

# ***Efficient Water Management Requires Data!***

**California & Israel  
Water in Agriculture Seminar & Discussion**



**David F. Zoldoske, Director  
Center for Irrigation Technology  
California State University, Fresno**

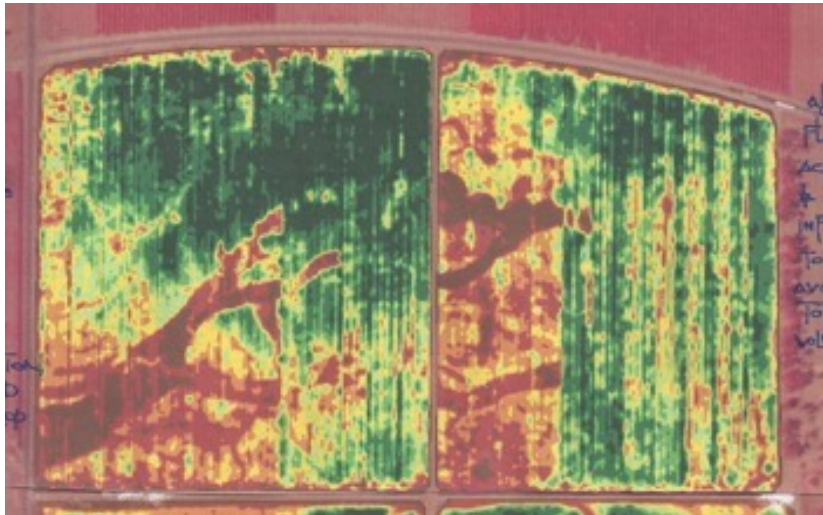
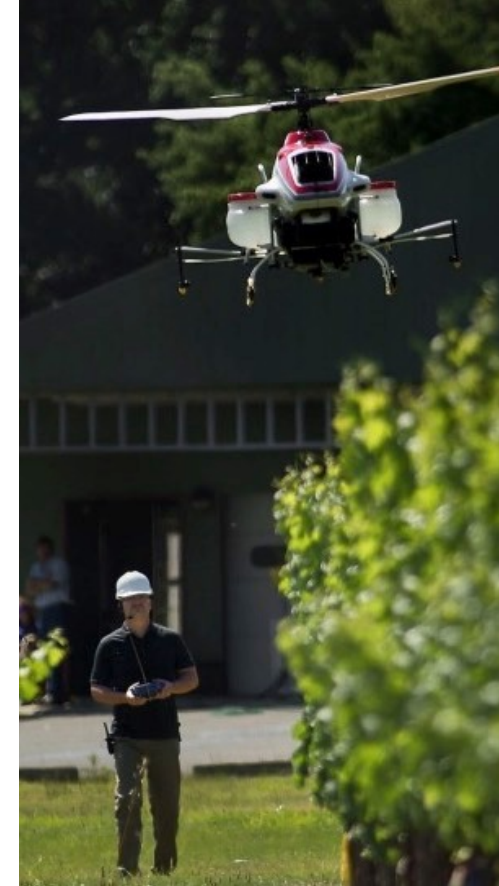


# Drivers for On-Farm Data

- a) Increased production and optimizing water/energy usage
- b) Regulatory compliance with SGMA, Nitrogen tracking/groundwater protection and others
- c) Supply chain certification of BMP's and/or other data to demonstrate sustainable water use practices



# New and Old Technologies Available to Growers I



## *On-Farm*

- ❖ Real time pump testing
- ❖ Plant, soil and remote sensing
- ❖ Distribution uniformity
- ❖ Determining when and how much water to apply
- ❖ Managing for Demand Response (DR)
- ❖ Optimizing water, energy, and fertilizer



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# *Regulatory*

- ❖ Documenting groundwater withdrawals
- ❖ Managing water and fertilizer movement in the root zone
- ❖ Demonstrating all water remains on the farm
- ❖ Other



