**WERA 1022**

**2019-2020 Meeting**

Irrigation Show and Education Conference

Las Vegas Convention Center, Las Vegas, NV

December 6, 2019

8:10 AM - Started off by Stacia Conger introducing herself and Ed Martin (advisor) and Jama Hamel (co-chair), who could not attend. Also introduced the objectives of the program to those who have never attended this meeting before.

Stacia brought up the purpose of the program and gave the example of possibly developing a crop coefficient publication based off of presentations given by Troy Peters in previous years of this meeting. There was interest in it, but it may have already been done. Charles mentioned that Rick Allen published 50-60 years worth at some point. Neil mentioned that he can dig up access to a national database that was used in a model in Utah. Xinhua mentioned that the crop coefficient group from EWRI had started to collect the data, but the group didn’t finish the work assigned to them. Stacia mentioned that she could reach out to follow up with that committee to get details.

Stacia asked for introductions from the attendees, listed below in no particular order:

David Yates – Climate Scientist, NCAR

Mike Tansey – US Bureau of Reclamation

Neil Allen – Faculty, Utah State University

Allan Andales – Faculty, Colorado State University

James Han – FieldNET Advisor Specialist, Lindsay Corporation

Chris Henry – Faculty, Arkansas State University

Xinhua Jia – Faculty, North Dakota State University

Jonathan Aguilar – Faculty, Kansas State University

Charles Hillyer – Director, Center for Irrigation Technology, Fresno State University

Daran Rudnick – Faculty, University of Nebraska

Stacia Conger – Faculty, Louisiana State University Agricultural Center

Presentations:

* James Han – Use Satellite Imagery to Calibrate Crop Coefficient Kc for Irrigation
	+ Incorporating remote sensing to scheduling irrigation to address precision agriculture trends
	+ Imagery sources getting cheaper and cheaper
	+ Currently have a crop model and access to global weather data down to the hour
	+ USDA soils database, use international database for global applications
	+ Conducts water balance simulations
	+ Generates water prescription that’s sent to the pivot
	+ Creates a vegetative index including EVI EVI2 NDVI to estimate crop coefficient
	+ Adjusts crop coefficients based on actual conditions up to 3 days previously
	+ Showed data from corn over two years, EVI > NDVI>EVI2
	+ Vegetative index and crop coefficient pattern are not limited by crop type
	+ Calculating “actual ET” from SMS (granular matrix potential) to check their modeled values
* Neil Allen
	+ Updated on Utah’s irrigation needs and current irrigation capacity, limited by water availability, concerned about the Great Salt Lake
	+ Major crops are alfalfa and pasture
	+ Putting lots of money into improving irrigation efficiencies because they almost always get a yield bump from any water that can be added to the system
	+ Some current studies
		- 550 silage corn plots with SMS, linear move with LEPA, LESA, PMDI, MESA, and Nelson Advantage packages across each span
		- Drip vs. Furrow irrigated onions,
			* Acclima TDRs in 3x3 grid pattern with one deep sensor for leaching,
			* infrared radiometer sensor for evaluating energy balance
			* Farmer receives 2.5 cfs every 7.5 days, so he uses all of it for furrow irrigation, saw deep percolation
			* Drip stayed below saturation in the deep layers
			* Crop coefficient was about 0.8 on the good data days
			* Soil was warmer on drip due to less evaporation during day, nighttime temps remained the same
			* Drip applied 14.6 inches compared to 92 inches from furrow. Yield was 92,319 lbs/ac for drip compared to 127,800 lb/ac. However, the surface farmer planted more onions per acre. Drip farmer was also too busy to manage and likely under-irrigated
		- 4 ways to help optimize water use in agriculture? – Matt Yost
			* Upgrading irrigation systems
			* Maintaining irrigation equipment (testing sprinkler nozzles, test pressure regulators, etc)
			* Irrigation scheduling (SMS, weather, commercial options)
			* Goal was to use progressive farmers that were doing their best
			* Modify crop/soil practices

**Break**

* Michael Tansey and David Yates - ETo Forecasting at Agricultural Meteorlogical Stations (WwET4Cast)
	+ Develop a web-based platform with daily ETo and short range forecasting for farming uses
	+ Implement at each existing weather stations in various networks
	+ Forecasting products used include
		- GEFS – global ensemble forecast system
			* Gridded data for 8 day forecasts
		- GFS - Global Forecast System
			* Newer system, coupled gridded weather model with ocean, atmosphere, etc.
		- Climate Forecast System (CFSv2)
			* Long range 180 days+
	+ Hydromet already doing a lot of supply-side forecasting already, but wanted to look at demand using same infrastructure
	+ Webpage access now
	+ Modeling is an ensemble practice with very small perturbations to create variations in the forecast
	+ Making a product applicable for the station location from gridded data, so they introduce a bias correction to apply grid to the weather station
	+ Hydroinspector NCAR website demonstration with slow internet
	+ Asks for collaboration and to spread the word of the product

**12:00 PM Break for lunch**

Discussion of next year’s meeting needs. Daran volunteered to host in Nebraska in coordination with the ASABE meeting. Neil was interested in hosting a Utah State meeting, but wanted to see how his workload changes because he’s too busy to commit at this time. We discussed having a meeting at CIT (under Charles Hillyer) or Colorado State (under Allan Andales) to tour the new irrigation consortium, but there was no strong commitment at this time. There was a suggestion to hold this meeting with the IA/ASABE meeting in 2020 just because it’s the decennial meeting with likely many in attendance before we move back to state meetings. I agreed to reach out to the Irrigation Association again. I also suggested that this meeting could evolve into the technical sessions for IA instead of a separate program since the few that presented at IA gave the same talk in our meeting. There was some positive response, so I will reach out to IA to test the waters about that idea as well.

