

# Rethinking Wastewater: Water Reuse in the United States



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*Re-inventing the Nation's*  
**URBAN WATER**  
**INFRASTRUCTURE**

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# Sewage Farming (19<sup>th</sup> Century)



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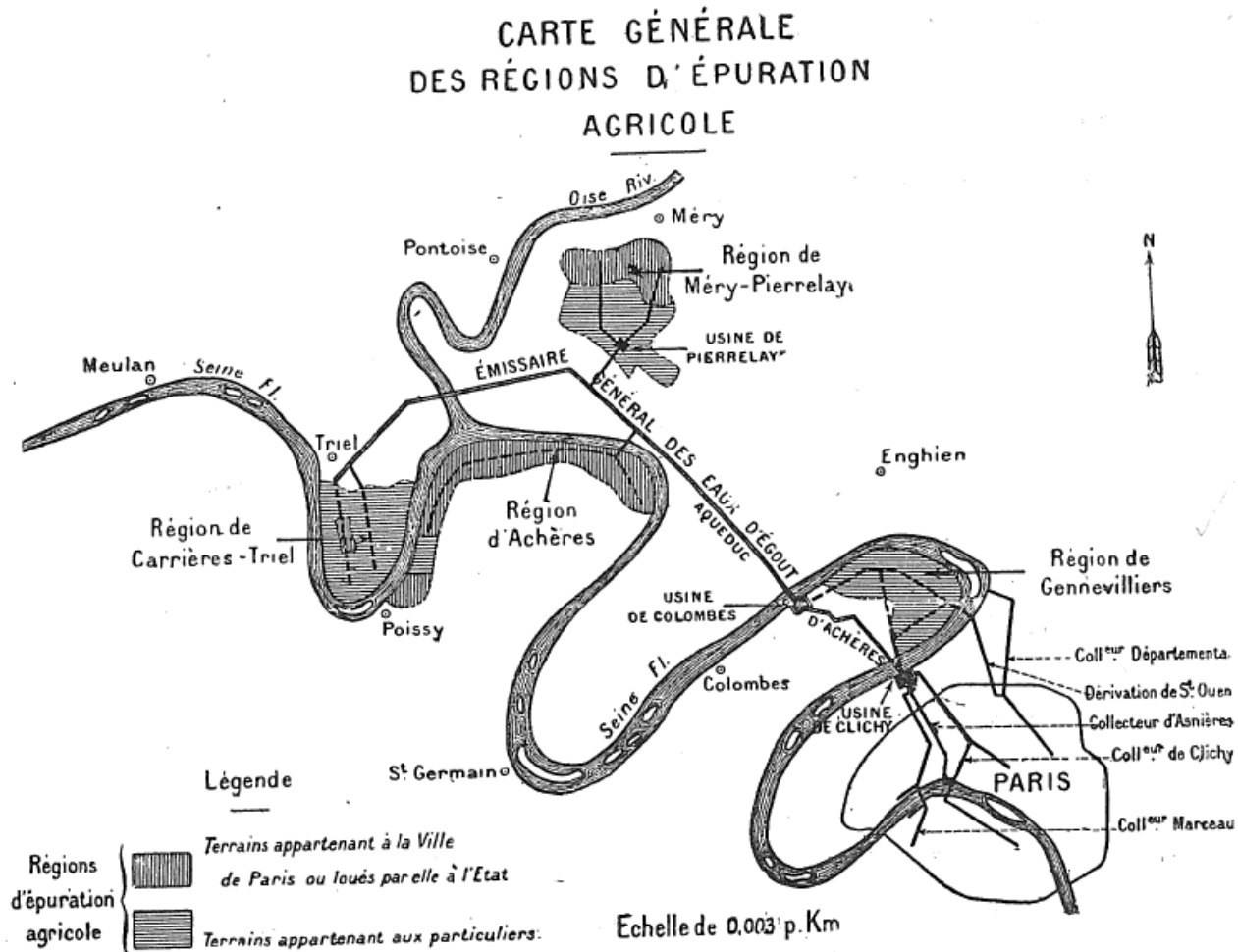




