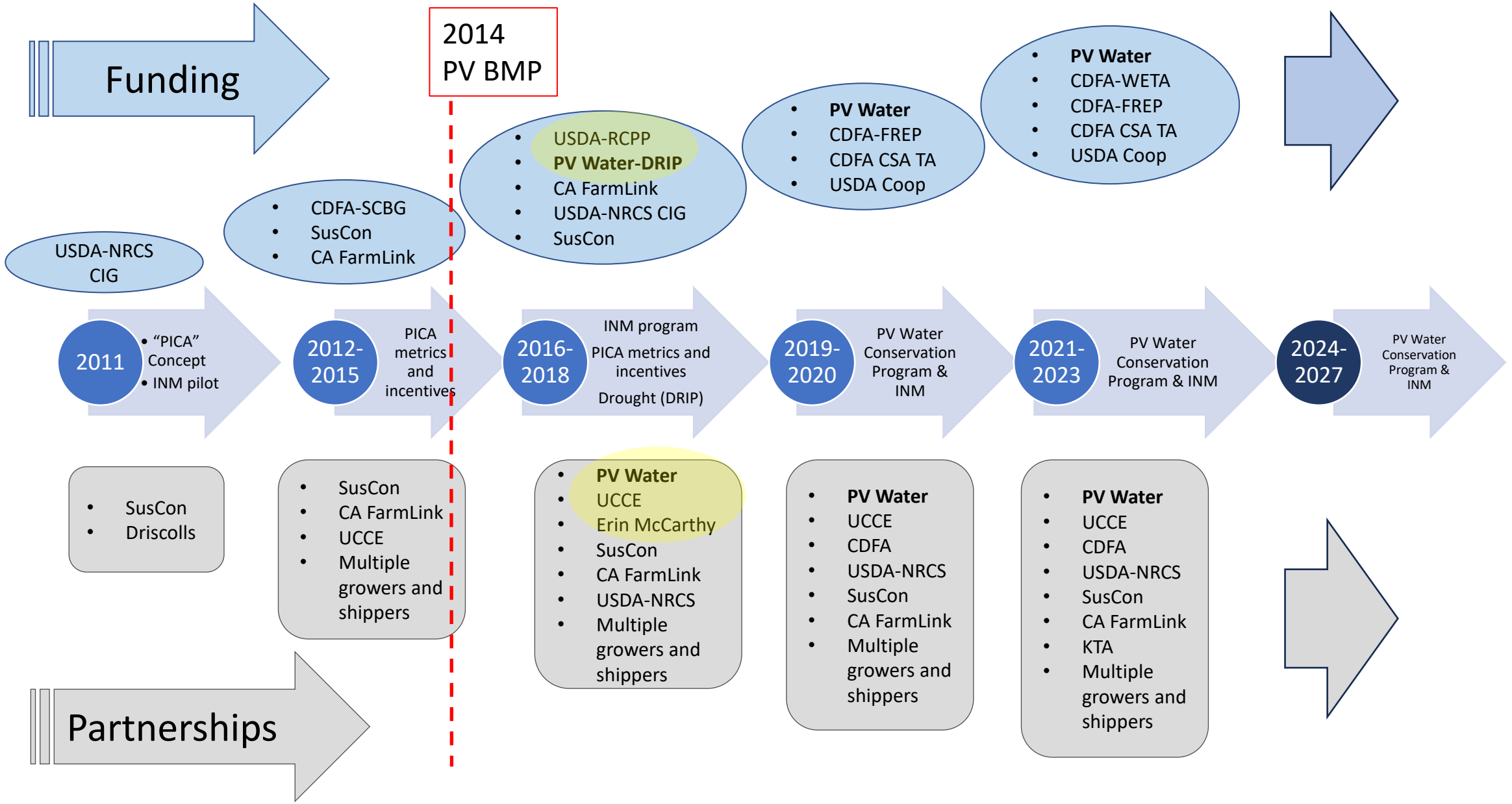
Pajaro Valley Water Management Agency

RESOURCE CONSERVATION DISTRICT OF SANTA CRUZ COUNTY

UC CE

PV Water Conservation Program **2024** Update

RCDSCC Program Development, Leveraged Funding and Partnerships



2016-2023 Program Growth

- **PV Water funding (approx. $1,561,000 since 2016)** has been essential to develop a robust water conservation program with high technical and material capacity to serve local growers

- RCDSCC has leveraged this investment with **additional grant funding (approx. $1,658,000)** from other sources (CDFA, USDA-NRCS, SusCon and CA FarmLink) to strengthen and sustain continuity of the program.

As a result of partnerships synergy and leveraged funding, the following has been possible:

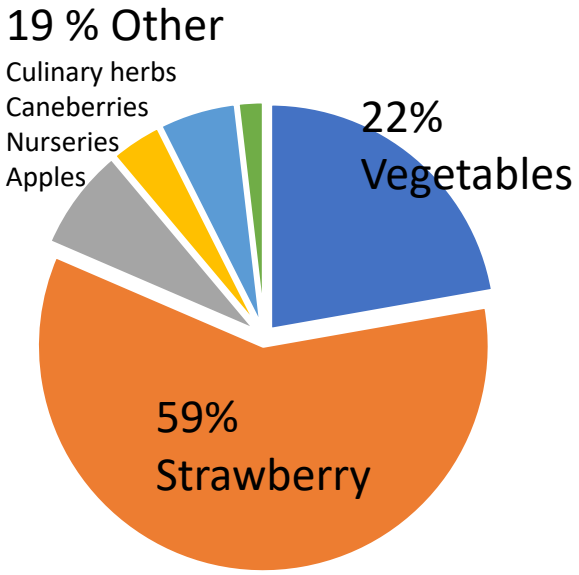
- Increased equipment inventory, organization and material capacity (**29 flowmeters and 32 telemetry units** currently in stock and available for program participants)

