

Agricultural water conservation in California:

Policy challenges and opportunities

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In 2009, California enacted the “Water Conservation Act” (SB 7), a groundbreaking law which put in place a series of benchmarks for reducing California’s water use. The most publicized aspect of the law was the requirement that urban water districts reduce their per capita water usage by 20% by the year 2020. The “20 by 20” goal, as it became known, required each municipal supplier to create an urban water management plan that established its reduction goals, and then report on its progress every few years.¹

Less known are the tentative steps that SB 7 took toward agricultural water conservation. The law requires that agricultural water supplies establish agricultural water management plans, though there are no binding measurement goals or efficiency targets. Suppliers must also make small changes which lay the groundwork for future conservation: installing meters on delivery gates to measure the volume of water delivered to farmers, and adopting tiered pricing that is based on the volume of water delivered.² The simplicity and even obviousness of these measures underscores just how far California has yet to go in monitoring agricultural water use, by far the biggest use in the state. Why have effects to mandate agricultural conservation stalled while municipal conservation proceeds?

The political influence of the agricultural sector is part of the explanation. The Association of California Water Agencies spent \$2.5M on federal lobbying in the last six years.³ Farm advocacy groups like the California Farm Water Coalition spend millions more to advance the interests of state agriculture, giving to Democrats and Republicans alike. The solution to California’s water shortages, according to these groups, is to build more storage reservoirs, relax the Endangered Species Act’s protection of delta smelt, and approve the controversial Bay Delta Conservation Plan, which would alter the diversion point from the delta and allow for more pumping.⁴ (The Sacramento-San

¹ *20x2020 Water Conservation Plan.*

² “The Water Conservation Act of 2009.”

³ “Lobbying Spending Database - Assn of California Water Agencies, 2013.”

⁴ Boxall, “Severe Drought?”

Joaquin Valley Emergency Water Delivery Act, a current bill proposed by House Republicans, is designed to do just that.⁵⁾

The result of this lobbying is that despite the dominance of Democrats in both chambers of the California legislature, a wide urban – rural split makes water legislation difficult to pass. Consider the \$11B water infrastructure general obligation bond that SB X7-2 (the Safe, Clean, and Reliable Drinking Water Supply Act of 2010) was supposed to place on the ballot in 2010. Legislators, unable to agree on funding levels for the Bay Delta Conservation Plan, amended the bond three times and twice delayed its placement on the ballot (it is scheduled for November 2014).⁶

But beyond lobbying, a larger issue is the lack of incentives in place that could make conservation feasible and even attractive to farmers. This year, for the first time ever, farmers in California’s San Joaquin Valley have been told not to expect any water deliveries from either of the valley’s two main water delivery systems, the Central Valley Project and the State Water Project.⁷ Faced with such shortages, water conservation ought to make economic sense for farmers. Yet conservation is still a politically fraught issue in the state for several reasons. The conflicts with environmental groups over withdrawals from the delta have left many farmers feeling as though the crisis is partly manufactured, the result of (in their view) overly-stringent endangered species law that prohibits pumping of water that could be used for irrigation. In addition, the way agricultural water in California is currently allocated and priced encourages waste. Finally, legal barriers and high infrastructure costs make conservation risky even for farmers who want to conserve. Given these impediments, binding agricultural conservation will not become politically possible until the barriers are removed and the incentive structure is reoriented to encourage conservation.

To change the incentive structure, something must be done about the price of water. Many economists have argued that the price of water in the west is far below its true market value, and this cheap water encourages wasteful uses.⁸ Large federal and state water projects built in the 1960’s and 70’s have effectively subsidized water deliveries to irrigation districts, which then re-sell the water to farmers at prices far below what domestic users pay. Many farmers also irrigate with groundwater, which they do not pay for and which is not well regulated in California (though some of it is also too

⁵ Richman, “California Drought.”

⁶ *Setting the Stage for a 2014 Water Bond: Where Are We and Where Do We Need To Go?*.

⁷ “California Farmers Told Not to Expect U.S. Water.”

⁸ Edwards and Libecap, “Water Institutions and the Law of One Price.”

contaminated by salts and selenium to use).⁹ As SB 7 highlighted, many agricultural water districts charge their customers flat rates for water based solely upon the acreage of irrigated land. Contrast this with the municipal world, where domestic users in nearly all California cities pay tiered rates based on the quantity of water consumed. With no price incentive for farmers to conserve, farmers continue to use water-intensive and wasteful irrigation methods; 40% of California farmland, for example, is still watered by old-fashioned flood irrigation.¹⁰

Another issue is the high cost of conservation. While there are cheap forms of conservation, such as irrigation scheduling and deficit irrigation, most water conservation requires heavy upfront investment in infrastructure. Drip irrigation systems cost \$500 to \$3,000 per acre.¹¹ 'Smart' sprinklers and laser leveling of fields can cost tens or hundreds of thousands of dollars. Even the basic concept of monitoring how much water each farmer receives from a supplier – a prerequisite for tiered water prices and conservation – is currently impossible in many districts that lack metered delivery gates. These technologies eventually pay for themselves, but it takes several years for farmers and districts to recoup the investment.

