Cotton - Field to Gin

Yesterday
Today
Tomorrow

Texas Alliance for Water Conservation

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College of Agricultural Sciences
& Natural Resources

Funded by:
Texas Alliance for Water Conservation

- Project established 2004 from a State of Texas grant administered through the Texas Water Development Board.

- Project is **Producer Driven** and **Board Directed**.

**Project Objectives**

- Develop and Demonstrate new technologies and management tools and strategies that result in less water being used with enhanced profitability.

- Identify effective crop and irrigation systems.

- Impact producer decision-making.
Ogallala Aquifer

- Aquifer covers 174,000 square miles across 8 states in the High Plains of the United States.
- Over 95% water pumped is for irrigated agriculture.
- The Texas South Plains on the southern end of the aquifer is an intensive agricultural production area and the focus of this program.
Field to Gin
Texas Cotton Production

- Texas No. 1 Cash Crop

- Statewide:
  - 65% of acres are rain-fed
  - 35% are irrigated

- High Plains:
  - 60% of acres are rain-fed
  - 40% irrigated

- Weather (rainfall) is most influential factor in yield
  - Rain-fed: 250–650 lbs/ac
  - Irrigated: 500–1,500 lbs/ac

- Harvest Methods
  - Stripper: Lower purchase & maintenance cost
  - Picker: Higher purchase & maintenance cost

Data provided by Plains Cotton Growers
In 1980, the peak of irrigated acreage on the High Plains:

- 2.2 million acres of cotton planted
- 2 million acres harvested
- 1.59 million bales produced

In 2010:

- 1.74 million acres of irrigated cotton planted (LESS than the peak)
- 1.68 million acres harvested
- 3.5 million bales produced (120% increase in yield on LESS acreage)

Data provided by Plains Cotton Growers
More than fiber

- 1980 – 50 lbs lint/inch water
- 2015 – 100 lbs lint/inch water
- 2029 – ?
Cotton Yield Increase
1980–2016

Yield, lbs/acre

Year
Pivot Irrigation Technology
2016 Demonstration

- **LDN**
  - Low drift nozzels

- **LEPA**
  - 40”
  - 80”

- **PMDI**
  - Precision Mobile Drip Irrigation

- **LESA**
  - Broadcast spray 80”

*450 gallon per minute from 3 wells*
LESA Broadcast Spray
LEPA 80"
Potential Evapotranspiration

Wind at 2 meters

Over 80 West Texas Mesonet Stations and expanding
TAWC–Solutions
ET Irrigation Scheduling Tool

Free web-based tool used to determine:

- When to apply water.
- How much water to apply.
- How to achieve specific management goals.

www.tawcsolutions.org
### Crop Summary

<table>
<thead>
<tr>
<th>Site</th>
<th>Weather Station</th>
<th>Acreage</th>
<th>Type</th>
<th>Last Et</th>
<th>Moisture Balance</th>
<th>Growth Stage</th>
<th>Total Irrigation</th>
<th>Total Rain</th>
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### Daily Measurements

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<th>Effective Irrigation</th>
<th>Effective Rain</th>
<th>Percent Et</th>
<th>Irrigation</th>
<th>Rain</th>
<th>Daily Et</th>
<th>Moisture Balance</th>
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Click on the above crops to view the summary and daily measurements for each.
Yesterday—
- Open ditch high pressure pivot
  - 50% Efficiency

Today—
- SDI
  - 98% Efficiency
- Soil moisture monitoring
- PMDI™
- VRI
- Ability to measure plant stress
- Water management tools

Tomorrow—
- Can we expect more of the same?
- Best Management Practices
Fieldprint Calculator

- Analytical tool designed by Field to Market: The Alliance for Sustainable Agriculture

- Evaluates crop production operations and computes their sustainability and operational efficiency

- A producer’s sustainability is evaluated based on metrics in the calculator
Metrics

- Land Use
- Irrigation Water Use
- Energy Use
- Greenhouse Gas Emissions
- Soil Conservation
- Soil Carbon
- Water Quality Index
Years of Production: 2007 – 2015

26 Producers, 34 sites, 193 Observations

Field size: 13 – 398 acres

Tillage Practices: No-till, Strip-Till, Conventional

Irrigation: Furrow, Pivot, SDI
Lloyd Arthur – 2015

- Land Use
- Irrigation Water Use
- Greenhouse Gas Emissions
- Energy
- Soil Conservation

TAWC Average
2015
Research Results

- Analyzing the relationship between gross margin and sustainability

- Development of a profitability metric

- Evaluating specific production practices (tillage, irrigation systems) to determine the magnitude of their impact
Thank You!

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