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# *Supply Chain*

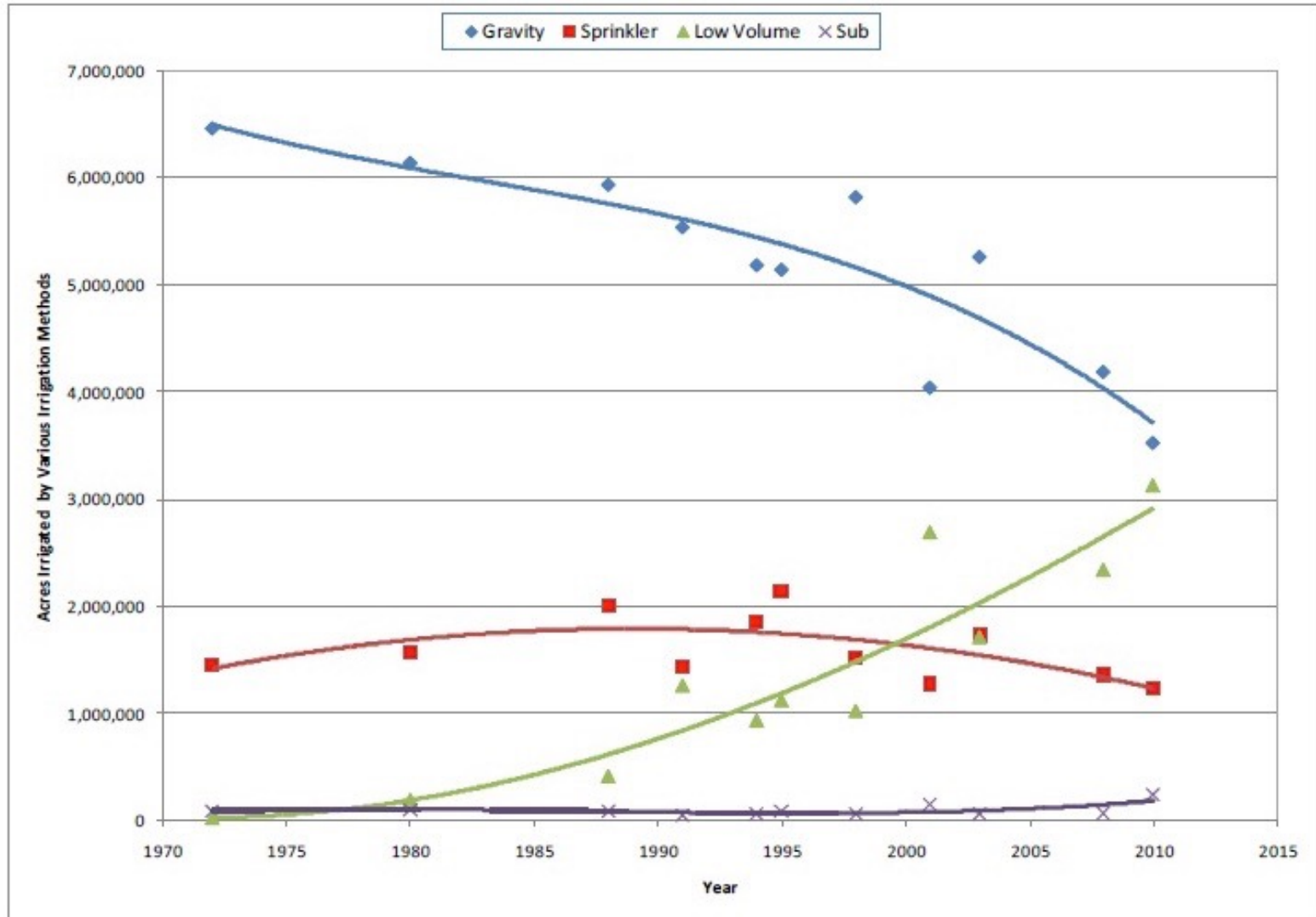
- ❖ Certify water and energy sustainability
- ❖ Document proper chemical (fertilizer) utilization
- ❖ Demonstrate farm practices meet/exceed BMP's





