

# INTERCONNECTED FATES: WATER AND FARM SECURITY IN CALIFORNIA'S CENTRAL VALLEY

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## GROUNDWATER MANAGEMENT RECOMMENDATIONS FOR CALIFORNIA AND CENTRAL VALLEY GSAs

**Dramatic groundwater withdrawals have been spurred throughout the state of California** over the last decade as surface water restrictions have increased and water allotments from interbasin and interstate transfers have decreased (*Figure 1*). Agriculture, the state's largest water consumer<sup>i</sup>, has the ability to implement water-use changes that will result in massive reductions to the state's overall water withdrawals.

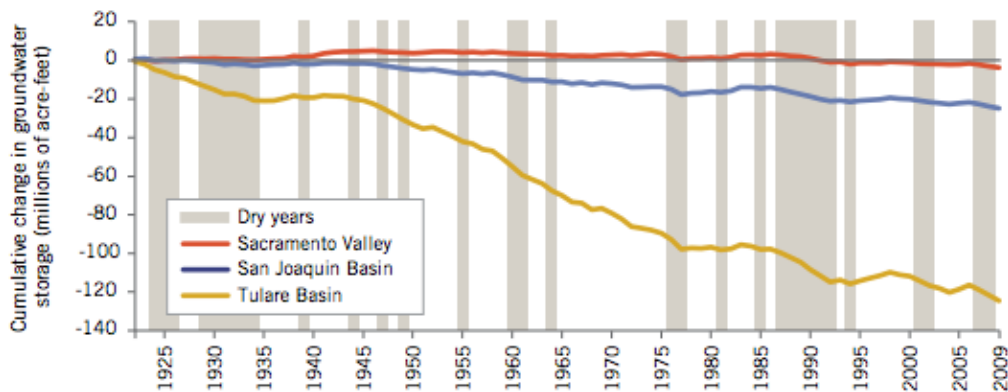
The Sustainable Groundwater Management Act (SGMA) of 2014 wisely emphasized localized groundwater sustainability agencies (GSAs) as the primary method of groundwater policy creation, however, a charge to protect groundwater does not mean that GSAs will look to reduce overall water consumption. In fact, a cursory search of Groundwater Management Plans (GMPs) revealed that for some GSAs, the primary groundwater saving tactic is to increase interbasin purchases and in-lieu recharge rather than adopt water-saving measures<sup>ii</sup>. Shifts of this kind may marginally improve

local groundwater levels, but in a complex system that is facing ongoing drought, agriculture and the ecology of the entire basin will rely on total water-usage decreases.

### RECOMMENDATIONS

A critical step in reducing agricultural water usage is to **improve efficiencies in the delivery of water**. Water infrastructure throughout the valley is old and decaying, and with increased subsidence from the over-pumping of groundwater, canals are buckling – losing up to 60% of their capacity<sup>iii</sup>. Improving conveyance systems also allows for the **conversion of irrigation systems from flood to drip**, further reducing water requirements. Finally, **encouraging the creation of localized groundwater markets** will ensure that conservation efforts are being sought out, that water is going where it is most needed, and most importantly that farmers are able to make decisions about their operations that not only financially benefit them but that benefit the ecosystem as well.

## UNSUSTAINABLE GROUNDWATER PUMPING IS DEPLETING RESERVES IN THE CENTRAL VALLEY



SOURCE: The Nature Conservancy, using California Department of Water Resources data and models.

NOTES: Dry years are those classified as critical or dry in the Sacramento Valley based on the California Cooperative Snow Survey.

Figure 1. Cumulative change in groundwater storage in California's Central Valley from 1925-2009.

## STRATEGIES

### Improve efficiencies in water delivery

Water canal infrastructure in the Central Valley is old and it's deteriorating quickly. Senator Feinstein's *Restoration of Essential Conveyance Act* from May 2020<sup>iv</sup>, was intended to rebuild and rehabilitate Central Valley water canals, however, putting those funds towards the conversion of existing canals to more-efficient water delivery systems would create a flexible water delivery infrastructure; that, combined with the conversion from flood irrigation to drip and smart scheduling irrigation could equal water savings of upwards of 6.6 million acre-feet per year<sup>v</sup>. While converting canal irrigation to more efficient delivery systems would require additional funding, the increased efficiencies could potentially outweigh the longer-term costs of securing additional water supplies.

### Reduce demand

In an area with few of its own surface water resources, and with one-sixth of the Nation's land under irrigation,<sup>vi</sup> the Central Valley relies heavily on groundwater at a rate of 20-30% of annual irrigation totals<sup>vii,viii</sup>. While there are a number of ways to reduce withdrawals including regulated deficit irrigation and crop shifting, shifting from flood irrigation to drip irrigation is one way to significantly decrease groundwater withdrawals without requiring farmers to change their entire operation or production crops.<sup>ix</sup>

The Alfalfa Project (TAP) in the San Joaquin Valley is a good example; it has created a unique system of financing aimed at reducing groundwater application to alfalfa crops by providing farmers with loans for water-efficient precision drip irrigation systems. The program, which has already converted 2,000 acres of farmland, expects to see a total reduction of 300 billion gallons

of water use in the final phase of the project<sup>x</sup>. This type of loan mechanism and irrigation conversion, when applied to additional crop types, could lead to significant groundwater savings throughout the valley, and improved yields. Additional benefits include improved crop retention, decreased salination, and a reduced need for herbicides due to the decrease in weed growth.

Possible consequences and costs of delivery conversion are that drip irrigation may not lead to improved groundwater recharge in some areas due to more total water leaving the system through yield increases in high-water retention crops such as tomatoes, and the loss of recharge via flood irrigation. In addition, initial costs of conversion are higher than fixing existing systems, meaning they may be out of reach for some operations.

#### **Promote Groundwater Markets**

Groundwater markets are able to capitalize on groundwater withdrawal reductions “by using sustainable basin yields as a cap on total extractions”<sup>xi</sup>. Combined with fixed allocations, this water scarcity creates the basis for thriving water markets, as evidenced in the Fox Canyon Groundwater Market<sup>xii</sup>, which provides farmers with the opportunity to profit from conservation efforts.

The creation of this market, however, required the assistance of several project partners – The Nature Conservancy and California Lutheran University among others, who in turn applied for financial support from the USDA in the form of a \$1.8 million Conservation Innovation Grant<sup>xiii</sup>. This, plus total farmer buy-in throughout the GSA, and

an anonymous online market system were required to jumpstart the project – all of which may not be attainable for other GSAs. However, projected benefits of the program far outweigh the costs: increased overall basin efficiency, the flexibility to allow farmers to make on-demand market decisions for their operations, and GSA-wide compliance with SGMA.

#### **CONCLUSION**

A critically overdrafted basin not only threatens the fragile valley ecosystem, but it also threatens the future of farming in the region. With \$17 billion dollars of farming revenue on the line<sup>xiv</sup>, serious efforts must be made to improve efficiencies and resiliency in California’s farming industry. The Sustainable Groundwater Management Act has the potential to create impactful water use changes if enforced, and if additional measures are put into place to further incentivize overall water use reductions in the agricultural sector. Combining the impacts of improved irrigation conveyance and methods with GSA water markets could lead to significant water savings and groundwater retention throughout the Central Valley. While potentially costly in the short run, these programs would maximize crop per drop in a variety of field types and improve overall field and ecosystem health.

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