Water Reuse, Growth and Climate-Resilient Cities

Prof. Christopher Scott
Udall Center for Studies in Public Policy
School of Geography and Development
University of Arizona
Research supported by WateReuse Research Foundation

• Determine challenges to sustainable water reuse under rapid growth in the Southwest United States
• Improve understanding of the interactions among technology, cost, institutions, and public choice
• Objectives
  – Partner with public utilities to inventory existing reuse
  – Assess public attitudes on water reuse as related to growth
  – Identify institutional restrictions and enabling conditions for supply-substituting water reuse
  – Assess impact of reuse on regional water demand, supply
  – Provide guidance on incorporating public input into water reuse planning
Climate Change and Growing Cities

Urban authorities often say:

1. “Climate change is a long-term process – why do we have to be concerned today?”

2. “We have more pressing concerns, like supplying water and sanitation services”

3. “Climate change means international carbon agreements – best left to federal authorities”
Valid Concerns, *But*…

1. Climate change is long-term, *but* variability (flood, drought, heat-waves) are already occurring.

2. Providing services today is a challenge, *but* these will be most affected by climate: *water is a lens that focuses climate change*

3. Climate (carbon) mitigation depends on international agreements, *but* adaptation is a local priority where water reuse, urban agriculture are important strategies.
Why Adaptation? What is It?

• Foresee future trends, even with uncertainty

• Respond to information, from your own sources or others

• Build resilience
  – ability to face major changes or shocks (like prolonged drought or devastating flooding) and reorganize though not necessarily to the original state
  – flexibility to keep planning options open
Urban vulnerability to climate change/prolonged drought

• ....Concerns:

  – Refurbishment of existing infrastructure
  – Equitable distribution
  – Lack of access to funding or technology
  – Larger institutional framework of water management, esp. water rights
  – Length of current drought
  – Need for regional scale data and planning
How do we build resilience?

• To facilitate key water and water reuse strategies:
  – Consider public perceptions
  – Understand managers’ priorities
  – Enhance local and regional planning
Public perceptions on water reuse and water security

- Concerned about future water supplies: 97% agree, 2% disagree, 1% neutral, 1% don't know
- Reuse will conserve groundwater: 82% agree, 11% neutral, 3% disagree, 4% don't know
- Reuse will increase water security: 75% agree, 15% neutral, 15% disagree, 4% don't know
- Reuse will reduce vulnerability to shortage: 48% agree, 25% neutral, 15% disagree, 12% don't know
- Reuse will reduce dependence on CAP: 66% agree, 15% neutral, 15% disagree, 12% don't know
Public perceptions on water reuse and regional growth

- Reuse will promote growth: 10% disagree, 43% agree, 30% neutral, 17% don't know
- Reuse will limit growth: 6% disagree, 13% neutral, 20% agree, 61% don't know
- Oppose economic growth with pop growth: 1% disagree, 33% agree, 27% neutral, 39% don't know
- Favor economic growth with pop growth: 1% disagree, 36% neutral, 25% agree, 38% don't know
Managers interviews

Interviews professional profile

Managers/directors 19
Advisors/advisory groups 17
Planners 9
Regulators 1
Total 46
Managers and planners frame the problem:
“We need a vision of our future”

- “Establish a secure water future that applies statewide as an operating plan.”
- “Figure short and long term goals and use adaptive management to absorb new information.”
- “Growth will occur regardless of the status of water or water reclamation. Having or not having reclaimed water will not promote growth, but it will enable water managers to deal with it.”
- “Build where the infrastructure is available or planned.”
Willingness to invest continued. . .

• “We face a vulnerability we never dealt with in the past; we need to make certain our infrastructure will sustain us.”

• “We encounter increasing competition for dwindling traditional water supplies.”

• “Climate change impacts, e.g. decreasing snow pack, impact both quality and quantity of water available.”

• “Infrastructure system is aging and not designed for drought stress.”
Managers and planners frame the problem: We need to reduce uncertainty

- “We acknowledge global warming and drought, but we continue to depend on groundwater and CAP [major infrastructure] —what happens if drought continues or gets worse?”

If we [water providers, planners, managers] use a regional approach, this would bring regulatory issues up to date.
Synthesis: water reuse & growth

- reclaimed water viewed as a source of new supply despite groundwater mining (negative water balance)

- habitat and riparian area uses of reclaimed water likely to be affected

- public perception is increasingly amenable to indirect potable reuse with safeguards

- patterns and rates of growth are unlikely to be significantly affected by public perception, and minimally so by regulatory controls on water reuse
Resilient Cities

• Those that foresee future trends:
  – Population and economic growth, including spatial patterns
  – Water supply (from where, variability in amount, quality)
  – Water demand (changing consumption, quality for use)

• Those that build institutional capacity for resilience, to face multiple changes not just climate
Climate Information & Policy Product

Border Climate Summary (BCS)

Resumen del Clima de la Frontera

http://www.climas.arizona.edu/outlooks/bcs
Questions or comments?  
cascott@email.arizona.edu

Thanks to WateReuse Research Foundation and International Water Management Institute