MIST- Mississippi Irrigation Scheduling Tool

Brandon Rice

Crumpton, J. Schmidt, A. Sassenrath, G. Schneider, J.

Why?

- Water conservation practices not consistently developed and implemented in the humid southeastern US.
- Average decline in the Mississippi River Valley Alluvial Aquifer of 37,004 ha-m (300,000 acre-feet) of water per year over the past 10 years (Powers, 2007).
- Recent changes in well permits now require farmers to implement water conservation practices or lose permitted use of ground water wells in Mississippi.
- Irrigation scheduling is an accepted water conservation practice.
Making an Irrigation Scheduling Decision

**FAO-56 Penman Monteith Model**


**Inputs to MPM Model**

- Sunlight (solar radiation)
- Temperature
- Relative Humidity
- Wind Speed

**Soil Data Inputs**

- Available water
- Textural characteristics

**Water Balance Equation**

Soil Water = (ET $\cdot K_c$) + I + R

R = Rainfall

I = Irrigation water applications

**Soil Moisture < Allowable Moisture Depletion** → IRRIGATE

Radar Total Rainfall Data from NWS
Inputs

Daily System Inputs

Weather Sensors → Irrigation Decision Support System ← User Inputs

Irrigation Amounts → Mobile Device or Laptop

Integration of HTML and Java together

MySQL used as the database to store the data

17 tables

- Weather Data
- Daily Water Balances
- Field Data

What makes it run?

- Java as our programming language
- JSPs (JavaServer Pages) used for the website
  - Integration of HTML and Java together
- MySQL used as the database to store the data
  - 17 tables
Difficulties

- Checking weather data
- Automating daily updates
- Displaying the data
- Cross platforms
  - Browsers, Tablets, Phones

Add a Farmer to beans's Account

This option allows you to add farmers to the account if multiple owners of farms will be managed by a single user under this account.

Farmers linked to this account:

<table>
<thead>
<tr>
<th>Name</th>
<th>E-mail</th>
<th>Cell Phone Number</th>
<th>Carrier</th>
<th>Changes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beans</td>
<td><a href="mailto:tr264@msstate.edu">tr264@msstate.edu</a></td>
<td>(228)233-2322</td>
<td>AT&amp;T</td>
<td>Edit Contact Info Add Farm</td>
</tr>
</tbody>
</table>

Add a Farmer to this account:

- Name: 
- E-mail: 
- Cell Phone Number: 
- Carrier: N/A

Add Farmer Reset

Return to Account Home
Mississippi Irrigation Scheduling Tool

Add a Field to Farm *Beans* belonging to Farmer *Beans*

Current Fields:

<table>
<thead>
<tr>
<th>Name</th>
<th>Crop</th>
<th>Planting Date</th>
<th>Emergence Date</th>
<th>Soil Type</th>
<th>Slope</th>
<th>Tillage Depth</th>
<th>Row Spacing</th>
<th>Moisture Deficit</th>
<th>Changes</th>
</tr>
</thead>
<tbody>
<tr>
<td>bean1</td>
<td>Soybeans</td>
<td>2012-02-01</td>
<td>2012-10-19</td>
<td>Heavy</td>
<td>0.3%</td>
<td>18.0</td>
<td>38.0</td>
<td>-3.0</td>
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</tbody>
</table>

Add a Field:

Field Name: ____________________________

Crop: ____________________

Planting Date: ________ / ______ / ______

Emergence Date: ________ / ______ / ______

Soil Type: ____________________

Slope: __________%

Tillage Depth: ____________________ inches

Row Spacing: ____________________ inches

Maximum Moisture Deficit: ____________________ inches

Add Field | Reset

Return to [Edit Farm](#) or [Account Home](#)

Mississippi Irrigation Scheduling Tool

Details for *beans* Account

Go to [Admin Home](#)

Select Farmer: Beans ▼ Next

Return to [Edit Farm](#)

Mississippi Irrigation Scheduling Tool

Details for *beans* Account

Go to [Admin Home](#)

Farmer: Beans

Change Field: bean1 ▼ Next

Reselect Farmer

Return to [Edit Farm](#)
Details for *beans* Account

**Moisture Deficit:** -0.7025

**Water Applied(in.):** 0.0

**Adjust Rainfall:** 0.0

Field need watering?

### March 2012

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<tr>
<th>Sun</th>
<th>Mon</th>
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<th>Thur</th>
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Reselect **Farmer**

Return to **Edit Farms**
Future Goals

- Integration with a mapping program
  - Google Maps

- Less user input for initial setup
  - Draw their field
  - Query databases for necessary information

Timeline

- Currently in the process of testing web application
  - Ease of use
  - Running calculations

- After the 2012 season
  - Verify & Improve

- Full web application available during 2013 season
Questions?