# What Technologies have Successfully Deployed and to What Scale?

## Irrigation Methods in California 1977-2010



# What Technologies have had the Biggest Impact?

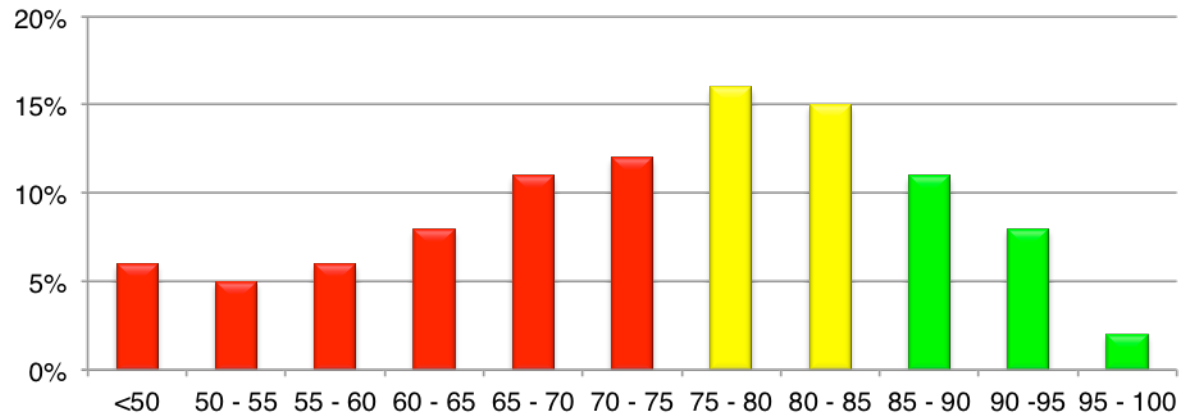
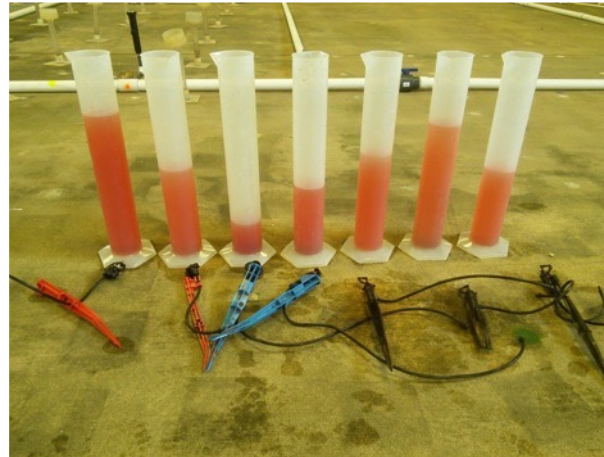


# How Well does the Technology Perform?



# What Challenges Still Exist?

## Systems Distribution Uniformity



"An Analysis of Mobile Laboratory Irrigation System evaluation Data: Agricultural Systems"

Blain Hanson, Wil Bowers: Department of Land, Air and Water Resources, University of California, Davis, CA

Bayohay Davidoff: State Department of Water Resources, Sacramento CA

Arturo Carajol: Mobile Laboratory, State Department of Water Resources, Sacramento, CA



# Knowing When and How Much to Irrigate



## Irrigation Scheduling



For Week Ending	Average Year		This Year ETo	Rain	Averages for Week				Change This Yr vs Avg Yr	Total ETC to Date
	ETo	Rain			Kc	ETC	Root Zone	Runtime		
	In/Day	In/Wk	In/Day	In/Wk	In/Dy	Ft	HH:mm		In	
3/8/2013	0.09	0.27	N/A	N/A	0.57	0.05	4.00 16:35	N/A	0.35	
3/15/2013	0.10	0.01	N/A	N/A	0.60	0.06	4.00 19:29	N/A	0.76	
3/22/2013	0.11	1.71	N/A	N/A	0.63	0.07	4.00 22:40	N/A	1.24	
3/29/2013	0.12	0.46	N/A	N/A	0.66	0.08	4.00 26:44	N/A	1.81	
4/5/2013	0.14	0.35	N/A	N/A	0.69	0.09	4.00 30:53	N/A	2.46	
4/12/2013	0.15	0.47	N/A	N/A	0.72	0.11	4.00 35:43	N/A	3.21	
4/19/2013	0.17	1.13	N/A	N/A	0.74	0.12	4.00 40:26	N/A	4.07	
4/26/2013	0.18	0.06	N/A	N/A	0.77	0.14	4.00 45:41	N/A	5.03	
5/3/2013	0.20	0.04	N/A	N/A	0.80	0.15	4.00 51:17	N/A	6.12	
5/10/2013	0.21	0.03	N/A	N/A	0.83	0.17	4.00 57:44	N/A	7.34	
5/17/2013	0.22	0.13	N/A	N/A	0.86	0.19	4.00 64:03	N/A	8.69	
5/24/2013	0.24	0.00	N/A	N/A	0.89	0.21	4.00 70:22	N/A	10.18	
5/31/2013	0.25	0.02	N/A	N/A	0.92	0.23	4.00 76:44	N/A	11.80	
6/7/2013	0.26	0.55	N/A	N/A	0.95	0.25	4.00 83:21	N/A	13.57	
6/14/2013	0.28	0.00	N/A	N/A	0.98	0.27	4.00 89:48	N/A	15.46	
6/21/2013	0.29	0.00	N/A	N/A	1.01	0.29	4.00 95:31	N/A	17.48	

# Summary -We Have the Technology!

- ✘ Educate the Grower
- ✘ Information/data needs to be available and actionable to the grower
- ✘ Incentivize corrective actions/verify
- ✘ ***Continue to Educate the Grower***