

Groundwater Sustainability Project

Winter Newsletter



Outline

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New Year's Message From the Director

Hello Groundwater Sustainability project researchers, collaborators, stakeholders, and supporters! I hope you had a wonderful 2022 and I wish you a successful and productive 2023. Together we accomplished so much in the first year of our USDA NIFA SAS project. This winter newsletter highlights some of our project achievements in the past year (e.g., our first annual symposium held in Davis in November 2022) and celebrates the successes of team members and partners. Through integrated research, education, and extension activities we continue to contribute solutions to the grand challenge of achieving groundwater and agricultural sustainability in the Southwestern US under a changing climate.

Lastly, please take a few minutes to read some of our accomplishments, which could not have been possible without your continued support for the project. In 2023, I look forward to working with you on project activities in Arizona, California, and New Mexico with the overall goal of improving the lives of people and the sustainability of our groundwater and agricultural systems.

Isaya Kisekka Director UC Davis Agricultural Water Center



Project director Isaya Kisekka during his opening remarks at the center's 2022 Annual Symposium





The UC Davis Agricultural Water Center's First Annual Symposium Was a Success

In November 2022, the UC Davis Agricultural Water Center of Excellence hosted its first annual Groundwater Sustainable Agricultural Systems Symposium. Scientists, farmers, and policymakers from across the Southwest gathered in Davis, California for three days of networking, presentations, and field trips to study sites around Yolo County, CA. The symposium showcased the multidisciplinary and multi-state nature of this USDA NIFA funded project whose goal is to find solutions to some of the biggest water challenges facing the American Southwest. Many members were meeting face to face for the first time.

On Wednesday, November 2, participants were welcomed to Davis with a networking dinner. The following morning, presentations began with opening remarks by Project Director Isaya Kisekka, who provided a brief project overview. "Our food system cannot survive without irrigated agriculture. At the same time, we cannot continue to pump our groundwater aquifers in an unsustainable way. So how can we reconcile these two things?"

To answer this question, we had a day filled with technical sessions from project team members discussing project related activities:

 Sustainable Agricultural Systems (Moderated by Steven Ostoja) - Speakers including Lauren Parker, Cristina Lazcano, Isaya Kisekka, Karl Longley, and Patrick Brown discussed their teams' accomplishments to date and what they plan to work on going forward.



Undersecretary Christine Birdsong discusses CDFA's contributions to climate resilience in California agriculture.

- Groundwater (Moderated by Scott Bradford) -Speakers including Thomas Harter, Helen Dahlke, Meredith Goebel, and Simone Williams discussed their teams' accomplishments to date and what they plan to work on going forward.
- Socioeconomics (Moderated by Ellen Bruno) -Speakers including Tyler Scott, Jeff Hadachek, and David Zilberman discussed their teams' accomplishments to date and what they plan to work on going forward.

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Join us on 🄰



Attendees of the Agricultural Water Center's 2022 Annual Symposium

- Education (Moderated by Sarge Green) -Speakers including Shannon Norris and Charles Hilyer discussed their teams' approaches to groundwater education. Sangeeta Bansal, a postdoctoral research associate at UC Davis, and Charlie Chen, a graduate student at UC Davis, discussed the center's Graduate Student and Postdoc Cohort Group, which connects grad students and postdocs across the project's participating campuses.
- Extension (Moderated by Debankur Sanyal) -Mallika Nocco presented an overview of the project's extension efforts. Frank McPherson and Marianne Bird also discussed the accomplishments of the 4-H Water Wizards program.

We were also lucky to have an amazing lineup of keynote speakers who presented on the larger water issues facing the Southwest:

• Christine Birdsong, Undersecretary of the California Department of Food and Agriculture, discussed CDFA's contributions to climate resilience in California agriculture.