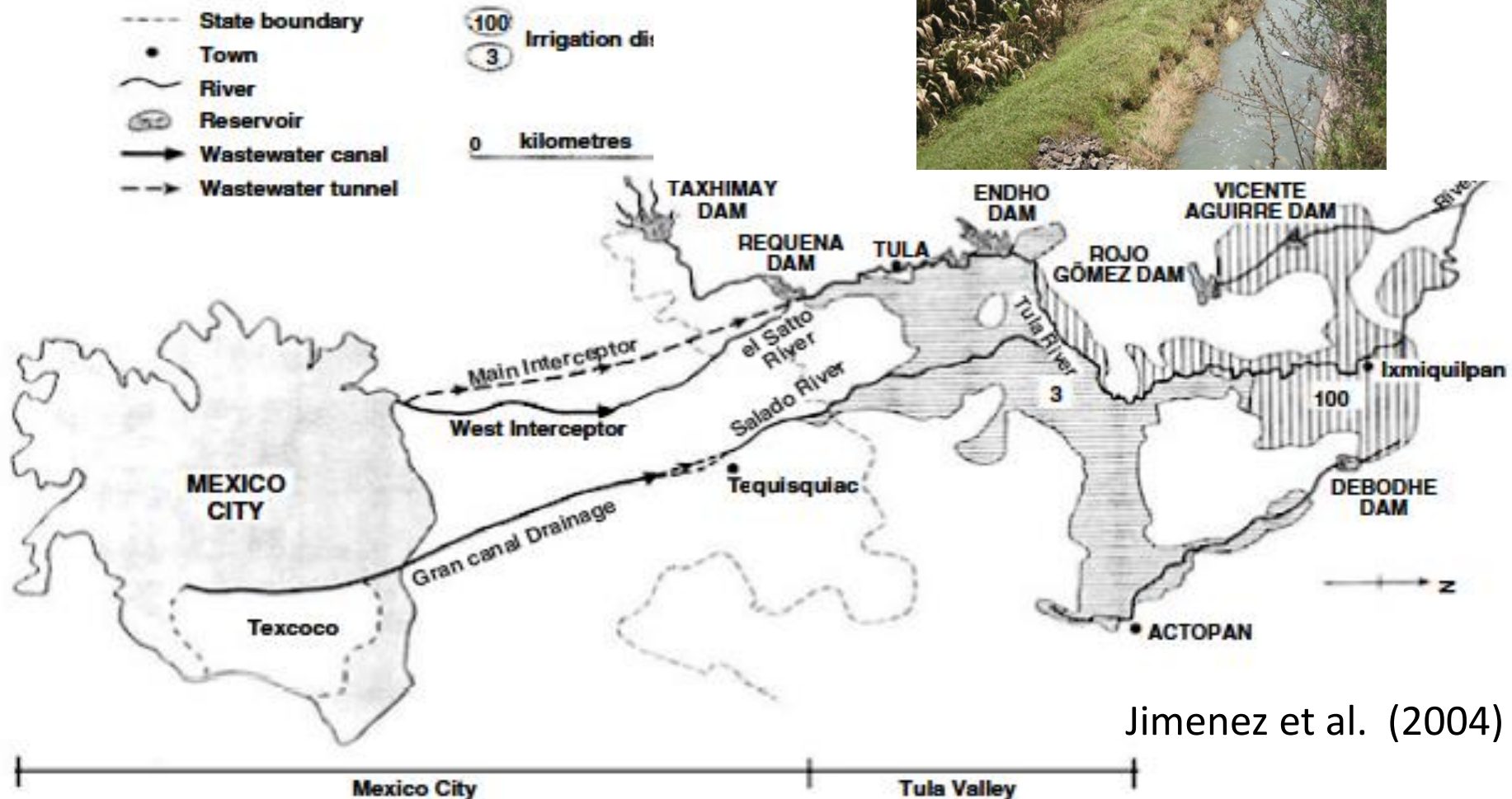
# Sewage Farming (19<sup>th</sup> Century)



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# Sewage Farms in Mexico City



Jimenez et al. (2004)

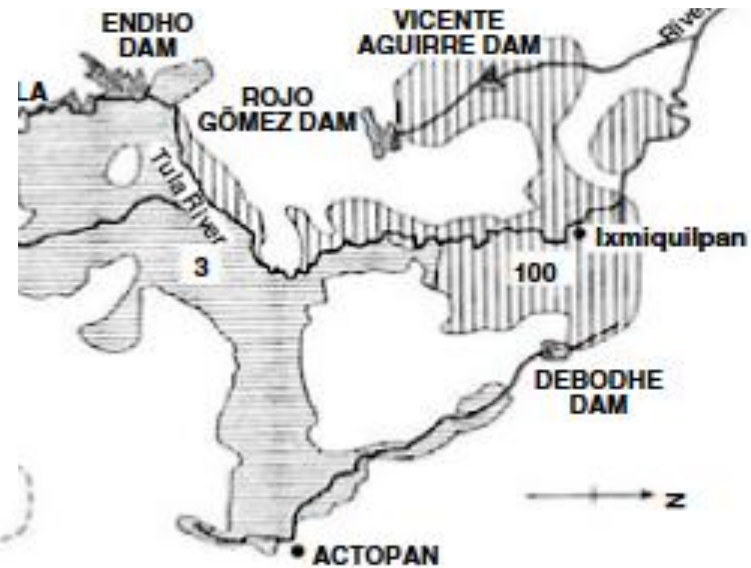
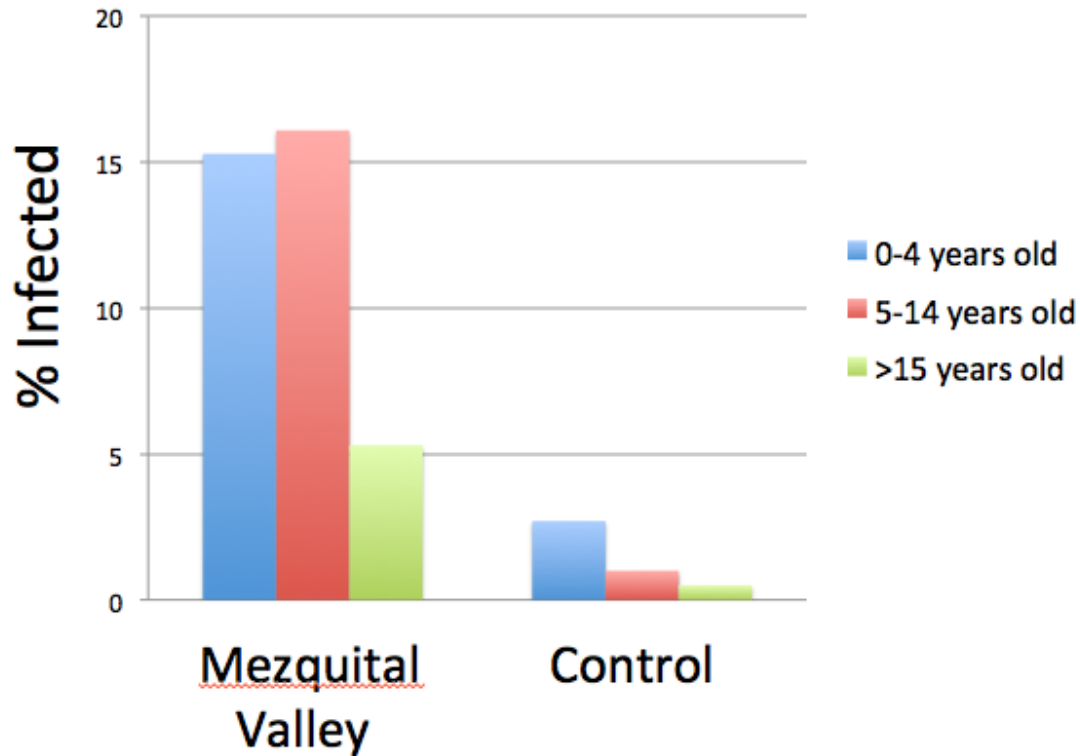




