

# Beyond the Irrigation District

## Investing in On-Farm Water Stewardship for California's Future



photo: USDA NRCS

### Community Alliance with Family Farmers

By David Runsten, Kendall Lambert and Jalal Elhayek

June 2014



# Executive Summary

Without strong efforts to improve water use on the 25 million acres of agricultural land in California, the state cannot achieve its goals of sustainable water management. This study confirms that state policy has neglected on-farm water efficiency for too long. As we face unprecedented water resource constraints under the current drought and the state legislature debates a new water bond to go before the voters in the Fall of 2014, we must consider how water policy of the past has limited agricultural water stewardship efforts and how that may inform California water policy moving forward.



The Department of Water Resources conservatively estimates that California agriculture could reduce water use by up to one million acre-feet annually through water use efficiency measures. Farmers and ranchers can further optimize their water use through a combination of efficient irrigation system technologies, agro-ecological farming, and best management practices (BMPs).

Despite this potential, many farmers indicate that they lack the technical information and resources to adopt new BMPs. Surveys conducted by American Farmland Trust suggest that up-front cost, risk of adoption, insufficient information, and lack of technical assistance are all barriers to implementation of new practices and technologies.<sup>1</sup> A survey by the Farm Water Coalition in the San Joaquin Valley found that many farmers lacked technical training and were unfamiliar with irrigation scheduling technologies.<sup>2</sup>

CAFF has completed a comprehensive survey of the programs and funding streams related to agricultural water management in California. The results show there is great potential to overcome barriers to adoption of on-farm water-use BMPs—but state programs and funding streams have fallen short for a variety of reasons.

## Findings

### Finding #1: Water Bond funding for agricultural water use efficiency has largely neglected on-farm water stewardship projects

CAFF analyzed funding allocations from two bond initiatives, Proposition 50 (2002) and Proposition 84 (2006). Since 2005, the Department of Water Resources (DWR) has allocated \$88.9 million dollars in Water Use Efficiency grants from Prop 50, with 41% of this funding supporting agricultural water projects. Within the Agricultural Water Use Efficiency (Ag WUE) grant category, we estimate that nearly 71% of Ag WUE Prop 50 funding

#### Agricultural Water Stewardship Practices

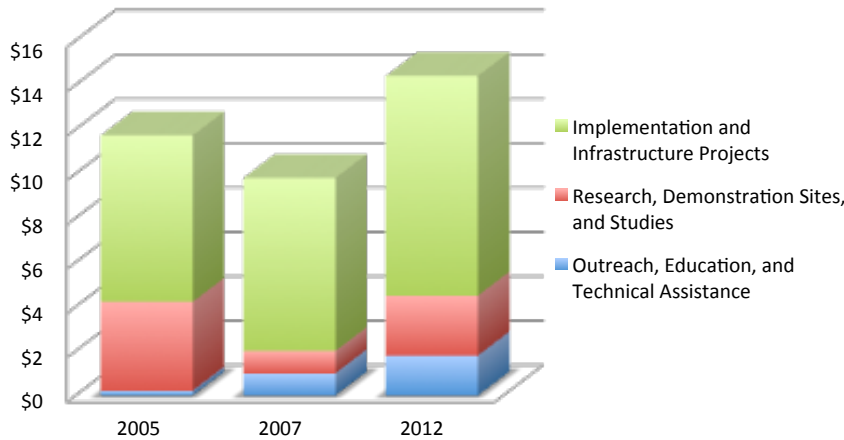
Just as urban areas can become less water-intensive by changing landscaping, replacing fixtures and appliances, and reducing runoff, so can agriculture contribute to sound water management by adopting a variety of technologies and practices. At the farm level, water-saving technologies and practices include:

- Building organic matter in the soil through cover cropping, minimum tillage, and amendments; soil organic matter becomes a reservoir, holding up to 30 times its weight in water.
- Drip and micro sprinklers can reduce water use by up to 20-50% and boost yields of some crops by as much as 30%.
- Irrigation scheduling and management practices, by using methods such as soil moisture and evapotranspiration monitoring, can reduce water use 25% or more, depending on the system and crop type.
- Dry farming in certain cropping systems eliminates irrigation water use by using farming methods to retain soil moisture.
- Keyline plowing redistributes rainwater flow to build soil fertility, further improving moisture-holding capacity.
- Ponds can reduce runoff, recharge groundwater, store rainfall, and integrate with regional flood management efforts.

