demand Management”
  - Trinidad 4, 10:30 AM