MIST- Mississippi Irrigation Scheduling Tool

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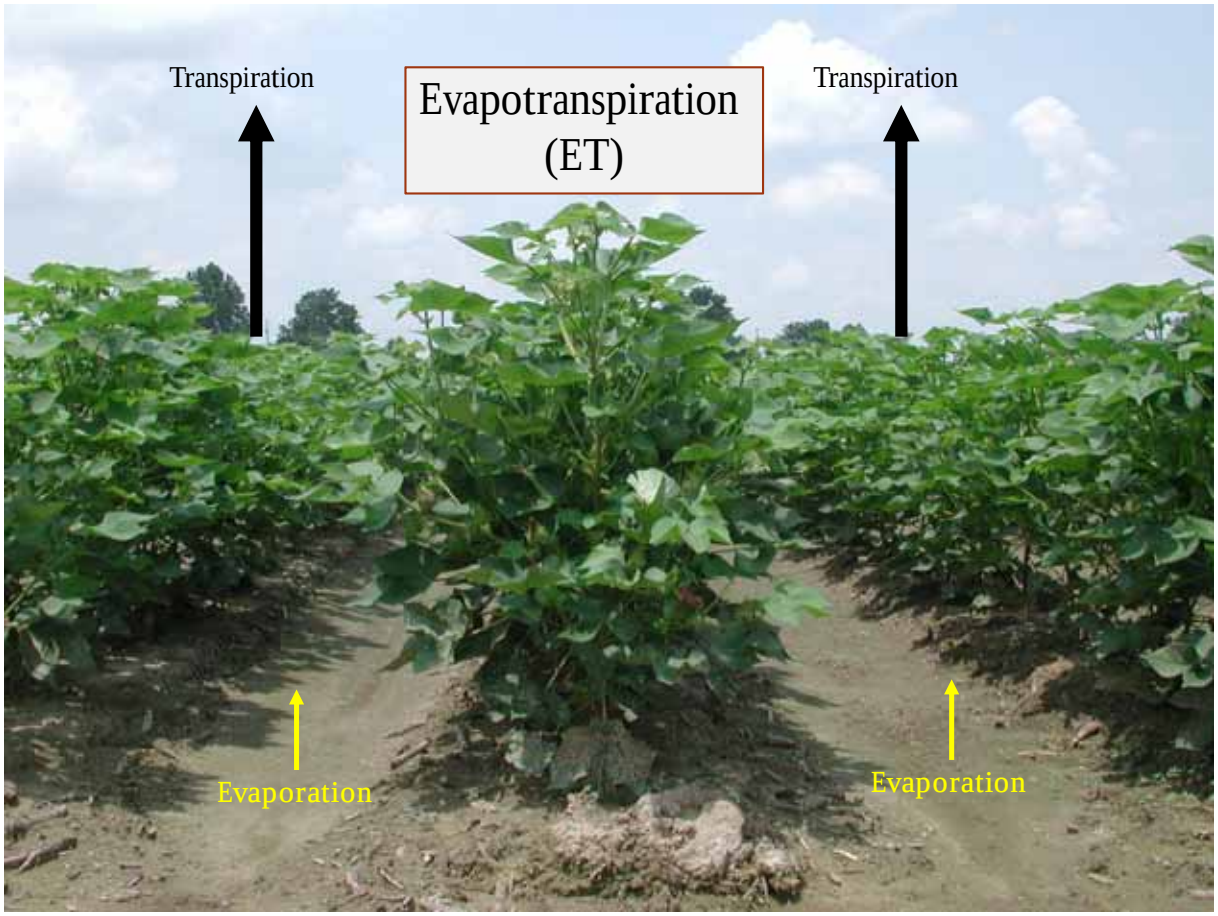
Why?

- 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

Allen, R. G., Pereira, L. S., Raes, D., & Smith, M. 1998. *Crop Evapotranspiration: Guidelines for computing crop water requirements*, FAO Irrigation and Drainage Paper No 56. Food and Agriculture Organization, Land and Water. Rome, Italy

Inputs to MPM Model

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

Soil Data Inputs

- Available water
- Textural characteristics

Water Balance Equation

$$\text{Soil Water} = (ET \times K_C) + I + R$$

R = Rainfall

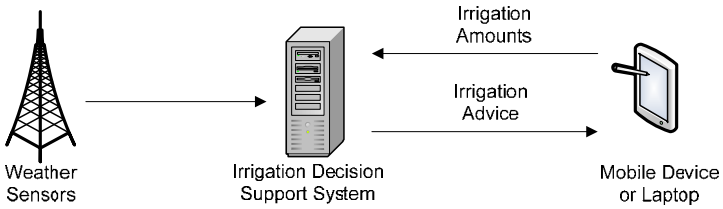
I = Irrigation water applications

Radar Total Rainfall Data from NWS

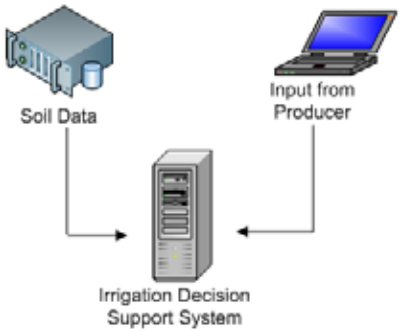
Soil Moisture < Allowable Moisture Depletion → IRRIGATE