- Augmented RCD staff capacity from 1 to **3.5 stably funded staff positions**

- Augmented overall program capacity to serve a larger annual cohort of growers/ranches (from 10-12 to **25-30 participants per year**)

Program Participation

Program participation	2019-2020	2021-2023
No. Farm Operations (growers)	19	**38**
No. Ranches (monitoring sites)	26	**52**
Total Acres	1,008	**1,494**
Percentage of ranches <40ac	58%	**76%**
No. Rebate Requests processed	4	**27**
Total $$ rebate requested	$16,875	**$108,330**
Drip irrigation participants (%)	73%	**72%**
Sprinkler irrigation participants (%)	27%	**22%**

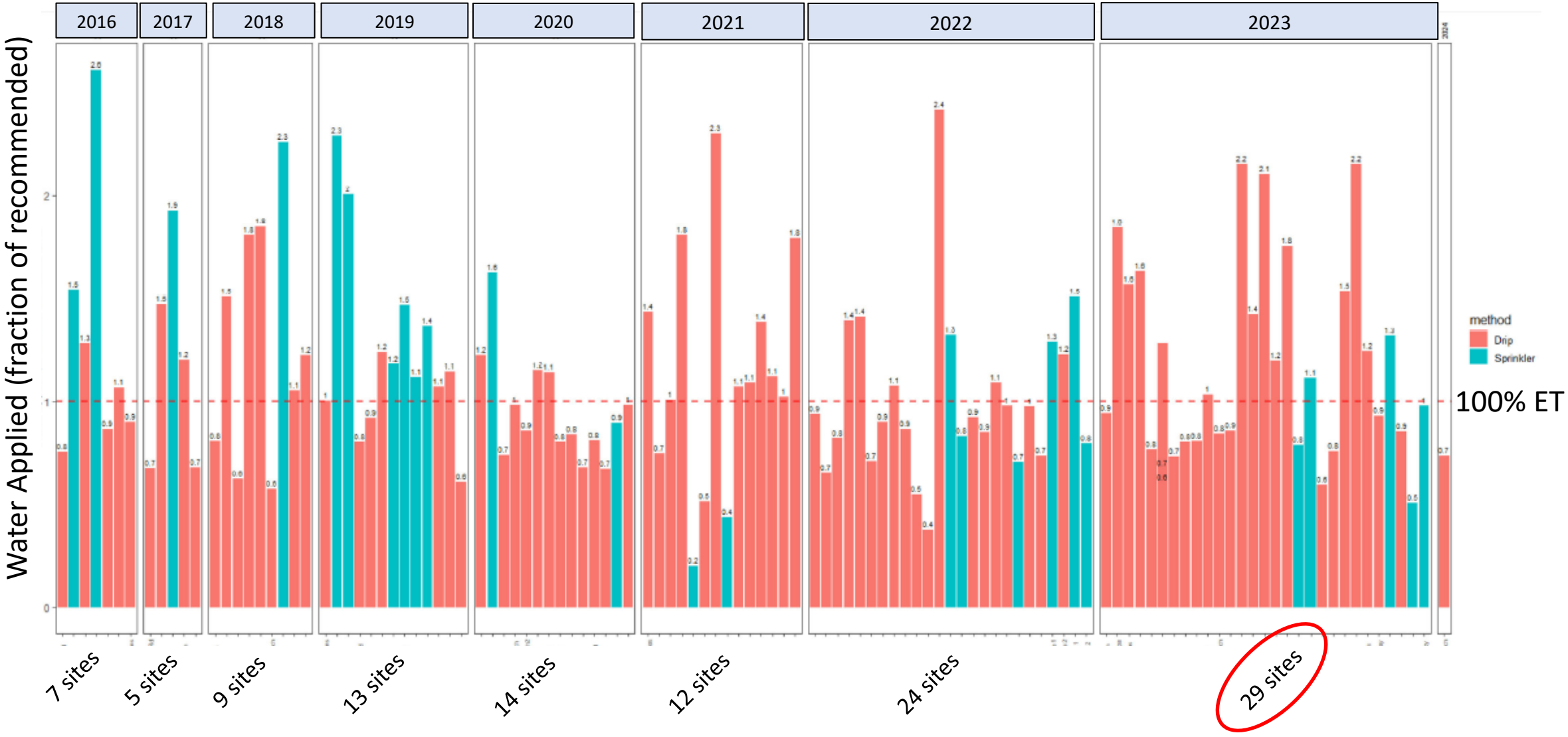


2021-2023 participants by crop

2016-2023 Program Growth & Performance

Take home messages:

