WRF Agricultural Water Reuse Focus Area

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The Water Research Foundation

WateReuse Arizona Conference – July 23, 2018
The (New and Improved!) Water Research Foundation

Merged July 2016

Officially integrated January 2018
WE&RF and WRF Integration

- A more interconnected research and innovation agenda
- Access to an expanded collection of water research
- Leverages funding
- Communicates more effectively with government partners
- Strengthens relationships with water partners
- Creates a model for collaboration across the water community

The evolution of water research

- 1,200 subscribers
- 2,300 research studies
- $700M integrated research portfolio

Denver, Colorado

Alexandria, Virginia
What does The WRF do?

Provide exceptional water research

Accelerate innovation and adoption of technology

Transfer knowledge

Set an industry research agenda

Applied research in water and the environment

Drinking Water  Stormwater  Wastewater  Water Reuse  Desalination
WRF Reuse Program Covers the Full Spectrum of Reuse

- Potable Reuse
- Urban Irrigation
- Industrial Reuse
- Food Crop Irrigation
- Wetland/Habitat Restoration
Water Reuse for Agriculture

- Municipal effluent for irrigation of crops (food and non-food)
- Irrigation quality reuse is the most common use with the majority of water being used for common space, park and public property
- Agricultural reuse for food crops is gaining momentum as a traditional water supply alternative
  - Ag reuse is common in California and Florida, and is the topic of rule making in Colorado and Hawaii
  - Additional monitoring is generally required (pathogens)
WRF Agricultural Water Reuse Research Program: Gaining Momentum in Recent Years

- State of Irrigated Agricultural Water Reuse – Impediments and Incentives (Reuse-15-08) developed and prioritized by the WRWF RAC
- Based off of preliminary findings of Reuse-15-08, three additional ag reuse projects initiated by WE&RF
- California State Water Resources Control Board awards a $4.5M grant to WRF for Reuse Research
  - $3M for Potable Reuse Research
  - $1.5M for Non-Potable Reuse Research
  - Agricultural Water Reuse and Industrial Reuse identified as priority topics
- Four agricultural water reuse research projects initiated in 2018

2015

2016

2018
WRF Agricultural Water Reuse Workshop

• January 31, 2018 Regional San in Sacramento
• Over 100 attendees (growers, regulators, consultants, water and wastewater agencies, academia)
• Status of ag water reuse, findings from WRF research efforts and an expert panel session on stakeholder experiences with the use of recycled water for agriculture
WRF Agricultural Water Reuse Research Portfolio

Research areas → Agricultural Reuse

www.werf.org
Ongoing Ag Reuse Projects

Overview of the Current Status of Agricultural Water Reuse

- State of Irrigated Agricultural Water Reuse - Impediments and Incentives (Reuse-15-08)
  - PI Dr. Bahman Sheikh, Water Reuse Consultant

Potential for Groundwater Recharge with Recycled Water on Agricultural Lands in California

- White Paper on Groundwater Replenishment with Recycled Water on Agricultural Lands (Reuse-16-03)
  - PI Dave Richardson, Woodard & Curran

Cost-benefit Analysis of Agricultural Water Reuse

- Evaluating Economic and Environmental Benefits of Water Reuse for Agriculture (Reuse-16-06)
  - PI Dr. Ann Thebo, Pacific Institute

How Agricultural Water Reuse Fits in with FSMA

- FDA Food Safety Modernization Act (FSMA) Produce Safety rule: Opportunities and Impact on Water Reuse for Agricultural Irrigation (Reuse-16-07)
  - PI Dr. Bahman Sheikh, Water Reuse Consultant
Upcoming Ag Reuse Projects

• Identifying the Amount of Wastewater that is Available and Feasible to Recycle in California (4962)

• Developing a New Foundational Understanding of SAR – Soil Structure Interactions to Provide Management Options for Reclaimed Water Use in Agriculture (4963)

• Assessing the State of Knowledge and Impacts of Recycled Water Irrigation on Agricultural Crops (4964)

• Addressing Impediments and Incentives for Agricultural Reuse (4956)

RFP’s to be issued in 2018 – stay tuned and visit: www.werf.org → Research Areas → 2018 Water Reuse Program
Irrigated Agricultural Water Reuse – Impediments and Incentives

• **Reuse-15-08 – Report coming soon!**

• Dr. Bahman Sheikh (Water Reuse Consultant)

• Global inventory of successes, delays, and set-backs in the process of switching from various traditional sources of irrigation water to recycled water

• Provide guidance that facilitates removal of impediments and implementation of effective incentives for use of recycled water for agricultural irrigation
Reuse-15-08 Work Plan

- Literature Review
- Interviews with Farmers and Utilities
- Geographic Information System
- Workshops with Agricultural Community
- Treatment Technologies
- Final Report and Guidance Document
Status of Agricultural Water Reuse

- 41/50 U.S. states report using recycled water for irrigation
- 33,000 MG of wastewater is produced daily
- ~2% of wastewater is currently used for irrigation
- 80% of irrigated croplands within 10 miles of POTW
- 35 high potential POTWs identified in GIS Analysis
  - ~1000 MGD
  - 200,000 ac of irrigated croplands within 5 miles
- Existing unallocated flows in CA could meet recycled water targets several times over

Source: State of Irrigated Agricultural Water Reuse, Impediments and Incentives (Reuse-15-08)
Impediments, Drivers, Incentives

• **Water scarcity** was a most frequently cited driver
• **Costs** are impediments; **Grants and loans** can be incentives
• **Perception** issues of safety were often cited as impediments
• **Regulations:**
  – Cited as Impediments – need for consistent, clear regulations
  – Government Targets and Mandates to Increase Use of Recycled Water Are Significant Incentives
• **Salinity** of water source can be either driver or impediment
• **Technical issues** were not cited significant as driver or incentive

*Source: State of Irrigated Agricultural Water Reuse, Impediments and Incentives (Reuse-15-08)*
Thank you!

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www.werf.org  
Research areas → Agricultural Reuse
Nonpotable Water Reuse

Agriculture  Green Infrastructure  Food & Beverage

Power  Manufacturing  Oil & Chemical Refining
Nutrient content of recycled water is perceived as a *benefit*

**Utilities:**
- Limits on nutrient discharges to surface waters serve as an incentive to practice ag reuse → reducing their discharges to surface waters
- In some parts of the country, increasingly stringent nutrient discharge limits necessitated improvements in treatment processes, leading to increased water reuse including the use of recycled water for agricultural irrigation

**Growers:**
- Salinity and nutrient levels are central concerns for growers
- Nutrients in recycled water can help producers reduce their application of commercial fertilizers—chemicals and manure.
- Real-time data on nutrient concentrations are needed to adaptively manage recycled water to accommodate the variability in fertilization needs throughout a crop’s production cycle

*Source: State of Irrigated Agricultural Water Reuse, Impediments and Incentives (Reuse-15-08)*