Howdy!
Research Program Briefing

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Texas AgriLife Research,
Amarillo/Etter, TX

(“several hats - long timer”)
Research Efforts involve a True Cooperative Mentality

The best thing one can do is surround one’s self with “brilliant, can do” people and work together in a true team effort “

.../Howell (long time ago)

(...a life lesson philosophy many administrators should learn)

- ie. “each has a true part and is responsible to the group effort and is NOT a token buddy system approach ”
“High Plains Water Team” Associates

(truly a “we” based approach)

- **State**
  - Dana Porter, PhD, PE, Lubbock, Engineer
  - Giovanni Piccinni, Uvalde, Crop Physiologist
  - Steve Amosson, PhD, Amarillo, Economist
  - Donald Dusek, Amarillo, Instrumentation
  - Brent Auvermann, Amarillo, Engineer
  - Leon New, PE, Amarillo, Engineer

- **ARS**
  - Terry A. Howell, PhD, PE - ARS, Bushland, Engineer
  - Prasanna Gowda, PhD - ARS, Bushland, Engineer
  - Paul Colaizzi, PhD - ARS, Bushland, Engineer

- **Other:** Giovanni - Uvalde
“100% Research Time”, %

- Research: 35%
- Admin: 50%
- "Extension": 15%

Texas AgriLife Research at Amarillo
Main Research objectives

- **Hatch TX 08947-** “IRRIGATION MANAGEMENT TECHNOLOGIES FOR EFFICIENT CROP PRODUCTION AND WATER RESOURCE CONSERVATION”

- **Objectives:**
  1. Develop ET network tools for irrigation scheduling and water mgmt.
  2. Investigate the development of a variable rate irrigation system, &
  3. Assess agricultural water use demands - regional and state.
The Texas High Plains ET Network

Two regional networks of meteorological stations located throughout the Texas North and South Plains whereby reference ETos and crop ET (ETco) calculations using newly standardized ASCE/EWRI ET equations are made and disseminated in an automated process providing daily ET for a variety of crops for improved irrigation scheduling to enhance water management and promote water conservation.
TXHPET Network Sites

- ET Sites
- soon
- terminated

Etter
Amarillo
Lubbock
Benefits of TXHPET network

- QA/QC meteorological datasets for TX hHP
- Data supports 24 state & federal based projects
- Data underpins regional water plans
- Data is basis for many several GWCD rules & pumping regulations
- Data provides basis for PWPG/PRPC recommendations
- Trigger basis of several crop/insect/disease models
### TXHPET associated events/values for crops

<table>
<thead>
<tr>
<th>Corn</th>
<th>Grain Sorghum</th>
<th>Soybeans</th>
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<tbody>
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<tr>
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<td>Dent</td>
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*Texas AgriLife Research at Amarillo*
FAO-56 Staging Concept
CIRE-Uvalde

Cumulative TXHPET ETco and FAO-56 values for soybeans in 2000
**TXHPET Ag Water Use Tech transfer**

(60 case illustration)

- **Outreach:**
  - 17 TXHPET presentations
  - 12 associated reports
  - 2 related abstracts
  - 1 peer reviewed article
  - 2 news releases

- **Impact:**
  - During project duration, over 680,000 pages!!! (136 paper case equiv.) of ET and crop water use data delivered to over 800 producers and agriculturists (~ half being electronically downloaded - 68 paper case equiv. in 2006- NOW 75% electronic)

…”1 years worth of TXHPET output.”
Non-ag data for ag based use project

<table>
<thead>
<tr>
<th></th>
<th>WTM data as % of TXHPET values</th>
</tr>
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<tr>
<td>Tair</td>
<td>1.05 0.98 1.00 1.03</td>
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<tr>
<td>Tdew</td>
<td>1.08 1.12 1.12 1.14</td>
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<tr>
<td>RH</td>
<td>0.97 1.09 1.04 0.99</td>
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<tr>
<td>Rs</td>
<td>0.94 1.08 0.96 0.87</td>
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</table>
| Wind Speed       | 1.00 0.91 0.84 1.22             

Daily Wind Speed (2002)

Daily Rs (2002)

Texas AgriLife Research at Amarillo
Lysimeter Efforts & Why Need

- World class state-of-the-art design(s)
- Several sizes/classes
- “Newer” designs – (team & solo based)
- Best instrumentation & pgm processes
- New designs not built as yet
- Renewed interest lately – (size/apps)
  - mostly talk people out of lysimeters
- “When 3rd generation designs done…so am I?”
Kc Research: Large Weighing Lysimeters
Uvalde Lysimeters
Variable Rate Irrigation - Components

1 inch

LVDT

Wire wound resistor
Bench Setup & Lab View Control - linearity & hysteresis tests

- First tests by resistor sensor
- Later by LVDT (magnetic field) positional tests
VRI - Step and End point Detection Issues
Recent CP System – NPRF (NPWD/TWDB/TAES grants)
Water Planning

- Assessment
- Data Analysis
- Methodology Development
- Model Verification
- Solutions based strategies & Water Savings
Water Planning - Region A

21 counties designated as Region A.

...uses over 1.72 million ac-ft/yr annually

...only one major surface storage in region A and it is low!
Texas Regions Volumetric needs

Figure 7-3. Volume of needs in regions in 2050.
2000 GAM Result

Color key – bluer has more sat thick; white is “dry”
“big time” white areas in western part of Panhandle
NPRF Research Cotton tests - “early years”

2 row x 25ft x 4 reps x 13 varieties x 2 planting dates
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Solution based Water Impact of Conversion

Water Use, ac-ft

Decade Year

2000 2010 2020 2030 2040 2050 2060

0 200,000 400,000 600,000 800,000 1,000,000 1,200,000 1,400,000 1,600,000 1,800,000 2,000,000

Orig. Estimates
50% converted
“Wildlife Problem” at Uvalde

“...always providing engineering solutions for agriculture”
“Plan A”
(Fencing improvements @ NPRF)
“Plan B”
“Plan C”

...we’ll leave the permitting up to Bill...
Again Thanks to All
who work with me!