1. Growing participation per year since 2016
2. More sites near or below recommended threshold (100%ET)



2020-2023 Grower Rebate Program

Implementation of new practices

Efficient sprinkler heads

Sprinkler check valves

Pressure regulators

Flowmeters & telemetry

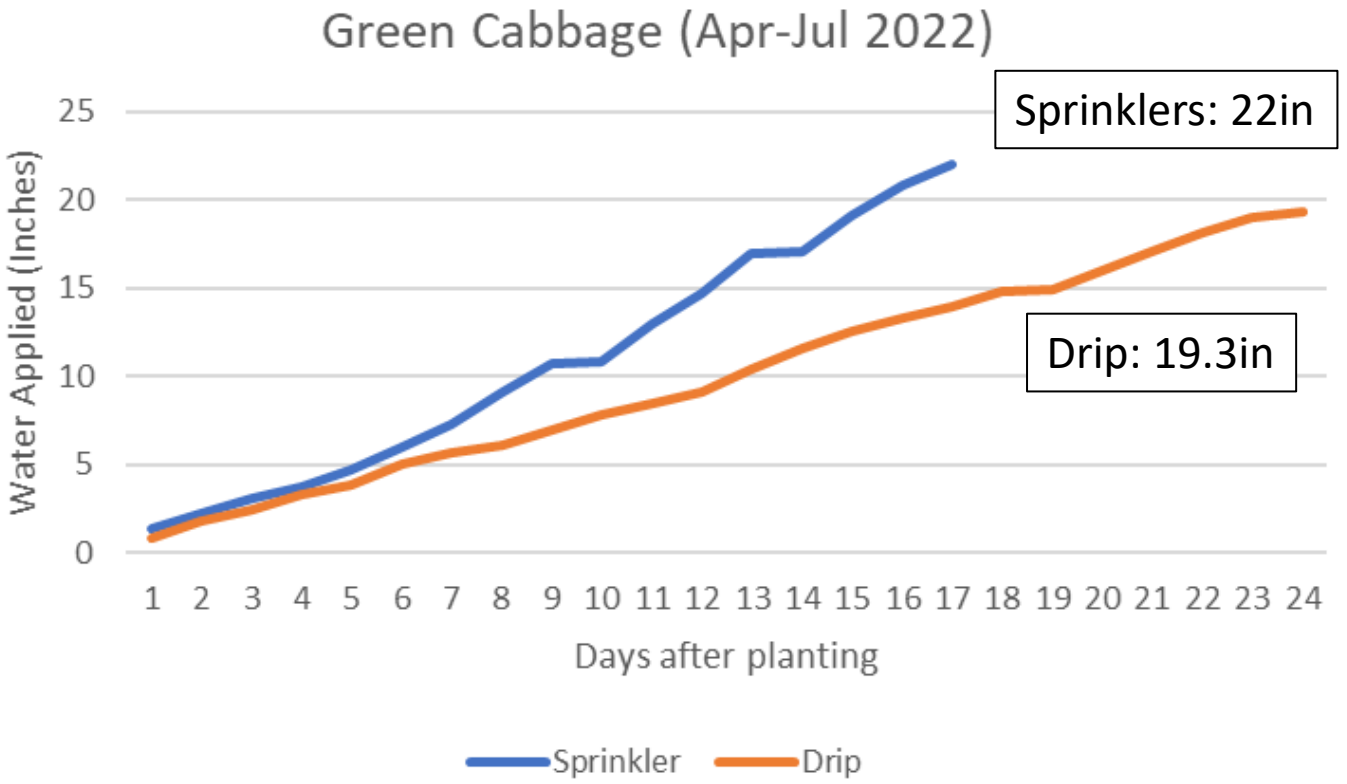
- A total **$125,205** in grower rebate requests processed since 2020

Rebates have been used for: windfighter sprinklers, new sprinkler heads and raisers, aluminum pipe joints and gaskets, pressure regulators, check valves, flush valves, flowmeters and telemetry, drip irrigation trials for vegetables, nurseries and orchard operations, PC drip tape and drip irrigation supplies, VFDs, VFD booster pump for storage tanks, soil tensiometers, and glued PVC sprinkler system for use under high tunnels.

Implementation of new practices
(Rebate Program)

Sprinkler to drip conversion

Side-by-side trial



(Drip block had more irrigation events but lower total applied)

Implementation of new practices

(Rebate Program)

Glued PVC Sprinklers under High Tunnels: Eliminate leaks and improve pressure uniformity

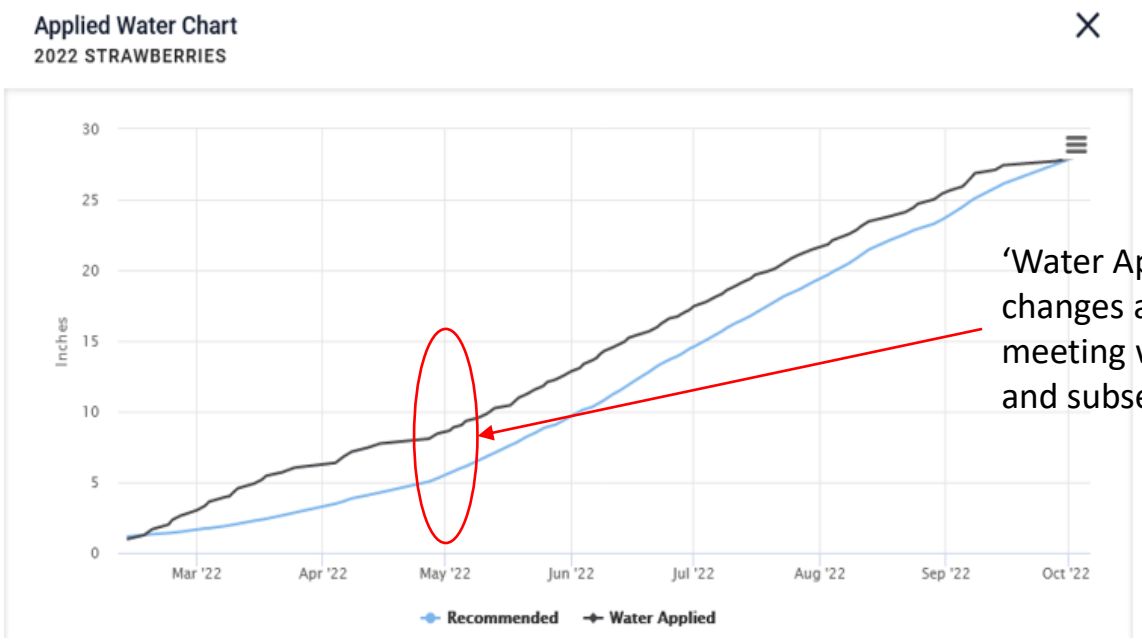
Glued pvc pipe suspended along the house edges and fitted with efficient **Windfighter nozzles**, **drain checks**, and **road guards** to evenly re-distribute water that would otherwise go into roadways.