# Sewage Farms in Mexico City



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Jimenez et al. (2004)





# Effluent for Irrigation



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Monterey Regional Reclamation Plant

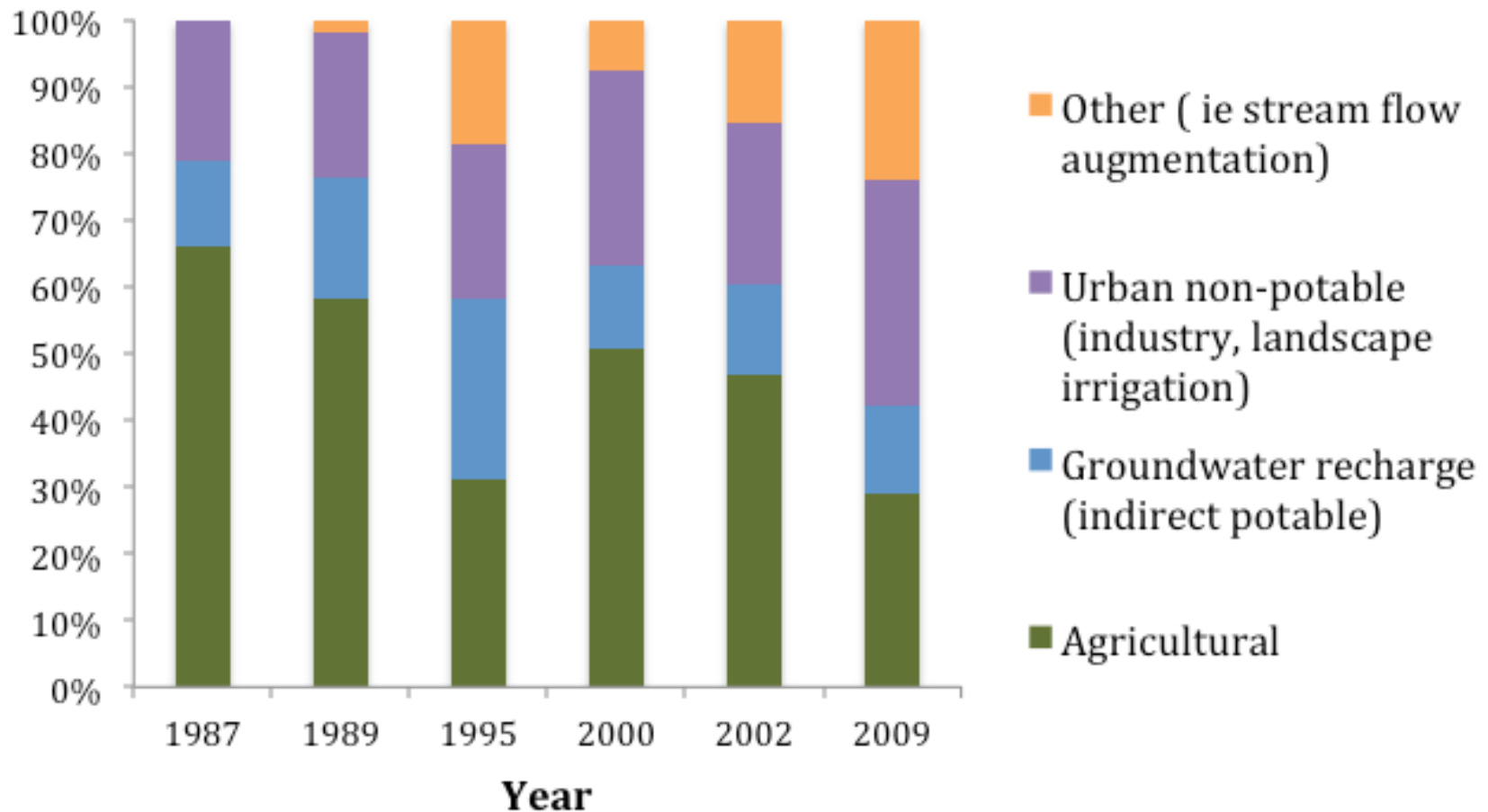




# Effluent for Irrigation



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Monterey Regional Reclamation Plant