Inputs

Daily System Inputs



User Inputs

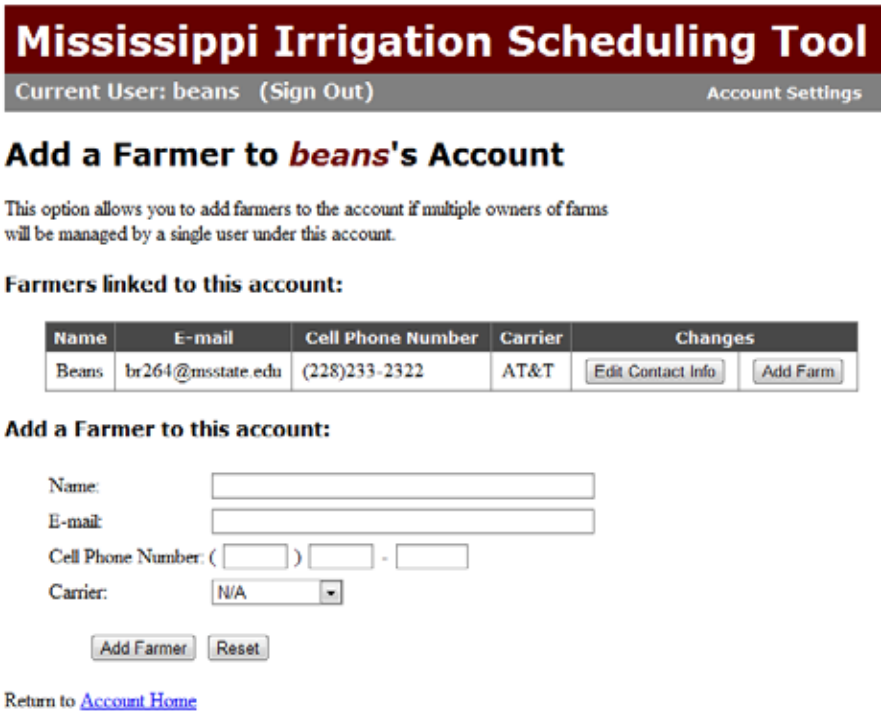


What makes it run?

- 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
    - Weather Data
    - Daily Water Balances
    - Field Data

Difficulties

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



Mississippi Irrigation Scheduling Tool

Current User: beans (Sign Out) Account Settings

Add a Field to Farm *BeansF1* belonging to Farmer *Beans*

Current Fields:

Name	Crop	Planting Date	Emergence Date	Soil Type	Slope	Tillage Depth	Row Spacing	Moisture Deficit	Changes
bean f1	Soybeans	2012-02-01	2012-10-19	Heavy	0-3%	18.0	38.0	-3.0	Edit Field Info

Add a Field:

Field Name:

Crop: Corn

Planting Date: MM / DD / YYYY

Emergence Date: MM / DD / YYYY

Soil Type: Light

Slope: 0-3%

Tillage Depth: inches

Row Spacing: inches

Maximum Moisture Deficit: inches

Add Field Reset

Return to Edit Farm or Account Home

Mississippi Irrigation Scheduling Tool

Current User: beans (Sign Out) Account Settings

Details for *beans* Account

Go to Admin Home

Select Farmer: Beans Next

Return to Edit Farms

Mississippi Irrigation Scheduling Tool

Current User: beans (Sign Out) Account Settings

Details for *beans* Account

Go to Admin Home

Farmer: Beans

Change Field: bean f1 Next

Reselect Farmer

Return to Edit Farms

Mississippi Irrigation Scheduling Tool

Current User: beans (Sign Out) Account Settings

Details for *beans* Account

Go to Admin Home

Farmer: Beans
Field: bean f1

Change Month: March
Change Year: 2012
Change

Field need watering?

March 2012

Sun	Mon	Tue	Wed	Thur	Fri	Sat
				1 Good	2 Good	3 Good
4 Good	5 Good	6 Good	7 Good	8 Good	9 Good	10 Good
11 Good	12 Good	13 Good	14 Good	15 Good	16 Good	17 Good
18 Good	19 Good	20 NoData	21 NoData	22 NoData	23 NoData	24 NoData
25 NoData	26 NoData	27 NoData	28 NoData	29	30	31

Reselect Farmer

Return to Edit Farms

Mississippi Irrigation Scheduling Tool

Current User: beans (Sign Out) Account Settings

Details for *beans* Account

Moisture Deficit: -0.7025
Water Applied(in.): 0.0
Adjust Rainfall: 0.0
Adjust Reset

Back to calendar

Field need watering?

March 2012

Sun	Mon	Tue	Wed	Thur	Fri	Sat
				1 Good	2 Good	3 Good
4 Good	5 Good	6 Good	7 Good	8 Good	9 Good	10 Good
11 Good	12 Good	13 Good	14 Good	15 Good	16 Good	17 Good
18 Good	19 Good	20 NoData	21 NoData	22 NoData	23 NoData	24 NoData
25 NoData	N					31

Moisture Deficit	Water Applied(in.)	Adjust Rainfall
-0.7025	0.0	0.0

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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Questions?