Measuring the Program's **Water Conservation Impact**

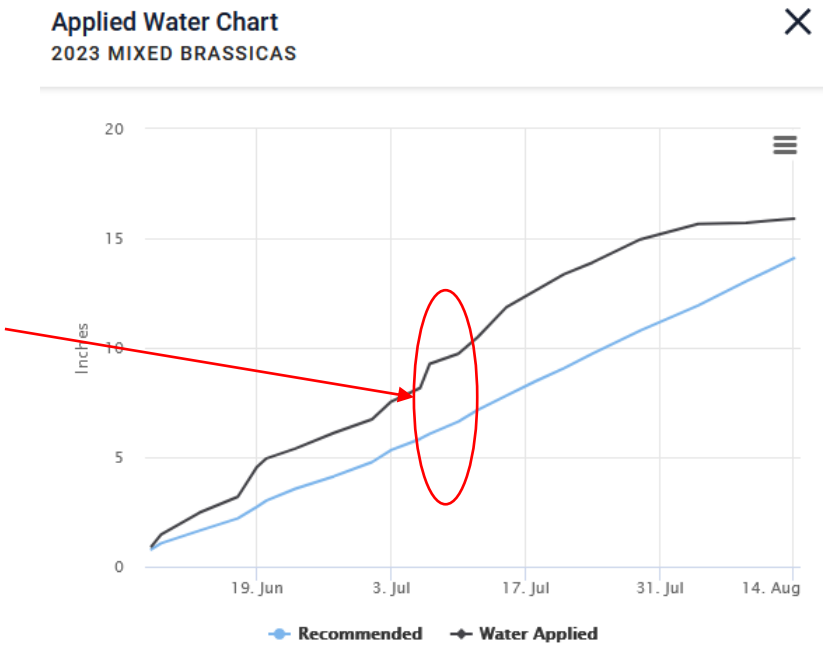
- Renewed emphasis moving forward
- Working with PV Water staff and UCCE partners to develop metrics and approach to quantify water conservation impact and track progress
- Multiple levels of performance assessment: a) single participant during one season; b) single participant/field between seasons; c) aggregate data for annual cohorts; d) multi-year comparison of aggregate data between cohorts
- Aiming to complement the basin-wide water use trends to better demonstrate the role of conservation

Individual participant's performance and change during one season

Do growers adjust their management based on monitoring feedback?



'Water Applied' <u>trend</u> changes after first meeting with grower and subsequent TA

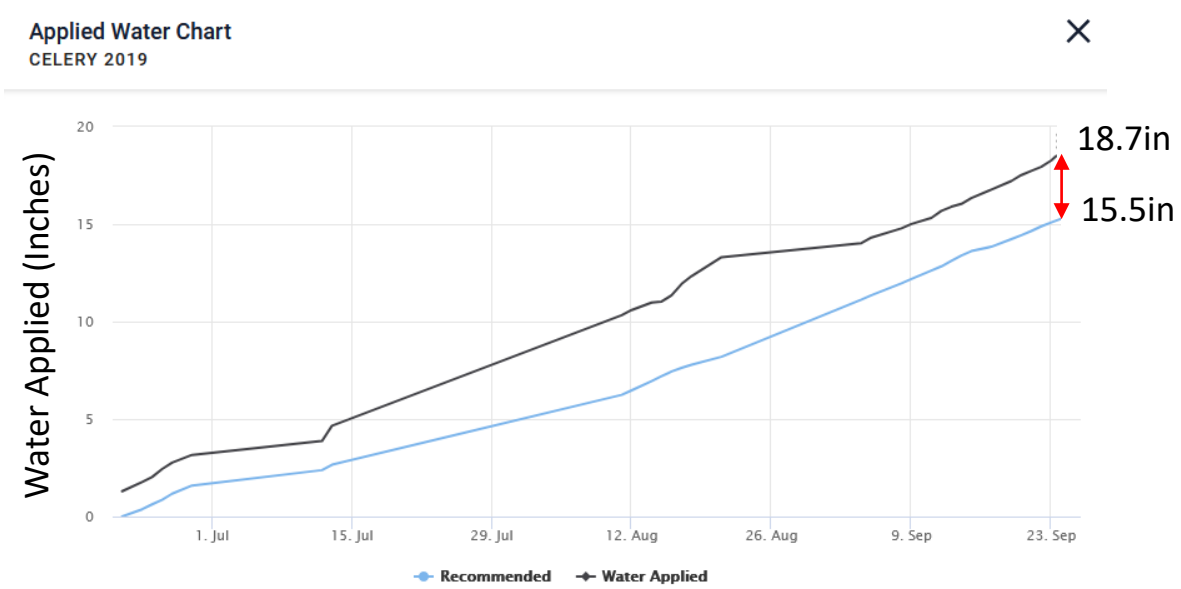


Many of them do!…and some actually use CropManage to generate and follow recommendations (as intended by its designers)