# Water Reuse at West Basin



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Irrigation (Title 22)



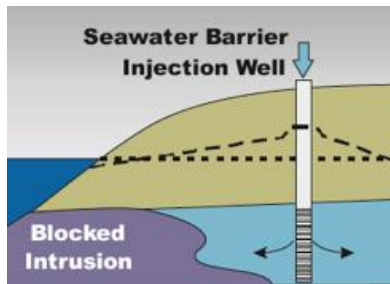
Cooling Towers



Edward C. Little  
Water Recycling Facility



Low-Pressure Boilers (RO)



Groundwater Recharge (RO)

High-Pressure Boilers (RO)



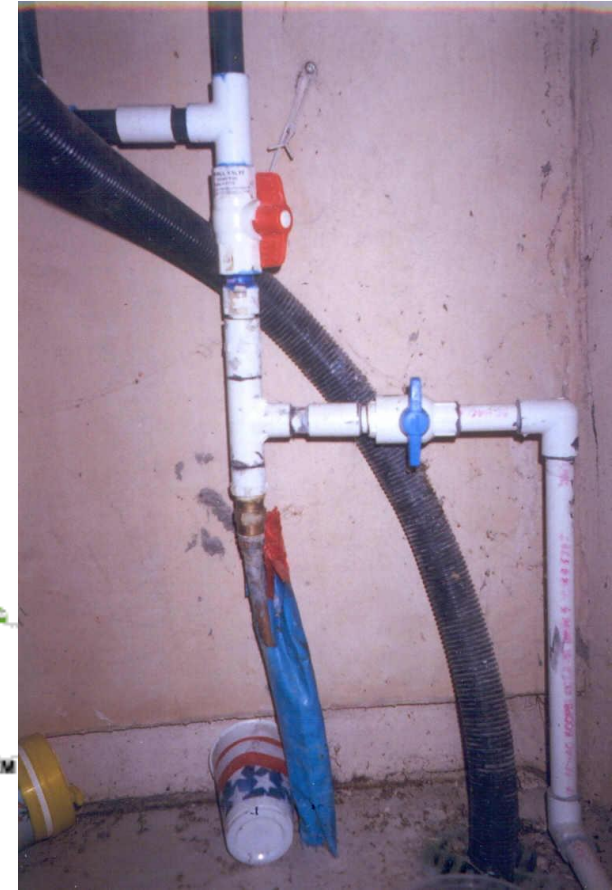
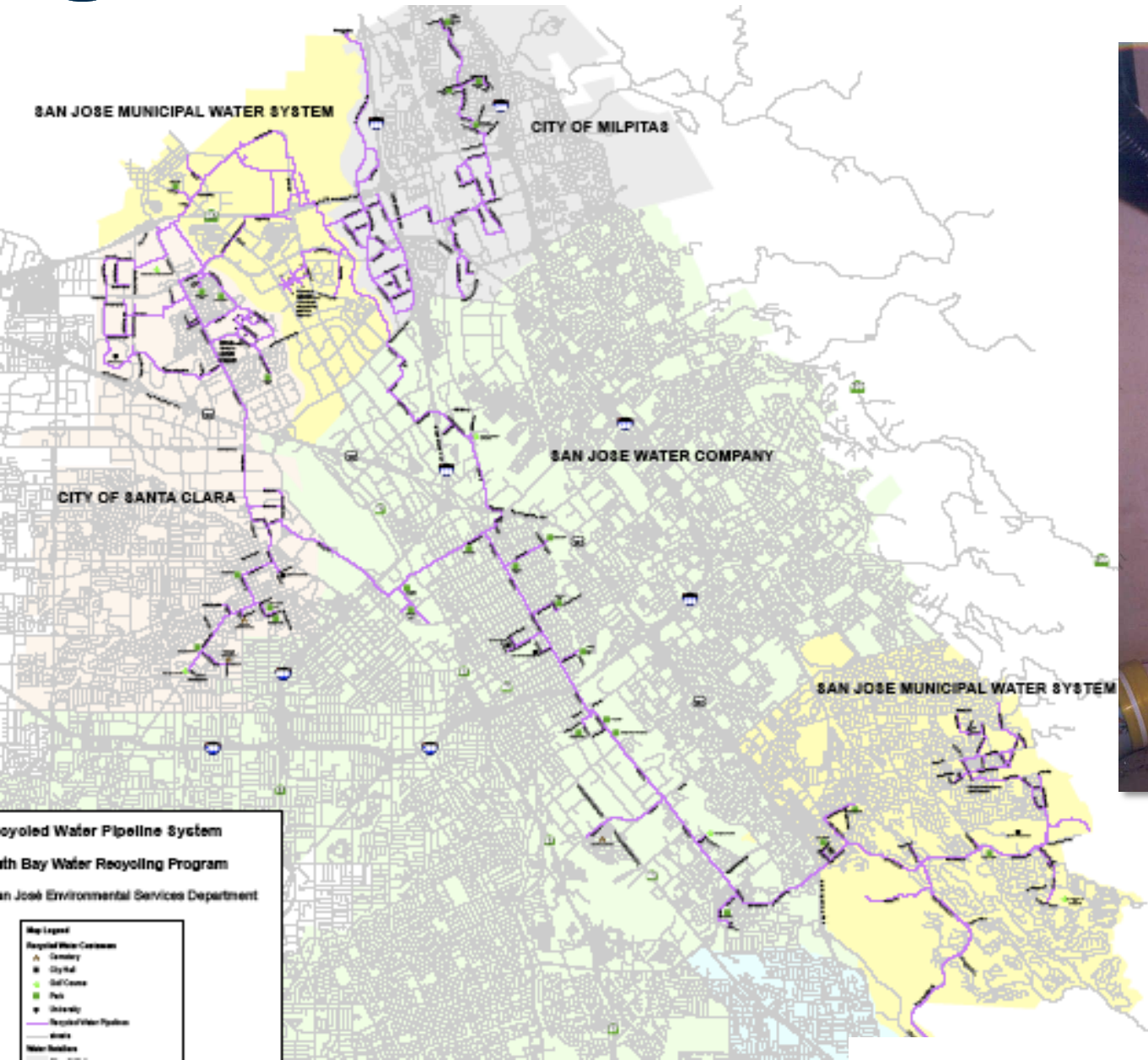