<sup>1</sup> American Farmland Trust. Spring 2012. California Agricultural Vision: From Strategies to Results, Progress Report. Available at <http://www.cdffa.ca.gov/agvision/>

<sup>2</sup> Agricultural Water Management Council and California Farm Water Coalition. 2010. Irrigation Practices and Influencers Survey Findings: San Joaquin Valley.

**Figure 1. Comparison of Grant Money Awarded by DWR to Ag WUE Projects across types, 2005-2012 (in millions of \$)**



was allocated to infrastructure and engineering projects such as pipelines, canals and pumps. Only 8% went to Outreach, Education, and Technical Assistance projects, and about 21% to Research and Demonstration projects (Fig. 1).

Analysis of Integrated Regional Water Management (IRWM) grant allocations from Props 50 and 84 reveals a similar emphasis on infrastructure projects. Out of 120 Prop 50 IRWM grants, only two were primarily focused on outreach and technical assistance to farmers.<sup>3</sup> Similarly, in 2011, Prop 84 IRWM grants only funded three projects *primarily* focused on water stewardship projects. Outreach and assistance projects constitute roughly 0.4% of the Prop 84 Round II IRWM grants awarded in 2014.<sup>4</sup>

While effective water management does require investment across project types, more investment in on-farm water management is needed to fully optimize water use in California.

## **Finding #2: Other agricultural water use efficiency programs prioritize irrigation technology upgrades and underfund best management practices, holistic planning, and technical assistance**

The Environmental Quality Incentives Program (EQIP) of the USDA Natural Resource Conservation Service (NRCS) provides cost-share incentives for farmers to adopt farm-level best management practices to protect natural resources and improve environmental outcomes. CAFF analyzed how EQIP funding was allocated in California from 2002-2010. Water conservation and irrigation management projects were given considerable priority, with \$162 million—or nearly 50%—of the total \$326 million in planned EQIP expenditures. However, the majority of the water conservation funding was allocated to technology and equipment cost-shares.

From 2002-2010, nearly \$141 million was spent on equipment/system upgrades for water conservation practices in California, while only \$21 million was spent on best management practices, such as cover cropping and mulching (Fig. 2). For example, micro-irrigation systems received \$64 million in that time frame, far more than any other practice, whereas the Irrigation Water Management BMP practice code received only \$3.5 million.

Although upgrading to more efficient irrigation equipment is an important step in on-farm water stewardship, a new system alone does not guarantee water-use efficiency or stewardship. Holistic farm management practices, such as soil moisture monitoring, irrigation scheduling or composting and cover cropping are needed to ensure efficient water use on-farm. Based on funding allocations, BMPs have not been prioritized under EQIP in California, although NRCS recognizes this problem and is working to address it. This is in part due to a lack of resources for technical assistance, which has limited the ability of NRCS staff to provide the necessary outreach and holistic management planning farmers need to ensure that new irrigation systems translate into on-farm water savings.<sup>5</sup>

<sup>3</sup> California Department of Water Resources. 2013. List of Awarded Projects, Proposition 50, Rounds 1 & 2 Implementation Grants.

<sup>4</sup> Information can be found at: <http://www.water.ca.gov/irwm/grants/implementation.cfm>. It should be noted that some infrastructure projects may have outreach components not accounted for in this analysis. The analysis is based on information included in project descriptions.

It should be noted that NRCS does provide technical assistance to growers outside of the EQIP program.

### Finding #3: Private industry's innovative technologies and advice are often cost-prohibitive for smaller farmers

Through private irrigation companies, growers can find various services and products at different price levels. They can purchase drip systems as well as technologies to manage irrigation events (e.g., soil moisture monitoring devices, weather stations, crop monitoring devices). By developing and installing these technologies, private companies help growers increase their on-farm water use efficiency. However, the most efficient and sophisticated systems and technologies are often the most expensive, costing tens or even hundreds of thousands of dollars.

Surveys indicate that growers are also turning to private consultants for information on best management practices.<sup>6</sup> But smaller growers, who make up the majority of the state's producers, may not be able to afford to hire private consultants to assist with on-farm decision-making, and consultants associated with irrigation equipment companies have little incentive to promote stewardship practices that do not involve new equipment.

