



Does converting land from agricultural to urban use save water?

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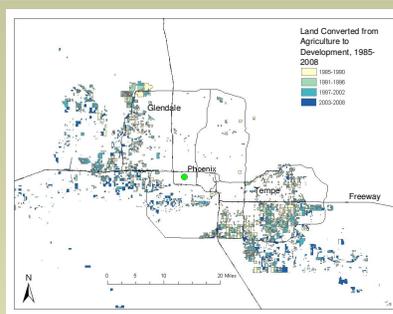
Water in Arizona is managed by the Arizona Department of Water Resources and the Groundwater Management Act, which encourage conversion of land from agricultural to urban use because of the assumption that **converting land from agricultural to urban use is a shift toward a more water-efficient land use**. This research critically examines that assumption.

Analyses were performed at **four spatial scales**.

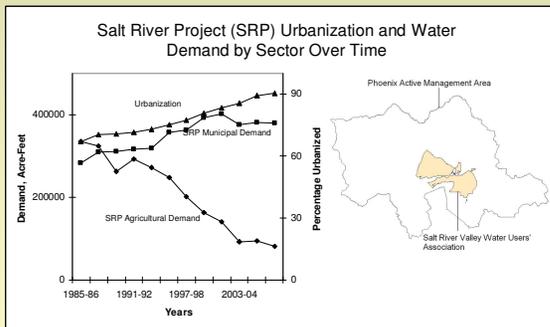
- I. Active Management Area-level** development
- II. Agricultural land** and patterns of conversion
- III. Irrigation district** water demand and urbanization
- IV. Census tract** water demand growth

II: Most former agricultural land is now developed

Two foci of outward expansion (Tempe and Glendale) show outward spreading of agricultural land. The majority of readily accessible agricultural land has been converted. The trend is complex. 2001-2008 land use conversions still occurred on land that was agricultural in 2000, but there is no way to tell if and when that land was in production. Therefore, there is substantial uncertainty as to whether those conversions save water.



III. Case study used to support land use conversion is not generalizable

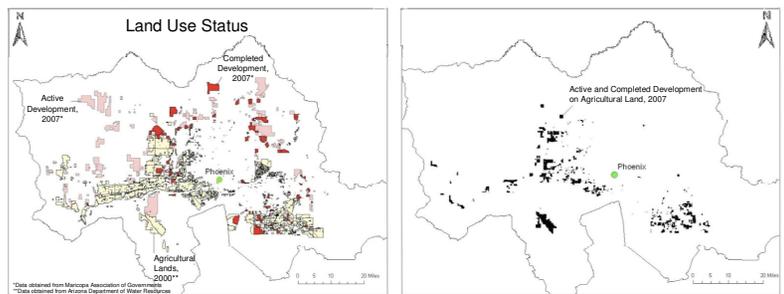


I: AMA-wide development occurring mostly off agricultural land

- 63.5% of completed development in 2007 (red, by acres) occurred off 2000 agricultural land.
- 73% of active development in 2007 (pink, by acres) occurred off 2000 agricultural land.



This strongly suggests that most recent development has not been occurring on agricultural land.



IV: An example census tract illustrates potential lack of water savings

In census tract 610.07, the population grew by 630% to 4,392 between 1990 and 2000, all of which was urban.

With the shift from rural to urban, 936.5 acres were converted from agriculture to urban use.

Using standard assumptions*:

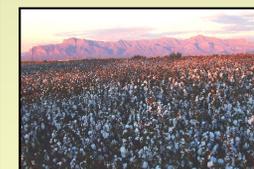
- 374.6 acres cotton would require 1,180 acre-feet per year
- 4,392 residents would require 1,112 acre-feet per year

Therefore, urban demand could potentially exceed agricultural demand over time.



*226 gallons per capita per day (gpcd) residential consumption, 4.2 acre-feet per acre per year cotton consumption with 25% incidental recharge and 40% crop coverage.

Conclusion: Substantial uncertainty remains, but there is **reason to doubt that converting land from agricultural to urban use saves water** and that it might be less common than generally believed.



SRP data are used as justification for the assumption that conversion from agriculture to urban saves water. However, this analysis cannot hold across the AMA for three reasons:

- SRP has been over 50% urbanized since before regulation of agriculture, and recent history consists primarily of densification instead of land use conversion.
- Agricultural water use fluctuates; up and down years in agricultural water consumption have occurred for a variety of factors, not just conversion of land.
- Municipal demand increases parallel to urbanization.

Problems abound in attempting to gauge the effectiveness of water policy in central Arizona. Challenges include:

- Fractured institutions
- Inconsistent/untraceable data among institutions
- Discrepancy between water rights and actual water
- Population and economic growth
- Climate change

Acknowledgment

This material is based upon work supported by the National Science Foundation under Grant No. SES-0345945 Decision Center for a Desert City (DCDC). Any opinions, findings and conclusions or recommendation expressed in this material are those of the author's and do not necessarily reflect the views of the National Science Foundation (NSF). Many thanks to Peggy Nelson and the Community of Undergraduate Research Scholars (COURS), Brian Pompell, and John Covert.