Individual participant's performance and change over 2 or more seasons

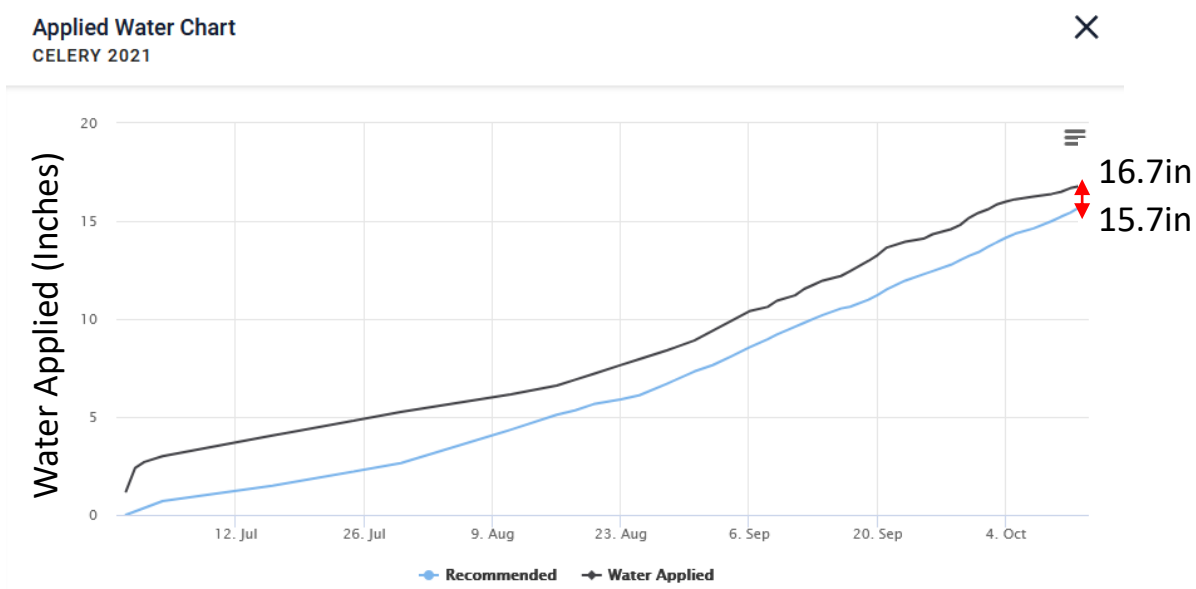
Example of grower response and improvement
Same ranch and crop, two different years
(Celery, Sprinklers)

2019



Applied vs. Recommended Ratio = 120%

2021

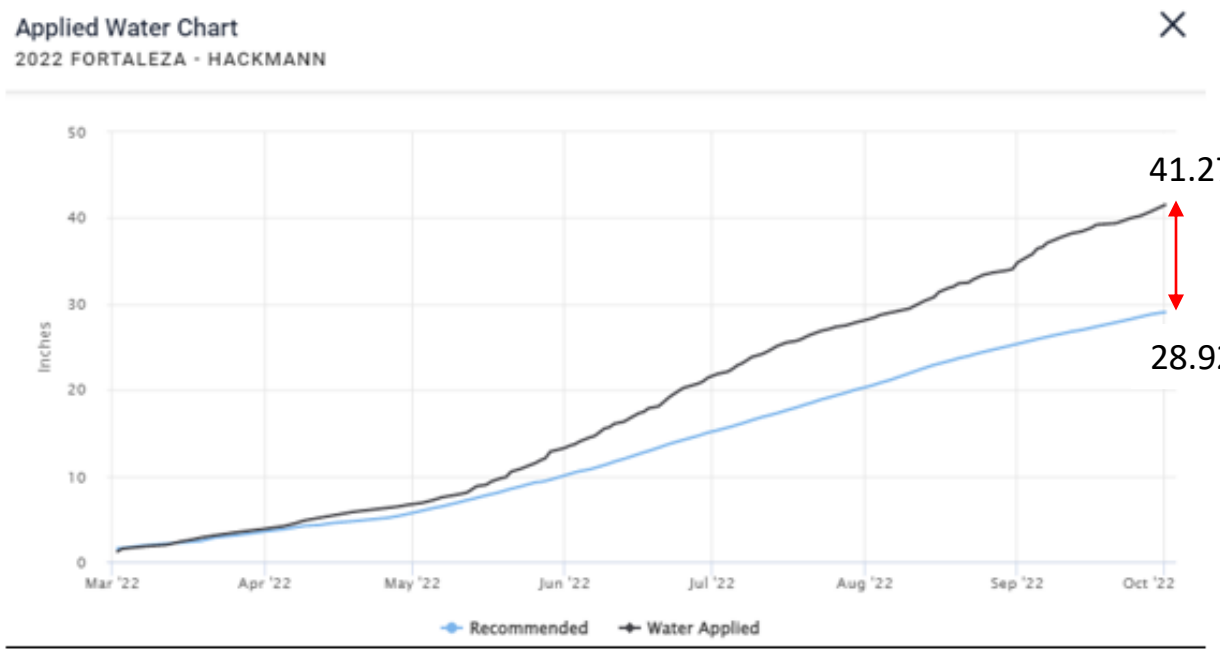


Applied vs. Recommended Ratio = 106%

Individual participant's performance and change over 2 or more seasons

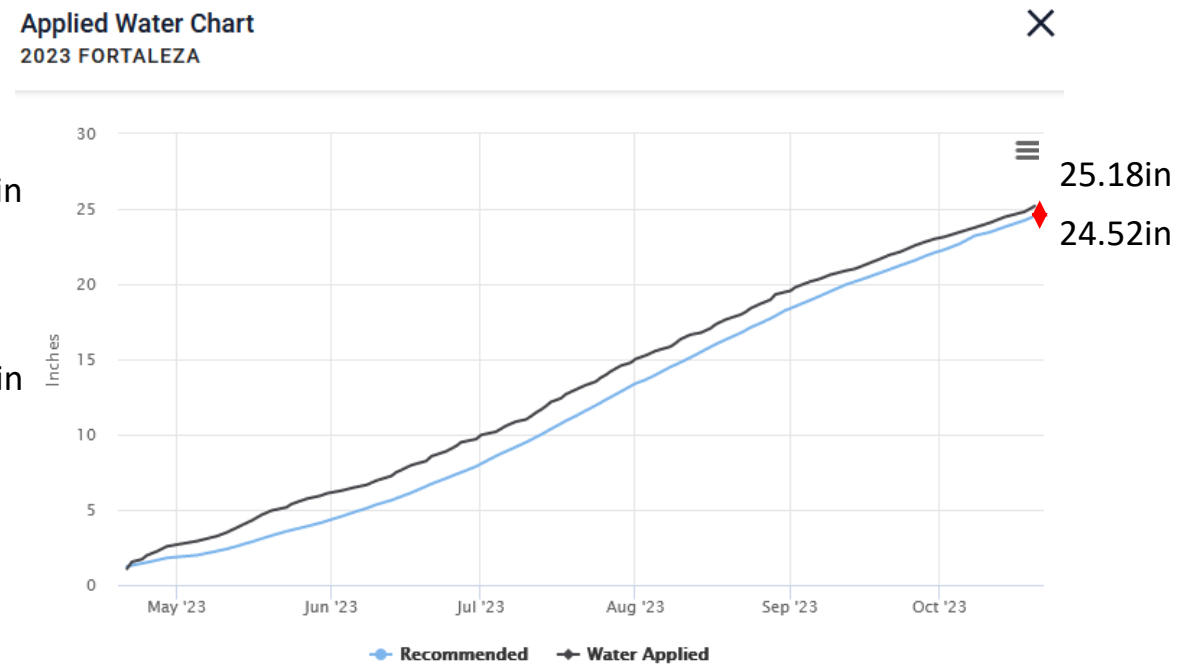
Example of grower response and improvement
Same ranch and crop, two different years
(Strawberry, Drip)