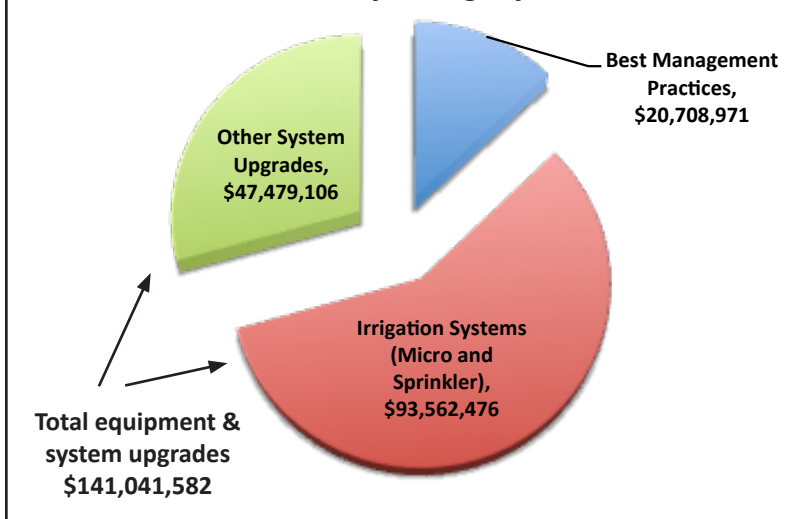
CAFF finds that smaller farming operations, in particular, may find it financially prohibitive to purchase efficient technologies or pay for private consulting. This suggests that publicly supported outreach and assistance to farmers on BMPs and low-cost technologies is necessary, as California's smaller farms together account for a large acreage and consume significant amounts of water.

### Finding #4: Technical assistance providers are understaffed, underfunded, and unable to meet the demand for assistance from farmers; California's premier research is not disseminated effectively

Throughout the state, numerous entities are instrumental in providing outreach, education and assistance to farmers regarding on-farm water stewardship. The state's many and diverse smaller farmers rely more heavily upon these technical assistance providers than their larger counterparts, who can often afford private industry advisors and consultants. Technical assistance providers, as well as their research colleagues, rely on funding from the state and federal governments, as well as private foundations, to support program work. Unfortunately, investment from these sources is limited, resulting in valuable programs that are often unable to meet the demand for assistance required by California growers. A summary of California's technical assistance providers is provided below.

**Resource Conservation Districts (RCDs)** are special districts that have promoted resource conservation and stewardship across California since 1938. California's RCDs conduct projects on public and private land as well as provide direct assistance to growers. However, RCD staff cite dwindling resources, lack of base funding, and lack of staff capacity as hindering their ability to

**Figure 2. Expenditures on Water Conservation EQIP Practices by Category, 2002-2010**



<sup>5</sup> For example, NRCS staff are supposed to complete a nine step holistic management plan with each EQIP contract; however, a recent report from the Environmental Working Group indicates that NRCS staff often skip the nine-step holistic management plan. Environmental Working Group. (2013). Untapped: How Farm Bill Conservation Programs Can Do More To Clean Up California's Water. Available at <http://www.ewg.org>

<sup>6</sup> American Farmland Trust. Spring 2012. California Agricultural Vision: From Strategies to Results, Progress Report. Available at <http://www.cdfa.ca.gov/agvision/>



adequately address on-farm water resource concerns.<sup>7</sup> For example, the innovative Mobile Irrigation Labs program—through which RCD staff conduct individual on-farm evaluation of irrigation systems and recommend improvements to reduce on-farm water use and improve crop yields—is currently only funded in 15 of California’s 98 RCD regions.

**University of California Cooperative Extension (UCCE)** is conducting ground-breaking research, from determining irrigation requirements of specific crops to the development of a network of over 120 automated weather stations used widely for irrigation scheduling.<sup>8</sup> Unfortunately, UCCE does not have enough farm advisors to adequately conduct outreach and education to farmers. Once the focal point of technical service delivery to agriculture, UCCE staff levels in 2010 were down by 40% compared to what they were in the early 1990s, with only 200 on-farm advisors.<sup>9</sup> With additional funding, UCCE staff could better meet the needs of farmers by increasing their focus on turning research findings into useful educational materials; conducting long-term follow-up to ensure new techniques are adopted, maintained and well-managed; and increasing the frequency, scope, and locations of field day demonstrations.<sup>10,11,12</sup>



photo: USDA NRCS

**Fresno State University’s California Agricultural Technology Institute** provides outreach and assistance to growers, primarily with an on-site efficiency test of the irrigation system subsidized by Pacific Gas & Electric. Although aimed at reducing energy consumption, these evaluations also optimize water use by reducing pumping inefficiencies. Fresno State focuses its outreach in the southern San Joaquin Valley, but programs such as these could be expanded to provide services to farmers across California.