# Limitations of Urban Irrigation



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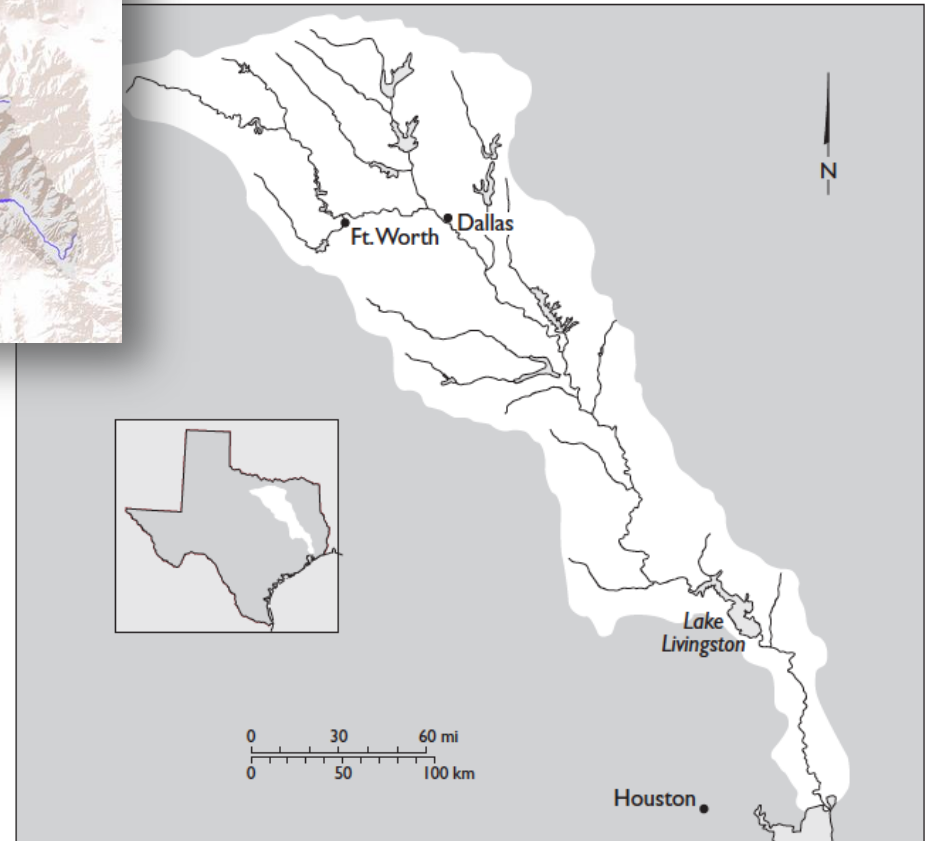
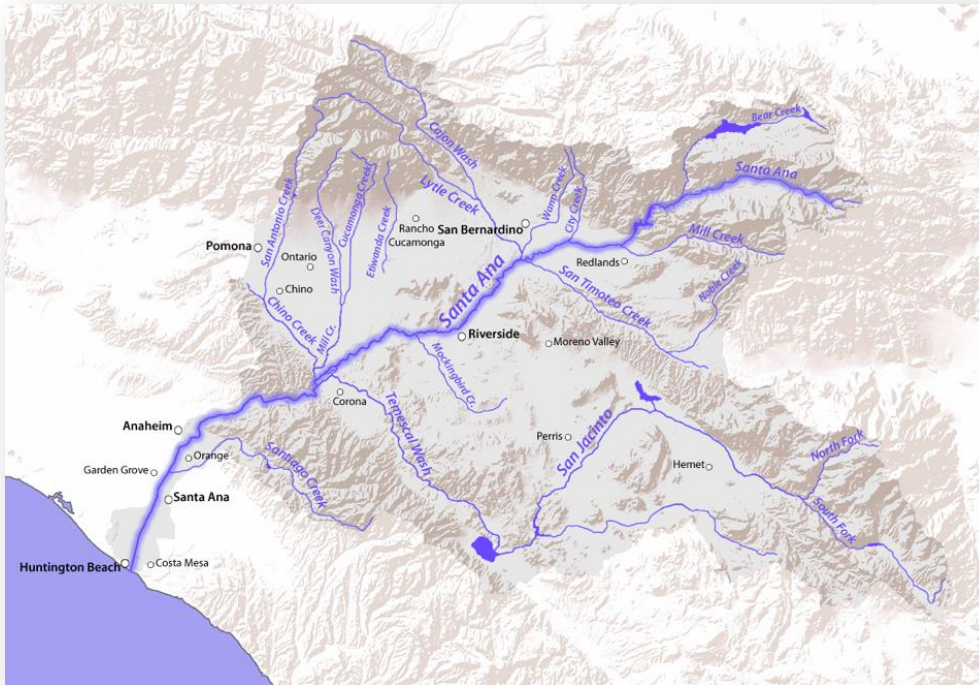