2022



Applied Vs. Recommended Ratio = 143%

2023



Applied Vs. Recommended Ratio = 103%

Aggregate Performance (annual cohorts)

Year: 2023

RESOURCE CONSERVATION DISTRICT OF SANTA CRUZ COUNTY

Current Year Data

*Enter data in blue shaded

Ranch	Rec (in)	Applied (in)	App/Rec (%)	No. Acres	Field (Period)	Crop
1	22.18	20.84	94%	18.0	AFF **(Nov-Nov)**	Strawberry
2	5.65	10.33	183%	15.0	EO **(Apr-Jul)**	Strawberry
3	6	7.68	128%	10.0	MM **(Apr-Jul)**	Strawberry
4	13.16	20.37	155%	12.0	AV **(Apr-Sep)**	Strawberry
5	29.32	17.64	60%	14.5	RU_A1 Big Sur **(Feb-Nov)**	Strawberry
6	28.78	19.31	67%	14.5	RU_A2 Fortaleza **(Mar-Nov)**	Strawberry
7	22.73	8.65	38%	29.0	RU_Balich Big Sur **(Mar-Oct)**	Strawberry
8	12.03	9.54	79%	8.0	BM **(Nov-Sep)**	Strawberry
9	5.97	4.52	76%	23.0	GG_Calabasas **(Sep-Dec)**	**Blackberry**
10	24.52	25.18	103%	38.0	CT_H **(May-Oct)**	Strawberry
11	18.91	15.82	84%	35.0	CT_KR **(May-Oct)**	Strawberry
12	34.38	29.61	86%	28.0	BS_Ch Elvira **(Mar-Nov)**	**Blackberry**
13	7.35	15.9	216%	10.0	GA **(Apr-Jul)**	Strawberry
14	13.82	18.73	136%	28.0	DS_Hambey **(Jun-Sep)**	Strawberry
15	9.37	17.34	185%	12.5	JL_Kett1 bl5 **(May-Dec)**	**Blackberry**
16	19.53	22.17	114%	12.5	JL_Kett2 bl9 **(Apr-Dec)**	**Blackberry**
17	18.05	31.29	173%	50.0	LSO_MBA **(Jul22-Mar23)**	Artichoke
19	14.09	15.9	113%	10.0	LEF **(Jun-Aug)**	Mixed brassicas
20	23.95	14.25	59%	15.0	JM **(May-Oct)**	Strawberry
21	21.74	15.98	74%	59.0	JL_N **(May-Dec)**	**Blackberry**
22	18.16	28.1	155%	45.0	MR_BV **(Jun-Oct)**	Strawberry
23	20.4	42.4	208%	23.0	AS **(Dec-Nov)**	Strawberry
24	20.06	24.49	122%	50.0	SA **(Dec-Oct)**	Strawberry
25	11.17	10.4	93%	15.0	GB **(Jul-Oct)**	Cannabis
26	9.64	12.62	131%	85.0	SH_Thompson **(Jul-Aug)**	Lettuce
27	10.41	8.88	85%	15.0	ChT_SA1 **(Apr-Jul)**	Strawberry
29	7	6.67	95%	24.0	SH_WC **(Jun-Jul)**	Lettuce
30	22.8	19.6	86%	29.0	RU_Balich Fortaleza **(Mar-Oct)**	Strawberry
Avg	**16.83**	**17.65**	**105%**	**728.0**		
Sum	**471.17**	**494.21**	**105%**	**728.0**		

Previous attempt at long-term program impact quantification…

Multi-year comparison in Strawberry water use

(same grower, same ranch, same crop)

(Limited data, difficult to obtain)

Mar - Oct water conservation ratio (Applied/ETc)

Ranch ID	2014	2015	2016	2017	2018	Improvement
a		104%		85%		19%
b	120%			95%		25%
c	130%		93%			37%
d			93%	69%	63%	30%
e			101%	149%	86%	15%
f			118%	74%	107%	11%
g				103%	80%	23%
Average						**23%**

* “improvement” is based on the first and last year only. The middle year in ranches d, e, f demonstrates the degree of variability between years, even for the same grower on the same ranch

Source: RCDSCC, PICA project

RESOURCE CONSERVATION DISTRICT OF SANTA CRUZ COUNTY

Desired approach moving forward…?