**Irrigation Training Research Center at Cal-Poly** provides training for students to become irrigation specialists and assist farmers with their water management decisions. They also conduct premier research such as the development of the Mobile Irrigation Labs, and on-the-ground projects such as Irrigation District Modernization programs that allow for system up-grades

to provide on-demand water to local farmers.

**Other NGOs and commodity groups** (e.g., wine grape grower sustainability organizations, the Almond Board, the Strawberry Commission, American Farmland Trust, Farm Bureau, Community Alliance with Family Farmers, Ecological Farming Association, Sustainable Conservation, etc.) provide outreach, education and assistance. All are working to provide technical assistance for growers to increase the adoption of on-farm water stewardship practices. Unfortunately, these organizations are restricted in their scope and impact due to the limited funding opportunities available to them.

## **Finding #5: California’s water planning and advisory efforts do not adequately consider on-farm water stewardship practices, thereby reducing funding and implementation opportunities**

IRWM Plans (IRWMPs) are purported to be master regional water plans, addressing all aspects of water resource management. As irrigated agriculture is California’s largest consumer of developed water, no regional water plan can address water supply and quality concerns without addressing on-farm water use. However, analysis of the IRWM planning and implementation statutes indicate that

---

<sup>7</sup> California Association of Resource Conservation Districts. 2012. California Association of Resource Conservation Districts Strategic Plan.

<sup>8</sup> CIMIS – the California Irrigation Management Information System.

<sup>9</sup> Merrill, J., Brillinger, R., and Heartwell, A. 2011. Ready...or Not? An assessment of California agriculture’s readiness for climate change. California Climate & Agricultural Network. Available at <http://calclimateag.org/our-work/ready-or-not/>

<sup>10</sup> Munk, D. 2011. Personal Communication; Email correspondence with Daniel Munk, UCCE Farm Advisor.

<sup>11</sup> Fulton, A. 2011. Personal Communication; Email correspondence with Allan Fulton, UCCE Irrigation & Water Resource Advisor.

<sup>12</sup> Faber, B. 2011. Personal Communication; Email correspondence with Ben Faber, UCCE Farm Advisor.

only the consideration of agricultural water use efficiency projects is required for an IRWMP to be eligible for bond-related funding,<sup>13</sup> and that, consequently, agricultural projects have been under-represented.

CAFF analyzed 12 IRWMPs in the Sacramento River, San Joaquin River and Tulare/Kern Funding Areas to assess the extent to which on-farm agricultural water stewardship projects, including outreach, education, and assistance, were included.<sup>14</sup> Our review indicates that these IRWMPs did not emphasize or prioritize strategies that facilitate agricultural water stewardship. Further, there is no correlation between the prevalence of irrigated agriculture in a region and the degree to which IRWMPs include agricultural water stewardship projects. In fact, three IRWMPs in these areas replete with irrigated agriculture were entirely devoid of any such projects.

The Agricultural Water Management Council (AWMC),<sup>15</sup> the state's efficient water management collaboration mandated by AB 3616 (1990),<sup>16</sup> was originally proposed as an advisory group to DWR—a collaborative forum where DWR, the California Department of Food and Agriculture (CDFA), the universities, farm organizations, irrigation districts, and other interested parties including environmentalists could meet to discuss how to move forward on implementing water stewardship practices in all irrigation districts and all farms in the state. The Farm Water Coalition, which represents large agricultural water providers, was given the managerial role. AWMC's 1999 MOU—arrived at after nine years of debate among parties—explicitly listed limitations on what issues could be considered by the group. They were *not* to address on-farm water management, land conversion, land retirement, crop selection or groundwater production. With the 2009 water legislation usurping the AWMC's role, the AWMC was disbanded in 2013, offering the state another opportunity to create a forum where all issues related to agricultural water can be discussed.



## Recommendations

### **Recommendation #1: The 2014 California Water Bond should include funding for farmer outreach, education and assistance programs for on-farm water use best management practices**

Despite demand, technical assistance programs for on-farm water management practices remain dismally under-funded. Important research is not making its way into implementation and water sav-

---

<sup>13</sup> California Department of Water Resources. 2010. Prop. 84 and Prop. 1E Integrated Regional Water Management Guidelines.

<sup>14</sup> These IRWM regions were chosen due to the prevalence of irrigated agriculture and water supply reliability concerns.