* Jonathan Aguilar K-State
	+ Only 18 inches of precipitation on western side of state, increasing as you head east
	+ Increasing sprinkler irrigation from flood irrigation
	+ Irrigated acres increasing on the eastern side, but overall acreage has stayed the same
	+ With efficiencies constant, lose about 0.17 inches per event
	+ Showed the updates to KanSched, moving to a web-based version for third iteration
		- Including an extrapolated forecast now
		- Moving toward a mobile application as well
		- Shows historical ETo for both grass and alfalfa
	+ SMS comparison
		- Testing CS655, Acclima 315, neutron probe
		- Conducting field days to show off options, installation methods
		- Commercial products use an ET value from a third party to adjust/interpret sensor data
* Chris Henry
	+ Surge and Sensor school for farmers
	+ Rice irrigation school for farmers
	+ Sap flow work because Arkansas soybeans may need later termination dates for high yields. Previous work from Nebraska is old and may need to be updated
	+ Developed an SMS calculator to help interpret potential readings
	+ MIRI rice plan app as a conservation measure
	+ Developed a printer for polypipe to print the pipe plan as it’s laid across the field with an ATV
	+ Irrigation water management demonstrations, IWM vs. farmer practices
	+ Summarized two publications that showed IWM was economical and can even bump yield in corn
	+ Increasing CHS trends in mid-South
	+ Updating rice practices to furrow-irrigated rice. Found that row rice uses less water than MIRI
	+ Irrigation Yield Contest
		- Award those that maximize water use efficiency
		- Three contest categories – corn, soybean, and rice
		- Yield must be economically acceptable to deter severe deficit
		- Min 30 acre yield, must have flowmeter, must have a supervisor (NRCS or ANR agent)
		- Prizes worth over $21K
		- Flow meters are sealed to the alfalfa valve
		- $100 entrance fee with application
		- All participants get a report at the end to show them how they fair against their neighbors
* Allan Andales
	+ Lysimeter study on dry pinto beans under linear move, used to be furrow irrigated so exploring the differences in irrigation practices on same field
	+ Lysimeter study on grass with smaller unit than the ag lysimeter
	+ Kcr calculated from ETr and lysimeter ET
	+ Noticed a lot of advection, problem inherent with ETr
	+ Water Irrigation Scheduler for Efficient Application (<http://wise.colostate.edu>)
		- GIS based
		- Detects local weather station
	+ Zone Irrigation Scheduling is a work in progress, pivot VRI
	+ Evaluating 7-day weather forecasts from awhere.com, streaming global gridded product with rainfall (no archives)
	+ http://Ogallalawater.org/irrigation-scheduling-tools
	+ Irrigation Innovation Consortium
		- Higher ed, industry, and NGOs in states
		- Funding opportunities with 1:1 match, may be good for our group to go after funding
		- Located at the CSU Irrigation Technology Center (very similar to CIT)
* Daran Rudnick
	+ Brule Water Laboratory
		- Lots of VRI work, UAS work, fertigation, etc.
	+ WCREC North Platte
		- Sensor evaluations, fertigation, deficit irrigation, irrigation scheduling, etc.
		- Pivot, SDI, and lateral
	+ TAPS program hosts “Farm Management Competitions”
		- On paper, 3K acres for decisions but actual practices are on three random plots under a VRI at WCREC
		- Awards
			* Economically profitable $2,000
			* Highest input use efficiency $1,000
			* Yield
	+ Sprinkler Corn planting
		- Hybrids perform very differently than other varieties, need for differentiating
	+ Looking at Water/Nutrient interactions and water/nutrient stresses
	+ Sensor evaluations
		- Pub on corrections for clay content on sensor data
		- Relates to dielectric mixing model, lab study
* Stacia Conger
	+ Showed an overview of land use and water use in Louisiana
	+ Presented some basic results from her irrigation scheduling spreadsheet
	+ Comfortable, at least initially, with the spreadsheet, now looking into the quality and availability of data to populate the spreadsheet
	+ Presented some introductory results of a newly started atmometer study where ET was being overpredicted compared to ETo
	+ Had some issues with atmometer reliability

Stacia reminded everyone that Ed still needs all state reports from 2018-2019 despite not having a meeting. She then thanked everyone for coming and concluded the meeting at approximately 4 PM.