# De Facto Reuse



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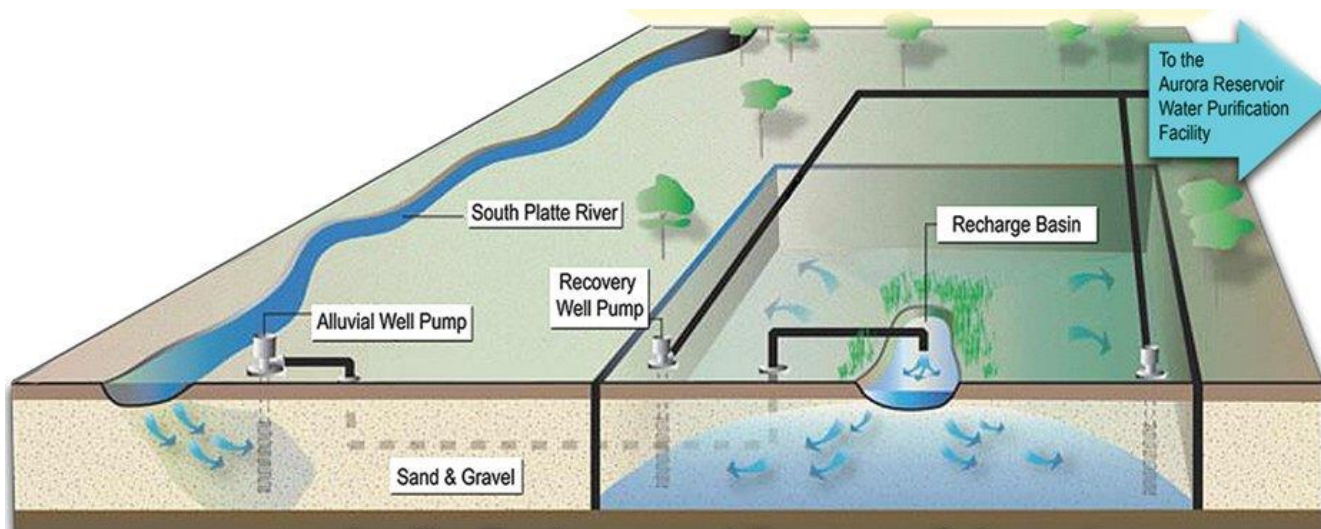




