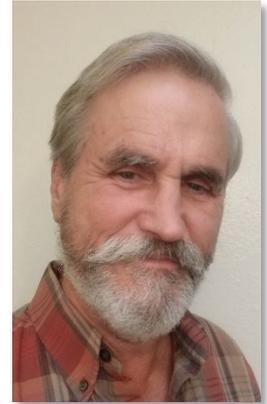


## Blake Sanden

*Presented by Bob Beede*

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It is a sincere honor to be the presenter for Blake Sanden, one of this year's American Society of Agronomy, California Chapter, Honoree's. I have known Blake since we were undergraduates at UC Davis. Blake earned his Bachelor of Science degree in International Agricultural Development and Agronomy in 1978. Recently married to the striking young lady, Sue McCullough, also a recent UC Davis B.S. graduate in Genetics, the couple put their new skills to work as missionaries in Zambia for five years developing literacy programs, assisting village medical clinics, and improving field and vegetable crops production practices. Upon their return to the States, Blake worked as the farm manager for Woodlake High School before returning to Davis for a master's degree in Water Science, Irrigation and Drainage in 1985. I was reunited with Blake when he became the Irrigation Technical Advisor for Paramount Farming Company, Westside Ranch; near Lost Hills in February of 1988.



He was responsible for irrigation scheduling and system maintenance on 26,000 acres of pistachios, almonds, olives, grain, and cotton. After several attempts, I had finally landed a UC farm advisor position in neighboring Kings County in 1979, and had been heavily involved with learning about and researching pistachios with Leland McCarthy's resident Entomologist, Gary Weinberger. Blake had a very arduous position complicated by an immediate supervisor who could be as ornery as a WWII drill sergeant. However, to Blake's great credit, he did not complain; I mention this as a reflection upon Blake's strong and understanding character. After four and a half years of boot camp, Blake applied successfully for the UC Extension Soils, Water, and Agronomy Farm Advisor position in Kern County. After all he had already accomplished, Blake was just getting warmed up when Hodge Black, the County Director, introduced him to the staff in July of 1992.

Those of you familiar with California agriculture recognize that Kern County could be a state unto itself when it comes to oil and agribusiness. It is a mecca for big farms, big ideas, and big expectations for innovation. George Ferry, the Kern County Soils and Water Advisor in the 50's and 60's, who became my Director in Kings County, used to say, "You can grow anything in any quantity from apples to zucchini in Kern County." Water allocation and management typifies the collective ability of Kern growers to accomplish big goals; although lowest in average rainfall in the entire Central Valley due to its most southern location, Kern County has one of the most sophisticated regional irrigation systems in the state to move surface water directly to farms and to more than 20 groundwater banking projects around the county. This water is sourced from the local Kern River, Friant Federal Bureau of Reclamation water from southwest Sierra Nevada snowpack, and the California Aqueduct State Water Project on the Westside bringing northern California-Delta water south. These agricultural visionaries also saw the wisdom in partnering with the University of California Extension system to facilitate achievement of their goals. In keeping with the high academic standards exemplified by other advisors in the Kern office, Blake most definitely did not disappoint them in his dedication to performing outstanding research and education outreach to the local, statewide, and international farming communities. Blake was the backbone of the UCCE soils and water program in the Southern San Joaquin Valley.

In support of my above claims, I wish to now outline some of Blake's key accomplishments during the last 13 years of his UC tenure; in total, Blake was Principal Investigator on 18 projects, Co-PI on 9 and a cooperater on 5.

1. Irrigation water use efficiency (WUE), soil moisture monitoring: Continuously recording soil moisture sensors linked to an in-field data logger were installed in 145 fields covering more than 12,000 acres belonging to 33 different growers in 14 different crops by Blake and his staff from 2002-2013. The average measured water use efficiency for all study fields in which neutron probe monitoring was done was estimated at 95%. This large-scale data is cited by the Department of Water Resources and one of the largest civil engineering contractors in the San Joaquin Valley in the policy development for the Irrigated Lands Regulatory Program.
2. Almond water use and yield: Blake monitored the applied water in 34 almond blocks (3,583 acres) with greater than 70% canopy from 2002-2005. Average water use was 46.8 inches with a WUE of 96%. A reduced number of blocks monitored from 2006-7 averaged 50.2 inches. This water use is about 15% greater than the 42 inches UC published 40 years ago. Thus, modern soil moisture monitoring technology revealed that southern SJV almonds required more water for optimal growth and yield. This greater water requirement was confirmed by an intensive five-year statewide water production function trial from which imposed irrigation levels from 70 to 110% of ET. The new ETc increased the average Kern County almond yield by 65% between 2002 and 2011 compared to the previous 15 years.
3. Refining Pistachio Crop Coefficients: Growers employing stem water potential and soil moisture monitoring report application of less total water than dictated by the original Kc values derived from the water balance method. Using aerial imagery, soil moisture monitoring, applied water data, and meteorological energy balance field data, Blake verified that much of the pistachio acreage in the southern San Joaquin Valley uses less water than the UC coefficients (Kc) determined 20 years ago would suggest. This has improved water use efficiency in his region.
4. Refining Alfalfa and Citrus Crop Coefficients: Deficit irrigation trials conducted by Blake indicate higher water use crop coefficients for these crops than values previously published for the southern San Joaquin Valley. A mild irrigation deficit in early navel oranges produced a significant yield loss that was not seen in an earlier study. Although alfalfa yield recovered after normal fall irrigation, citrus growers risked a 10-20% yield loss in the earliest navel oranges with even mild stress.