- Felicia Marcus, with Stanford University's Water in the West, discussed the water challenges facing the western U.S.
- Stephanie Anagnoson, Director of Water and Natural Resources for Madera County, discussed groundwater management in the Madera Groundwater Sub-basin by Madera County Groundwater Sustainability Agencu (GSA).
- Dax Hansen, owner of Oatman Farms, the first Regenerative Organic Certified farm in the southwestern U.S., joined us virtually to discuss his operation's adaptation to water scarcity and climate change in Arizona.
- Sharon Megdal, Director of the University of Arizona's Water Resources Research Center, discussed water challenges facing the southwestern U.S.
- Kamyar Guivetchi, Manager of the Division of Planning at the California Department of Water Resources, gave a keynote presentation on California's plan to boost water supply and flood-MAR.

2022 Annual Symposium Field Trips

 James P. Dobrowolski, USDA NIFA National Program Leader for Water, joined us virtually to give closing remarks.

Participants also got the opportunity to learn data management skills from Beth Tweedy. LeAnn Brosius from the Kansas State University Office of Educational Innovation and Evaluation gave an update on the evaluation team's work to date.

The project's advisory committee, chaired by Ms. Stephannie Anagnoson together with the other committee members present, namely; Doug Parker, Meagan Schipanski, Kirk Pumphrey, Sebastian Saa, Ajay Goyal with Ronald Rayner joining remotely met with members of the project executive committee during the symposium. The advisory committee was happy with the project's progress to date and provided constructive feedback on how the project can improve going forward to enhance impact.

The night closed out with a poster session where participants had the opportunity to learn more about their colleagues' research. The poster competition was won by Aaron J. Guerra, with Charlie Chen and Elise J. Zufall tying in second place.

The next day, participants got up bright and early for field trips. At the first stop near Esparto, graduate student Cassandra Bonfil gave a presentation on nitrogen leaching evaluation at a processing tomato site, and graduate student William Lennon then gave a demonstration of the deep vadose zone monitoring system (VMS) used for measuring nitrate leaching all the way to groundwater. Participants then had the chance to see one of the City of Woodland's aguifer storage and recovery wells, which helps to recharge the city's aquifer in years with sufficient surface water. Finally, we visited one of Bullseye Farms' pistachio orchards to learn about their implementation of cover crops and the co-benefits of water-carbon management in orchards. USDA ARS scientist Dr. Matthew Roby discussed the use of eddy covariance towers to monitor the cover crop's effect on the ecosystem-scale carbon and water exchange in a young pistachio orchard.

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Graduate student William Lennon (far-center) demonstrating how samples are collected from a vadose zone monitoring system (VMS) used to evaluate nitrogen leaching in a processing tomato field for a group of field trip attendees.



City of Woodland engineers present specifics about their aquifer storage and recovery wells for field trip attendees.



Dr. Matthew Roby of USDA ARS SAWS Unit in Davis explains the use of the eddy covariance flux tower to monitor the effects of cover crops on the ecosystemscale carbon and water exchange in a young pistachio orchard.

Poster Competition Winners!!!







Aaron J. Guerra Creating SmartLawn for the Future: A Demonstration of Water Conservation in Urban Settings



2ND

Elise J. Zufall A Structural Topic Model Analysis of Groundwater Sustainability Plans

2ND



Charlie Chen Estimating Blue and Green Water Footprints of Pistachios in Madera County, CA

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We hope everyone who participated in the symposium had an amazing time networking with colleagues and learning more about the exciting work. We are already looking forward to our next annual symposium this year in Phoenix Arizona. Please be on the lookout for a save-the-date notice! The Link to the symposium recordings can be found by clicking on the Youtube icon at the bottom of this page.



Arizona Stakeholder Meeting

On January 24, 2023, the Arizona project team hosted a hybrid stakeholder meeting at the University of Arizona Maricopa Agricultural Center to share project progress, and hear feedback from project advisory board members present as well as other stakeholders. It was well attended by farmers, policymakers, and private sector representatives. In attendance was the Project Director, Isaya Kisekka, and representing the advisory committee members were Ronald Rayner and Bryan Hartman. The meeting was moderated by the Director of the University of Arizona Water Resources Research Center, Dr. Sharon Megdal.

Other members of the Arizona project team present included soil health specialist Debankur Sanyal and graduate research associate Simone Williams, who is developing a SWAT model for the Pinal AMA.