# Managed Natural Systems



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# Potable Water Reuse

Wastewater Effluent



Reverse Osmosis



UV/H<sub>2</sub>O<sub>2</sub>

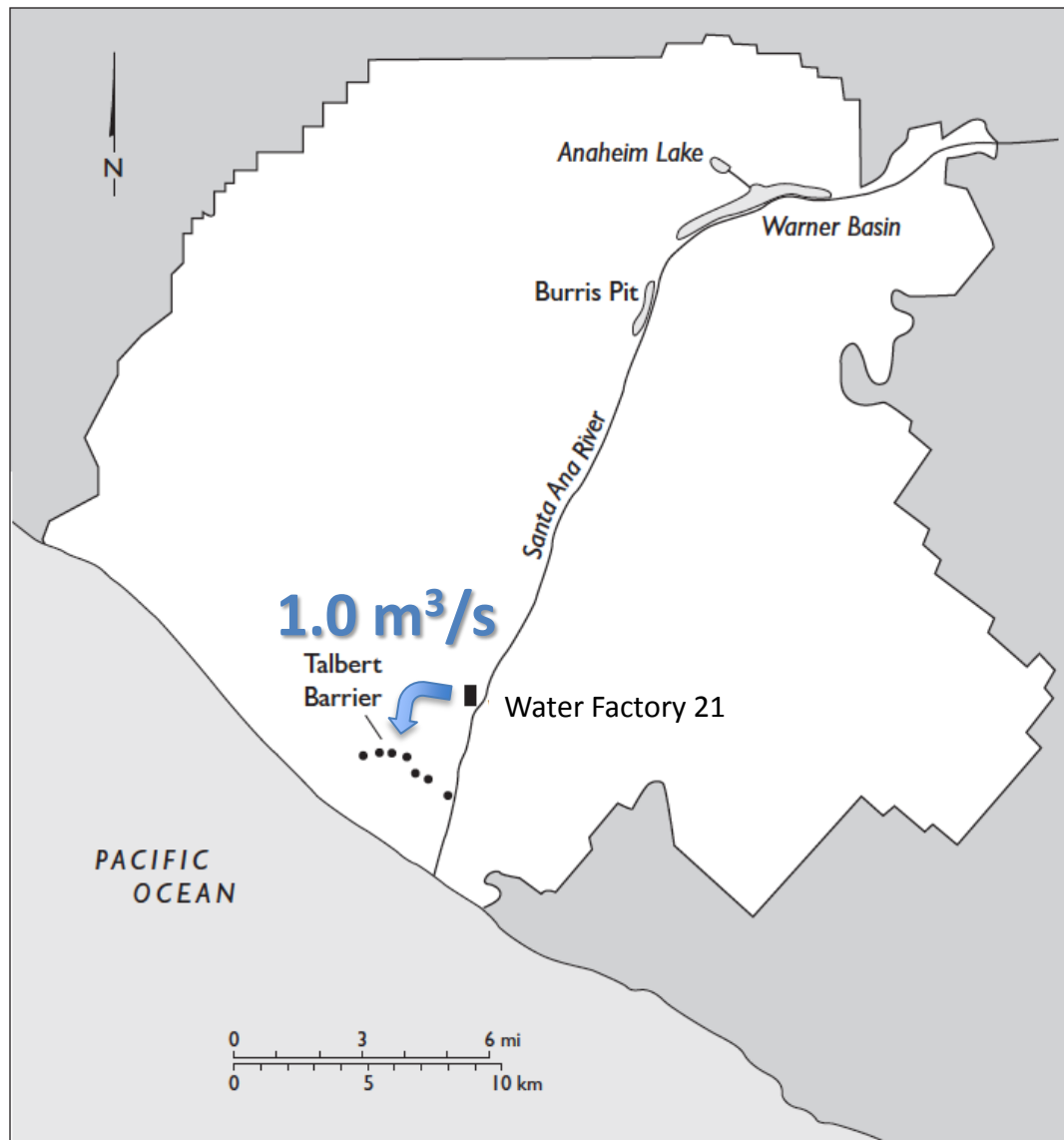
Drinking Water  
Supply





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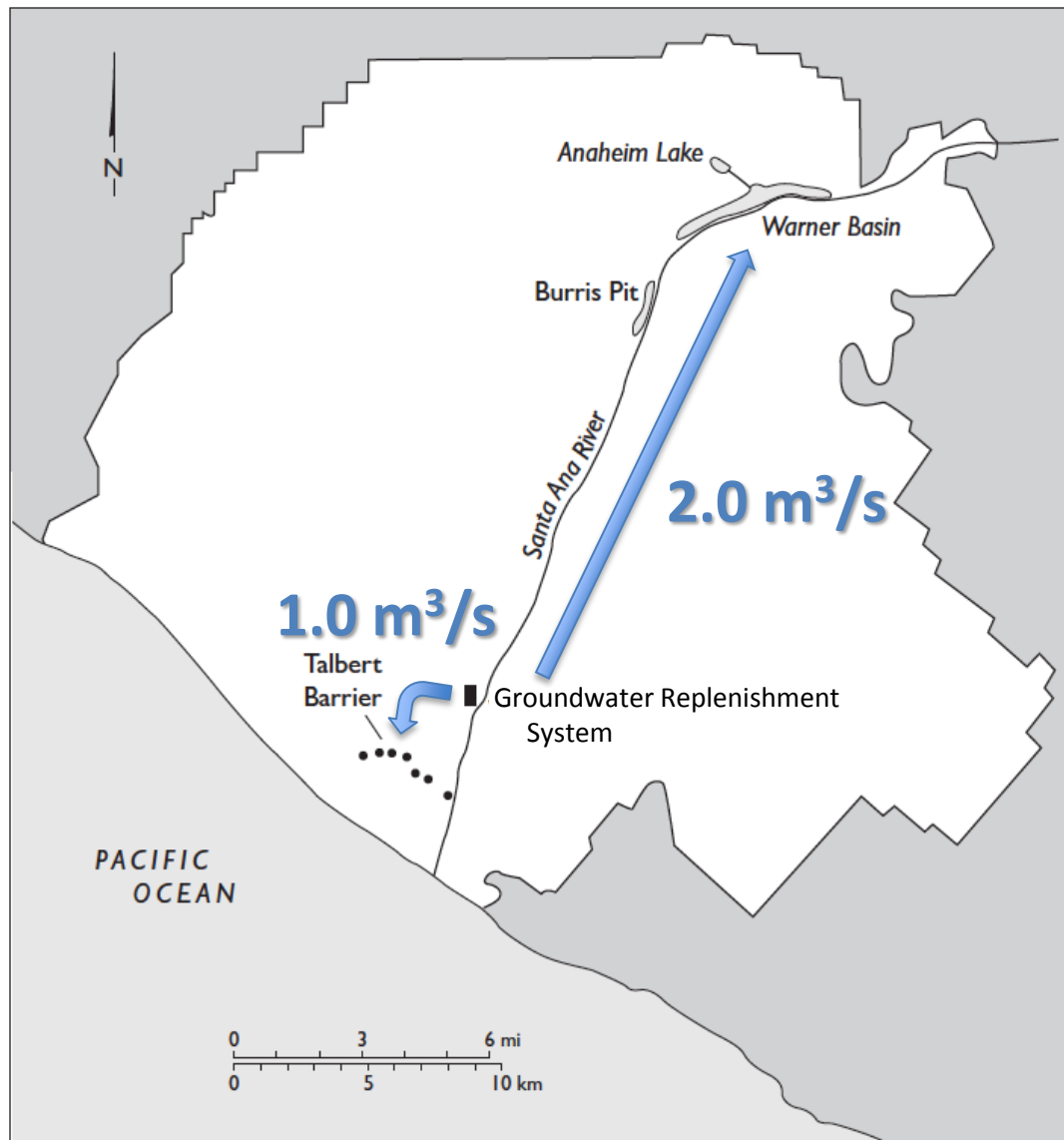
# Potable Reuse in Orange County