<sup>15</sup> Information regarding the AWMC is based on Dave Runsten's observations from participating in the AWMC; on Juliet Christian-Smith's 2013 draft report prepared for the Roundtable on Water and Food Supply entitled "Collaborative Governance Approaches to Agricultural Water Stewardship: Lessons Learned from the Agricultural Water Management Council;" and on Roger L Reynolds and Tracy Slavin, "MOU on Efficient Water Management Practices by California Agricultural Water Suppliers—Can it Work?" in "Competing interests in water resources -- searching for consensus, Proceedings from the USCID Water Management Conference." USCID, December 1996.

<sup>16</sup> The AWMC was set up pursuant to AB 3616, the Agricultural Water Suppliers Efficient Water Management Practices Act.

## Case Study

NRCS/Bureau of Reclamation (BoR) joint program integrates infrastructure improvements with on-farm water use efficiency to achieve measurable results.

BoR provides funding for projects at the water purveyor or irrigation district level that has created new water supplies for agriculture and improved water management and conservation. Concurrently, NRCS provides technical and financial assistance through EQIP to farmers in targeted irrigation districts to complement BoR's infrastructural improvement projects.

By restructuring the districts' infrastructure to provide on-demand water, farmers were able to use pressurized irrigation systems and create flexible irrigation schedules. USDA reports that as a result of these projects, on-farm water use efficiency was increased by **an average of 25% in seven targeted irrigation districts and the districts saved 38,223 acre-feet per year.**



photo: CAWSI

ings on the farms and ranches of California. The 2014 Water Bond should balance its approach to agricultural water use efficiency by combining infrastructure upgrades with support for farm-level BMPs and information dissemination to achieve the most lasting efficiency gains across farm scales.

## Recommendation #2: Water efficiency planning processes should more fully require and enable integration of agricultural water use efficiency projects

IRWM planning statutes have proven insufficient and should be strengthened to incorporate feasible agricultural water stewardship strategies in proportion to the degree to which irrigated agriculture impacts water supply in their region. To facilitate the integration of on-farm water stewardship projects into IRWMPs, increased participation from agricultural stakeholders at the regional and state level is needed. A collaborative forum advisory group successor to the AWMC, managed by a neutral party, should be formed to make progress on efficient water management practices with agricultural water suppliers and their farmers through information dissemination, trainings, and support.

Because many IRWMPs do not engage agricultural stakeholders in their planning and implementation, and because it can be very difficult or impossible to access IRWMP funds for on-farm water use efficiency efforts, we strongly recommend a funding stream in Water Bond legislation that is available outside of IRWMPs.

## Recommendation #3: Infrastructure investments should directly facilitate on-farm stewardship practices such as drip irrigation or holistic management practices such as irrigation scheduling

Real, quantifiable gains can be made through an integrated approach to on-farm water management that combines infrastructure improvements with technical assistance (see NRCS/BoR Case Study at left). Any investments in infrastructure upgrades for delivery of state-developed water should be designed to work concurrently with locally-appropriate farm-level BMPs.

## Recommendation #4: Cap-and-trade proceeds should fund an on-going competitive grants program for on-farm water stewardship projects

Governor Brown's drought legislation (SB 103) allocates the CDFA \$10 million to provide direct assistance to farmers in the form of grants to implement efficient irrigation systems and evaluation. This represents a solid basis for a state-wide direct assistance program. With a longer timeframe and additional funding for direct assistance to growers and third-party assistance for implementation, this program could provide competitive grants and assistance to farmers long-term for holistic water management practices. Greenhouse Gas Reduction Fund (GGRF) allocations could be used, in part, to support on-farm water stewardship, as these projects reduce greenhouse gas emissions as well as water use. Improved irrigation efficiency reduces applied water, energy use and the GHG emissions associated with irrigation pumping. The reduction in irrigation frequency reduces nitrous oxide emissions associated with applied irrigation. ■

## About the Authors

David Runsten is the Policy Director, Kendall Lambert is the Water Program Coordinator, and Jalal Elhayek was formerly a Research Associate at Community Alliance with Family Farmers.

## Acknowledgements

The authors thank Adam Kotin and Renata Brillinger with the California Climate and Agriculture Network for assistance with editing and design.

This report was made possible with the generous support of the 11th Hour Project, Gaia Fund and Farm Aid.



To download a copy of the complete report, go to [www.caff.org/programs/policy/water](http://www.caff.org/programs/policy/water)

For more information, contact:

Dave Runsten, CAFF Policy Director  
(530) 756-8518 x 125

Kendall Lambert, CAFF Water Program Director  
(510) 832-4625 x 13