Blake has done an outstanding job in tackling research projects NO ONE, including the faculty and Extension Specialists, were capable of doing on their own. Two such projects are the almond nitrogen and potassium fertilization project lead by Dr. Patrick Brown, Professor, UC Davis Department of Plant Science, at Wonderful Farms, and Blake's pistachio rootstock/salinity project with Mr. Starh, a cotton grower transitioning to tree crops south of Buttonwillow. These were HUGE projects in size and time demand. Blake secured the cooperation of the growers, and then went into the field with his assistants to establish and oversee the project.

The pistachio rootstock/salinity project involved 310 acres and MILES of irrigation pipe that he and research assistant, Beau Antongiovanni, personally installed. They then established 0.5, 2.5, and 5.0 ds/m irrigation water to test its long-term effects on the two most commonly planted rootstocks, UCB-1 and *Pistacia integerrima* (Pioneer Gold 1). The grower soon saw the growth reduction from the 5.0 ds/m water and wanted to terminate this treatment. Blake successfully negotiated keeping this critical

treatment by reducing the size of each replicated plot. However, this came at great physical expense to Blake, who re-plumbed 13,000 additional feet of pipe to maintain the integrity of the trial! Such is the dedication and determination of Blake Sanden! The result from this 10-year project yielded individual production functions for each rootstock, and established 5ds/m as a long-term soil salinity threshold at which yield would not be affected.

Armed with his salinity results on newly planted trees, Blake was a key contributor to another project led by Dr. Daniele Zaccaria, LAWR Extension Specialist, and then Post-doctoral Scholar, Giulia Marino (now a UC Extension Specialist) on the assessment of pistachio water use in saline soils using Eddy Covariance. Blake contacted me for assistance in locating research sites, because he had intimate knowledge of pistachio culture, and knew what requirements to look for. Blake and I toured Kings County for almost a day looking at possible locations. Once located, I did the initial introduction to the grower to secure their cooperation. Blake then followed through to ensure that the promises made were kept. When the specialist was out of the country during harvest, Blake was the one who came to the rescue to get the cooperation of the grower and harvest the trial. This is no small task these days, because time is money to these custom harvesters, and they do not get paid for messing around gathering individual tree yields in garbage cans with Extension people. It's safe to say Blake was THE go-to guy for assessment and explanation of the problem salinity creates for tree nut crops

Blake is also an outstanding teacher, with 200 Extension presentations in the past 13 years. In many ways, Blake has served as a specialist in the southern San Joaquin Valley, because of his direct experiences with his assigned subject matter, and the depth of his knowledge. Soil and water science has a host of terms, abbreviations, and equations associated with solving salinity and infiltration. Blake has worked extremely hard to teach growers and allied industry people how to understand soil analyses and apply the proper amendments. He always patiently listens to the analysis numbers and our plan, and then offers his thoughts in agreement or opposition to it. If he disagrees, he teaches you why. Blake has also served on many advisory committees; he has been a board member for the California Irrigation Institute, the oldest continuous water forum for over 15 years. In 2017, he was honored as the Irrigation Person of the Year. He has authored 16 peer-reviewed publications during the latter half of his career, as well as scores of technical and county-based research reports, detailed newsletters, and a comprehensive website filled with how-to information.

Blake is also a very fine individual, having represented UC and agriculture with class and without discrimination to anyone. I see Blake as a very fair fellow, one who has worked hard at being a peacemaker. Blake did not find it difficult to subscribe to the UC policies of Affirmative Action, because he has a kind and unbiased heart molded by his faith. Anyone having served as a missionary, and contracted malaria several times while working to elevate the standard of living for those less fortunate than us Americans certainly understands the essence of equality.

In conclusion, given all the outstanding research and knowledge Blake has contributed to UC and California agriculture, I am truly honored to be the one blessed with the opportunity to share his career with the American Society of Agronomy, who recognizes the significance of his contributions to precision irrigation and soil management. I join Society members today in honoring you for your distinguished service to the Society and the California farmers responsible for insuring a safe, abundant food supply. Congratulations, Blake!