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# Potable Reuse in Orange County







# Three Dimensions of Legitimacy



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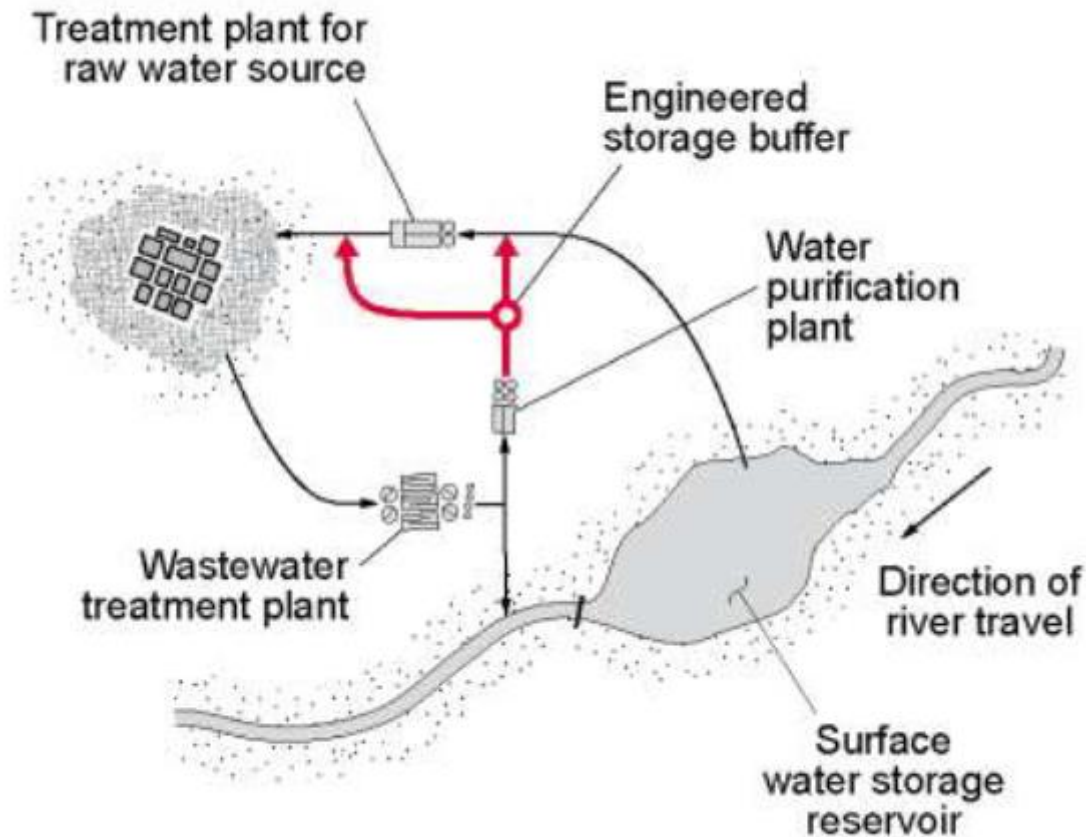
- **Pragmatic:**  
Does it serve self-interest of the community?
- **Moral/normative:**  
Does it comply with external quality standards?
- **Cognitive:**  
Does it mesh w/cultural belief systems/daily experience?





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# Next Stop: Direct Potable Reuse



Tchobanoglous (2012)





# Final Thoughts



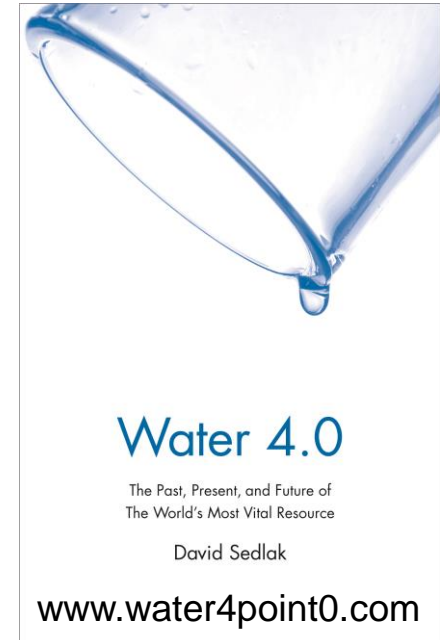
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- **Wastewater is an Important Water Resource**
  - Drought resistant
  - Low GHG emissions relative to desalination
  - Benefits to public health and environment
- **Evolution in Practice**
  - Irrigation has limited potential in urban settings
  - Potable reuse is proven and increasingly accepted
  - Potable reuse requires institutional reform

# Acknowledgments



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