In addition to high costs, the law itself creates barriers to conservation. California water law is based on an intricate hybrid of eastern riparian law and western prior appropriation law, on top of which federal laws like the Endangered Species Act and interstate agreements like the Colorado River Compact place further restrictions on how water can be used. The complexity of this legal system places enormous barriers in front of farmers or water districts who would sell or lease their water rights to those with higher value uses. Traditional prior appropriation law requires that water users apply their water towards a "beneficial use"; any conserved water that a farmer returns to the stream from a more efficient irrigation method is water that she could lose her rights to use in the future. The law thus creates an incentive for farmers to apply water to unproductive uses (flood irrigation) and low-value crops (alfalfa).

One way to tilt the incentive structure toward conservation would be to promote markets for water rights. Markets would help to increase the price of water, by flattening the price differential paid by municipal versus agricultural suppliers; they would promote efficient use of water by allowing wasted water to go to higher value uses; and they would provide farmers with additional income to finance conservation infrastructure. Despite the many advantages, water markets have not yet become

⁹ Woody, "Water-Cleaning Technology Could Help Farmers."

¹⁰ Boxall, "Severe Drought?"

¹¹ Than, "Can California Farmers Save Water and the Dying Salton Sea?"

commonplace in the west because of high transaction costs and legal barriers.¹² Although spot markets for trades between agricultural users have begun to appear in recent years, prices tend to be high due to transaction costs and uncertain property rights – water rights are so complex and uncertain in California that purchasing a right to water does not necessarily mean the buyer will actually receive any water. And while farm-to-farm transfers do occur on these markets, more productive transfers between irrigation districts and cities are still rare.

Nevertheless, a few agriculture-to-urban transfers have made the news recently. In 2013, the Dudley Ridge Water District sold 14,000 acre-feet worth of water rights to the Mojave Water District for \$73M.¹³ This put the price of water at \$5214 per acre-foot – ten times larger than what farmers in the district pay for water from the State Water Project. Municipal districts are frequently willing to pay far higher prices for water than farmers. When water is transferred from farms to cities, not only is water diverted from the most wasteful agricultural uses (alfalfa in the desert), but the excess income can help farmers to invest in more efficient agricultural techniques.

There may also be a political benefit for farmers to redirect some of their water to cities. As drought and urban conservation becomes a long-term reality in California, farmers are increasingly under public scrutiny for the way they use or misuse water. In one recent dustup in *The Wall Street Journal*, alfalfa farmers in the Imperial Valley were criticized for exporting “virtual water” to China in the form of water-intensive alfalfa.¹⁴ The article focused public attention on how water from the Colorado River is used to produce water-intensive crops like alfalfa in one of the hottest and driest agricultural region in California. Is it right, the paper asked, that so much water should be used for an export crop that profits only the farmers, when cities are facing strict conservation measures? In the flurry of news coverage that followed, farmers in the valley felt they were under attack.¹⁵

Dr. Robert Glennon of the University of Arizona has pointed out that alfalfa farmers could conserve water by letting their fields fallow in the summer, when yields are lower anyway, and selling the unused water to Las Vegas, Phoenix or the Metropolitan Water District.¹⁶ The cities would receive badly needed water, and the farmers could use the

¹² Edwards and Libecap, “Water Institutions and the Law of One Price.”

¹³ “Valley Water Keeps Flowing toward Southern California.”

¹⁴ Culp, “Parched in the West but Shipping Water to China, Bale by Bale.”

¹⁵ Jervey, “Exporting the Colorado River to Asia, Through Hay.”

¹⁶ *Ibid.*

profits to finance conservation infrastructure such as drip irrigation, improving their public image in the process.

An exemplary example of how such transfers could promote agricultural conservation occurred in 2003, when the Imperial Irrigation agreed to sell 200,000 acre-feet per year of Colorado River water to San Diego.¹⁷ The transfer required the district to scale back its local water use, at first by brute force methods such as paying farmers to fallow their fields and lining the All American Canal to reduce seepage losses. But over the long term, the money generated by the agreement will go towards helping farmers install drip irrigation systems and laser-level their fields. These conservation programs will help California to live within its annual 4.4M acre-foot allocation of water from the Colorado River.

Agreements between cities and irrigation districts can take other forms besides long-term transfers. The Metropolitan Water District of Southern California maintains options contracts with several irrigation districts in the Sacramento River basin to secure the option of purchasing water at pre-negotiated prices during drought years.¹⁸ Such contracts provide a stable source of revenue for the districts to implement water conservation projects, while also providing reliability to MWD and its member agencies.

There are many impediments to agricultural conservation. SB-7 laid the groundwork for monitoring by requiring agricultural water management plans and metered floodgates, but stopped short of setting binding conservation targets. Such targets will not be politically or economically feasible until substantive changes are made to ensure that the price of water more closely reflects its true value, that water rights can be traded without legal barriers and high transaction costs, and conservation does not lead to a loss of farmers' water rights.

¹⁷ "Water Authority–Imperial Irrigation District Water Transfer."

¹⁸ "Improved 2003 Water Picture Allows Metropolitan to Decline Final Sacramento Valley Transfer Option | Business Wire."

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