Multi-year comparison of water use for different crops

(same grower, same crop, same or similar field, variable periods)

Ranch	Crop / Period	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Improvement
a	Strawberry / Mar-Oct		104%		85%							19%
b	Strawberry / Mar-Oct	120%			95%							25%
c	Strawberry / Mar-Oct	130%		93%								37%
d	Strawberry / Mar-Oct			93%	69%	63%						30%
e	Strawberry / Mar-Oct		125%	101%	149%	86%						15%
f	Strawberry / Mar-Oct			118%	74%	107%						11%
g	Strawberry / Mar-Oct				103%	80%						23%
1	Strawberry / Apr-Oct								233%	53%	216%	16%
2	Strawberry /Apr-Oct								150%	89%	123%	61%
3	Strawberry / Mar-Oct									143%	103%	40%
4	Lettuce / Summer									193%	95%	98%
5	Cannabis / Jun-Oct									127%	93%	34%
6	Strawberry / Mar-Oct								72%		60%	12%
7	Strawberry / Mar-Oct								81%		67%	13%
8	Strawberry / Mar-Oct								75%		38%	37%
9	Strawberry / Mar-Oct								98%		86%	13%
10	Strawberry / Mar-Oct									97%	122%	-25%
11	Strawberry / Mar-Oct						90%			84%		6%
12	Strawberry / Mar-Oct							104%			136%	-32%
13	Strawberry / Mar-Oct				153%				42%			112%
14	celery / Summer						122%		107%			15%
15	Blackberry / May-Dec									144%	185%	-42%
16	Blackberry / May-Dec									176%	114%	62%
17	Strawberry / Apr-Oct								177%	79%		99%
18	Lettuce / Summer					233%	149%					84%
19	Strawberry / Mar-Oct									73%	85%	-12%
20	Strawberry / Mar-Oct								157%	109%	155%	3%
Average												**28%**

Focus Areas moving forward…

One-on-one technical assistance:

- Weather-based irrigation scheduling using CropManage
- Integrating soil moisture sensors data to guide irrigation management
- System pressure management, distribution uniformity, flow rate and application rate
- Irrigation block sizing based on pump capacity and system specs
- Address other aspects of the whole system that also affect irrigation outcomes (e.g. shared wells, labor constraints, system design and controls)

Adoption of innovative water conservation equipment and practices:

- Continue to implement the conservation rebate program
- Continue to leverage State and Federal funds (CDFA-SWEEP, NRCS EQIP)
- Explore system automation and other technological solutions

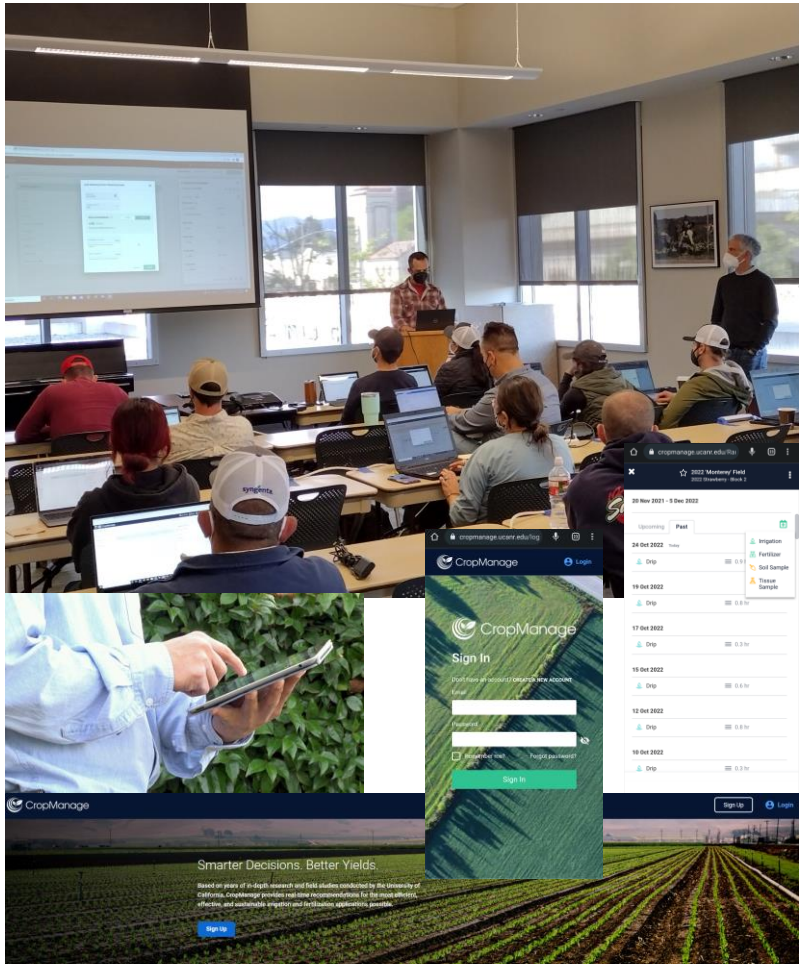
Water conservation impact quantification:

- Estimate potential water conservation associated to conservation rebates
- Track individual progress within and between seasons
- Quantify aggregate performance of annual cohorts
- Estimate inter-annual trends and potential conservation between cohorts and a benchmark (yet to be determined)

