**WERA 1022 Multi-State Meeting**

Annual Meeting Notes

**September 25, 2018**

Ed Kee, Former DE Secretary of Ag, Retired UD Vegetable Specialist – Guest speaker

* Introduced DelMarVa area and identified the Chesapeake Bay
* 1.2 mil acres of cropland across DelMarVa
* VA Eastern Shore has many wetlands and barrier islands
* Delaware
  + 41% farmland (2,500 farms) with 24% permanently preserved
  + 76% is in open space
  + In 1950, 80% of land was in farmland
  + Farm value high in chickens, vegetables, soybean, corn, greenhouse/nursery
* DuPont Highway was built by DuPont and turned over to the state in the 1920’s. This opened up agriculture opportunities
* Canning
  + 1842 – 1st canning operation in Baltimore. They canned in-season fruits, vegetables, and oysters. There was lead used to seal cans. It was before pasteurization science, so it wasn’t always done correctly
  + 1927 – Canned tomatoes were king, good way to get nutrition to rural areas
  + Labeling was important for canned goods
    - Pictures on labels helped with marketing
    - Walt Disney designed the label for international shipping
  + Operations became old, needed updating for environmental reasons, sometimes easier to shutdown instead. Canning decline in the area. Processing shifted to California.
* Poultry
  + 1923 - Cecile Steele accidentally got 500 chickens and decided to raise them and sell them
  + Within a few years, local farmers followed suit and grew to 10,000 chickens
  + WWII increased demand for protein, also created black market due to government price control
  + Nutrient management is strict
  + Planting windbreaks around houses, helps with ammonia
* Irrigation
  + Great aquifer in terms of volume
  + 1973 – 20,000 acres with mostly hand-moved pipe for veggies
  + 2019 – 150,000 acres of irrigation with center pivots, 5,000 acres of drip irrigation
  + Increase in yield covered crops and mitigates risk
  + Farmers use the DEOS system to understand ET rates and use the checkbook method OR just intuition, experience, and self-knowledge
  + There are now models that estimate fungal disease based on estimations of host, disease, and environment

BREAK

*Business meeting*

* Ed Martin showed the NIMMS website and discussed reporting requirements
* Ed Martin showed Arizona’s weather network website AZMET
* Kevin Brinson showed the Delaware Environmental Observing System (DEOS).
  + 57 stations in DE and PA (for rainfall that affects DE watersheds)
  + Data used for:
    - Irrigation
    - Disease forecasting
    - Snow removal
    - Others
  + Irrigation scheduling tool has forecasting added this year from NWS forecasting database
* James Adkins gave a summary of a sensor project
  + 20 growers for 3 years, so 60 total, tried sensors
  + Found that ET data was good enough
  + Producers were not willing to handle the sensors on their own
  + Used Watermarks with one set point and it worked well, matched KanSched
  + Soil water storage is top 10-18 inches, sandy soils
  + No water conservation issues, just nutrient and economics issues
* Gene Stevens
  + From the bootheel of Missouri
  + Irrigation app (cropwater.org) with 111 users, 454 fields in 2017
  + Program went statewide in 2018 and numbers are up!
  + Graduate student developed DD60 crop growth model was integrated into the app
  + Restricted by the distance of the Mesonet, but working to allow manually added ETo
  + Solar Radiation Index used to adjust. Multiple days of cloudy conditions with index <0.5 for 3+ days is a stress event
  + Cotton irrigation, best yield at 18 inch root zone
  + Furrow rice irrigation, best yield at 12 inch root zone, nitrogen losses looked at
  + Looked at soybean NDVI, LAI, other weekly data on multiple maturity groups and varieties
  + The new data will be used to add new features to the app
* Wei Ren
  + Modeling development for 15 years, simulates hydrological and chemical changes
  + MS River Basin, coastal systems
  + Looks at transport from land to water, leaching
  + Climate Smart Agriculture, soil health (cover crops, no-till, biochar)
  + Recent interest in irrigation
  + Trying to develop an optimum irrigation schedule for nitrogen input to protect agroecosystems by combining model with modern technologies
  + Realizing that its an ideal idea, not realistic
  + Has meterology network in ABE dept
  + Will bring some new information next time to start discussing Kentucky specifically with extension agents

**September 26, 2018**

Mark Isaacs, UD Experiment Station Director – Guest Speaker

* Provided introduction to the station, history of the facility, and how UD is structured
* Explained how their funding works and why they operate in specific ways
* Successful because community funding was spent frugally and they were very responsive to the community’s needs

Gordon Johnson, Vegetable Specialist – Guest Speaker

* Disease forecasting
  + Sensors were not reliable, so they moved into weather information
  + NEWA Potato Disease Forecast
  + MELCAST for Watermelon
  + Cucurbit Downy Mildew risk information
  + Delaware Downy Mildew Lime Bean Risk Tool
* Insect Emergence
* Planting temperature
  + Weather stations give a starting point, but doesn’t give field specific temps. They also need to go out and measure it.
  + UD produces temperature tables that predict emergence percentage and number of days from planting to emergence
* Growing degree days (crop maturity)
  + Tests varieties to verify seed company information
  + Tenderness reading for peas
* Irrigation scheduling
  + Provide estimated ET tables, related to temperatures and expected weather conditions
  + Checkbook method
* Pesticide application
  + Discussed dicamba drift
* Frost and freeze warnings
* Drought monitoring
* Heat monitoring
  + Correlate high temps with plant responses
  + High temps cause blooms to drop and cause other issues
* Long term weather use example
  + Processing plant utilization
    - Historical growing degree day data to determine planting dates for different locations
    - Looks at 30 year running averages – maybe 15 year is sufficient
    - Determine changes in planting dates and irrigation requirements
* Recent projects
  + In-field weather monitoring of mostly temp, RH
    - Lima bean heat tolerance
    - Root knot nematode
  + Long term environmentally-sensed data for climate warming
    - Rising min temperatures most troubling, but max temperatures are also increasing
    - Extreme temperature events
  + Targeted heat mitigation – mulch, radiation blocks, reflective materials, shade, regulators, root inoculants
  + Adaptive heat mitigation – crop changes, planting season, genetics

*Business meeting*

* Vasudha Sharma
  + Groundwater areas of concern connected to highly irrigated areas
  + 20% of farmers use checkbook method
  + Farmers indicated they don’t like the excel spreadsheet
  + Very limited ET and crop coefficient information
  + Start of extension includes ET gage network, SMS irrigation trigger levels, move to smart apps
  + Future projects – Irrigation Management Assistant (IMA) Expansion
* Vivek Sharma
  + Wyoming has low annual precipitation (12.7 in) with high ET (46 in)
  + Spatial and temporal variability in precip and ET
  + 1.54 Mil acres are irrigated in the state
  + 85% of total consumption is irrigated agriculture
  + Wyoming is a headwater state
  + Primarily surface irrigated with increasing sprinkler irrigation
  + Current research
    - Irrigation, nitrogen management on sugar beets
    - Screening dry bean genotypes for drought tolerance
    - SMS – testing multiple sensors and working on calibration curves now
    - Dry bean water management under sprinkler and surface irrigation
    - ET research - Measuring ETc and Kc for different crops, BREBS
    - Developing WACNet weather network
* Stacia Conger
  + Showed where irrigated agriculture resides in the state
  + Developed Kc’s for cotton on sandy clay loam soils using soil moisture sensors
  + Developed irrigation scheduling spreadsheet and checked it against 2015/2016 data. Need to add infiltration to it.
  + No progress on state weather network