For the media report on the meeting click HERE

Photo Gallery











Announcements

SWAT & SWAT+ Training 2023 March 13-17, 2023 @ 8:00 AM to 5:00 PM Davis, CA



The California Irrigation Institute's 61st Annual February 27-28, 2023 @ 8:30 AM to 1:30 PM Sacramento, CA

2023 Annual Water Resources Conference June 13-15 in Fort Collins, CO





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WRRC 2023 Conference July 11-12, 2023 @ 9:00 AM to 2:00 PM Tuscon, AZ

2nd Global Evapotranspiration Symposium October 23-27, 2023 @ 8:00 AM to 4:00 PM University Park, Pennsylvania



Subgroup Meetings

- Groundwater Every 3rd Tuesday of the Month
- Student & Postdoc Every Last Thursday of the Month
- Executive Committee -Every 3rd Friday of the Month
- Education Every Last Tuesday of Every Other Month starting in January (Next Meeting in March)
- Extension Every 1st Monday of Every Other Month starting February (Next Meeting in April)

Zoom links available on request





Project Publications

Congratulations to all the project team members that published papers last year.

 Thorp, K. R. (2022). PYFAO56: FAO-56 evapotranspiration in python. SoftwareX, 19, 101208.

https://doi.org/10.1016/j.softx.2022.101208

- Linker, R., & Kisekka, I. (2022). Concurrent data assimilation and model-based optimization of Irrigation Scheduling. Agricultural Water Management, 274, 107924. https://doi.org/10.1016/j.agwat.2022.107924.
- Raij-Hoffman, I., Miller, K., Paul, G., Yimam, Y., Mehan, S., Dickey, J., Harter, T., & Kisekka, I. (2022). Modeling water and nitrogen dynamics from processing tomatoes under different management scenarios in the San Joaquin Valley of California. Journal of Hydrology: Regional Studies, 43, 101195. https://doi.org/10.1016/j.ejrh.2022.101195
- Peddinti, S. R., and I. Kisekka (2022), Effect of aggregation and disaggregation of land surface temperature imagery on evapotranspiration estimation, Remote Sens. Appl. Soc. Environ., 27, 100805, doi:10.1016/J.RSASE.2022.100805.
- Emami, M., A. Ahmadi, A. Daccache, S. Nazif, S.-F. Mousavi, and H. Karami (2022), County-Level Irrigation Water Demand Estimation Using Machine Learning: Case Study of California, Water 2022, Vol. 14, Page 1937, 14(12), 1937, doi:10.3390/W14121937.
- Peddinti, S. R., and I. Kisekka (2022), Estimation of turbulent fluxes over almond orchards using high-resolution aerial imagery with one and two-source energy balance models, Agric. Water Manag., 269, 107671, doi:10.1016/J.AGWAT.2022.107671.

- Vanella, D., S. R. Peddinti, and I. Kisekka (2022), Unravelling soil water dynamics in almond orchards characterized by soilheterogeneity using electrical resistivity tomography, Agric. Water Manag., 269, 107652, doi:10.1016/J.AGWAT.2022.107652.
- Thorp, K. R., S. Calleja, D. Pauli, A. L. Thompson, and D. E. Elshikha (2022), Agronomic Outcomes of Precision Irrigation Management Technologies with Varying Complexity, J. ASABE, 65(1), 135–150, doi:10.13031/JA.14950.
- Kisekka, I., S. R. Peddinti, W. P. Kustas, A. J. McElrone, N. Bambach-Ortiz, L. McKee, and W. Bastiaanssen (2022), Spatial–temporal modeling of root zone soil moisture dynamics in a vineyard using machine learning and remote sensing, Irrig. Sci., 1, 3, doi:10.1007/s00271-022-00775-1.
- Parker, L. E., N. Zhang, J. T. Abatzoglou, S. M. Ostoja, and T. B. Pathak (2022), Observed Changes in Agroclimate Metrics Relevant for Specialty Crop Production in California, Agron. 2022, Vol. 12, Page 205, 12(1), 205, doi:10.3390/AGRONOMY12010205.

How to cite the project support in publications:

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Don't forget to send us your publications, extension bulletins, conference presentations etc, to feature them in the next Newsletters and on the Ag Water Center Website.