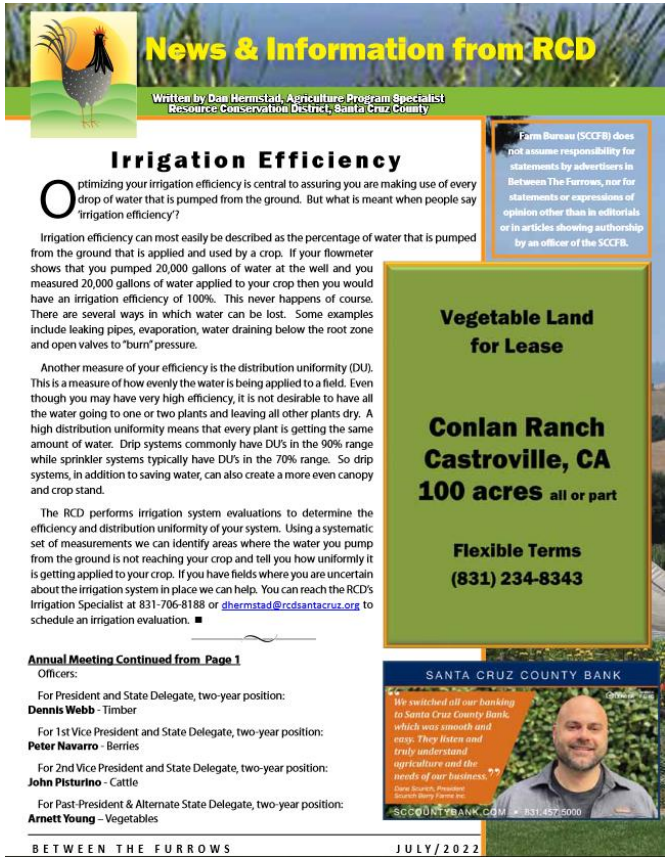
Outreach and Education

Irrigator trainings in Spanish

CropManage workshops



Newsletter articles



News & Information from RCD

Written by Dan Hermstad, Agriculture Program Specialist
Resource Conservation District, Santa Cruz County

Irrigation Efficiency

Optimizing your irrigation efficiency is central to assuring you are making use of every drop of water that is pumped from the ground. But what is meant when people say 'irrigation efficiency'?

Irrigation efficiency can most easily be described as the percentage of water that is pumped from the ground that is applied and used by a crop. If your flowmeter shows that you pumped 20,000 gallons of water at the well and you measured 20,000 gallons of water applied to your crop then you would have an irrigation efficiency of 100%. This never happens of course. There are several ways in which water can be lost. Some examples include leaking pipes, evaporation, water draining below the root zone and open valves to "burn" pressure.

Another measure of your efficiency is the distribution uniformity (DU). This is a measure of how evenly the water is being applied to a field. Even though you may have very high efficiency, it is not desirable to have all the water going to one or two plants and leaving all other plants dry. A high distribution uniformity means that every plant is getting the same amount of water. Drip systems commonly have DU's in the 90% range while sprinkler systems typically have DU's in the 70% range. So drip systems, in addition to saving water, can also create a more even canopy and crop stand.

The RCD performs irrigation system evaluations to determine the efficiency and distribution uniformity of your system. Using a systematic set of measurements we can identify areas where the water you pump from the ground is not reaching your crop and tell you how uniformly it is getting applied to your crop. If you have fields where you are uncertain about the irrigation system in place we can help. You can reach the RCD's Irrigation Specialist at 831-706-8188 or dhermstad@rcdsantacruz.org to schedule an irrigation evaluation. ■

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Annual Meeting Continued from Page 1

Officers:

For President and State Delegate, two-year position:
Dennis Webb - Timber

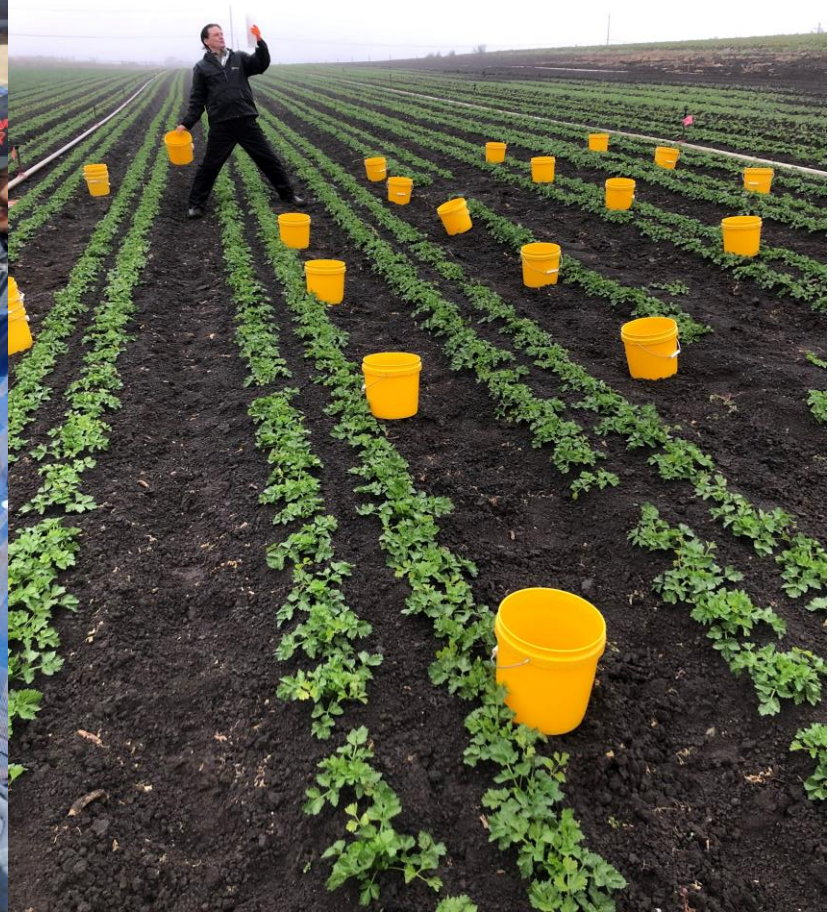
For 1st Vice President and State Delegate, two-year position:
Peter Navarro - Berries

For 2nd Vice President and State Delegate, two-year position:
John Pisturino - Cattle

For Past-President & Alternate State Delegate, two-year position:
Arnett Young – Vegetables

BETWEEN THE FURROWS JULY/2022

Leverage experience and technical expertise from our UCCE partners



Thank you, PV Water!

RESOURCE CONSERVATION DISTRICT OF SANTA CRUZ COUNTY

UCCE University of California Cooperative Extension