Adaptive Management of Irrigation with Feedback Control to Avoid Groundwater pollution by Nitrate

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1. Reclaimed Water is Reused for Irrigation

The Secondary Effluent is Irrigated with Center-pivot Sprinkler System

2. But, the problem is ... 

Nitrate in the reclaimed water has the potential to pollute underlying groundwater

3. Solutions are ...
   • Observations to identify our system
     - Embedded Networked Sensing (ENS)
     [Drawing by Jason Fisher](http://www.cens.ucla.edu)
   • Prediction models to forecast nitrate transport in subsurface system – Simulation models
   • Adaptive Control methodology to prevent from nitrate pollution by adjusting the irrigation rate based on current observations and simulation models
     - Receding Horizon Feedback Control

4. Embedded Networked Sensing System in Palmdale, CA

[Drawing by Jason Fisher](http://www.cens.ucla.edu)

5. Adaptive Control
   - Receding Horizon Feedback Control (RHFC)

6. Results of Adaptive Control

7. Conclusions

Adaptive control using sensor networks and Receding Horizon Feedback Control is efficient and promising to identify a system, to control irrigation process, and eventually to prevent groundwater pollution while realizing the benefits of reclaimed water.

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