



**IRRROMETER**

IRRROMETER COMPANY  
1951 - 2011  
**60**  
YEARS OF EXCELLENCE

**IRRROMETER**  
Optimizing Irrigation... Maximizing Conservation...  
WORLDWIDE - Since 1951



# IRROMETER

## Irrigation Scheduling by Crop Demand

# Irrigation Scheduling Methods



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# Tradition Method



# Calendar Method



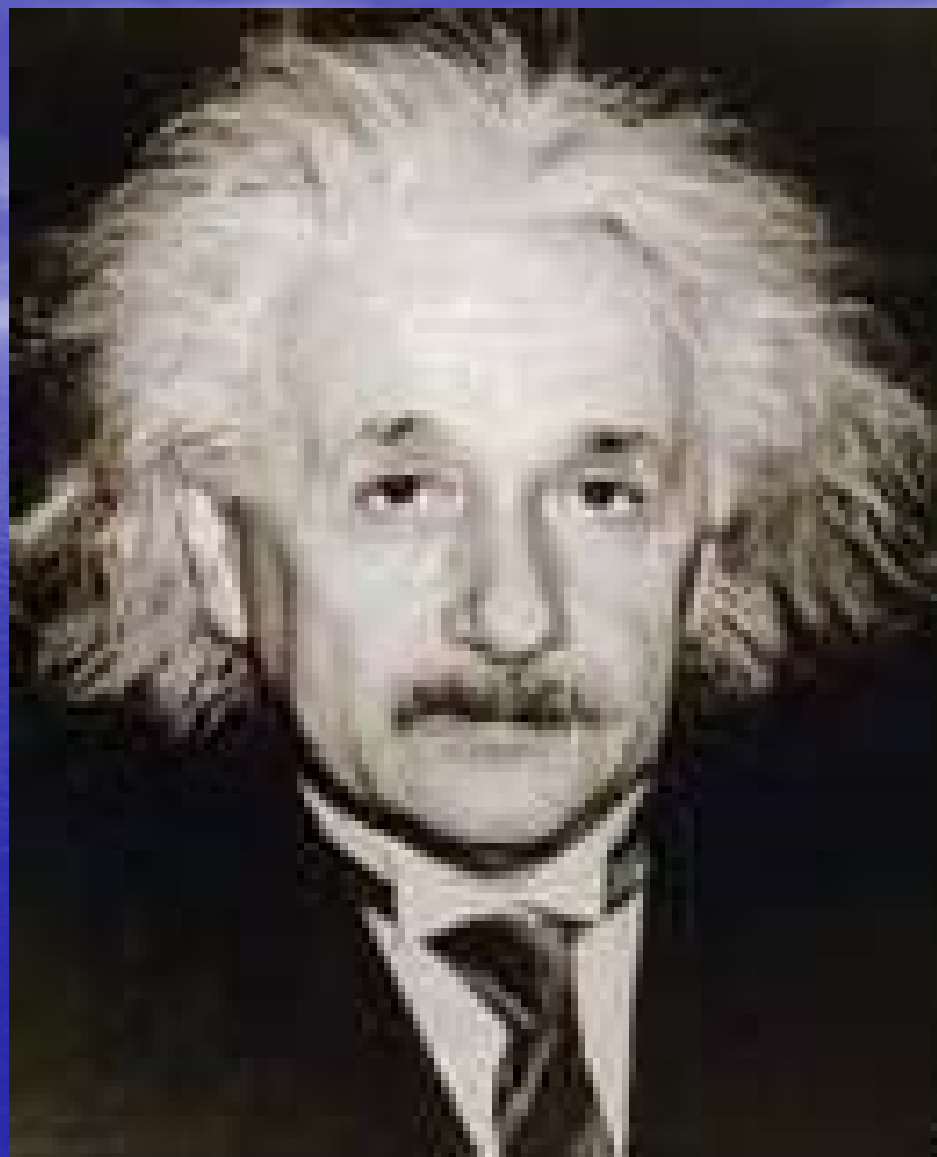
# Observation Method



# Feel Method

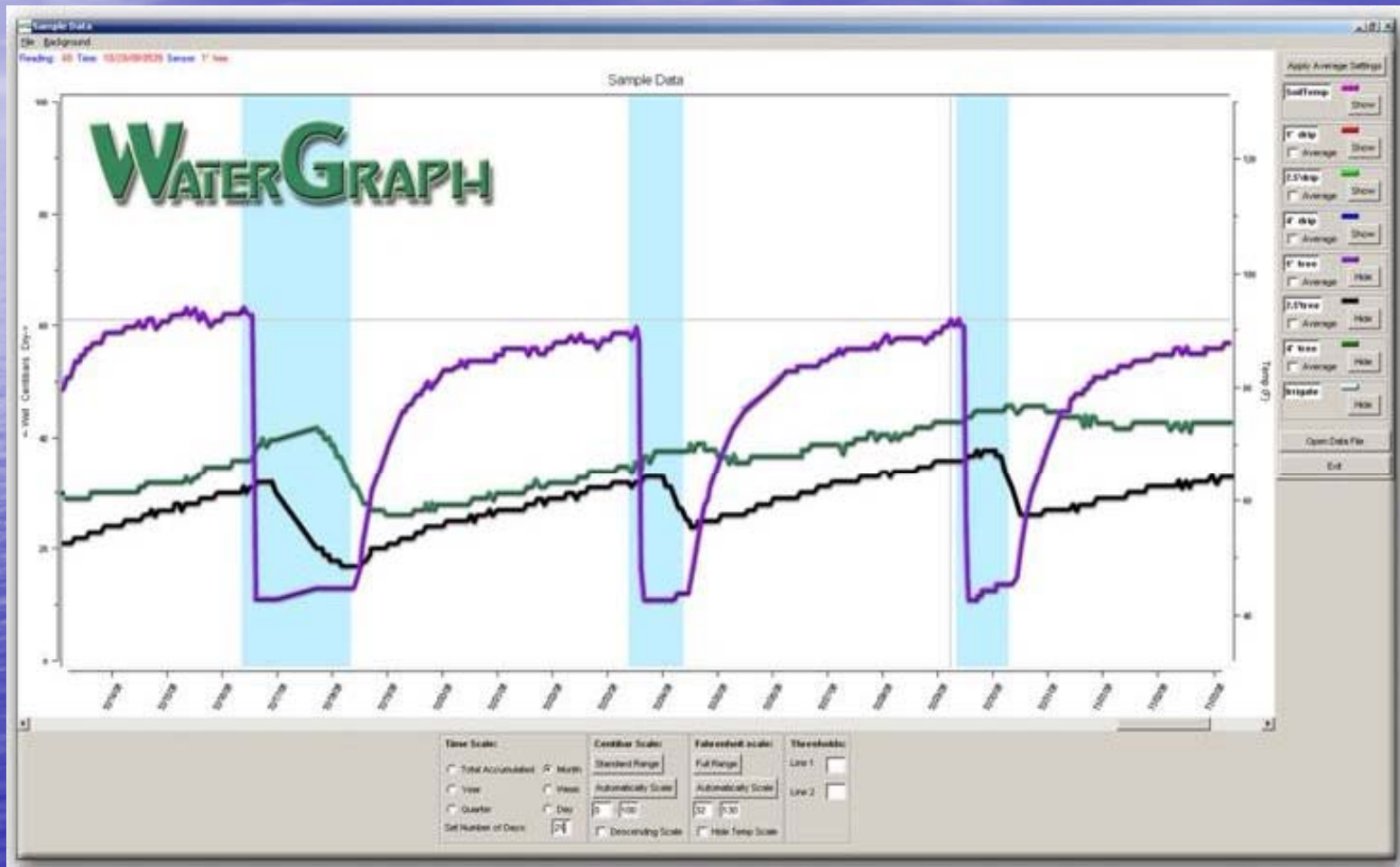


# Scientific Method



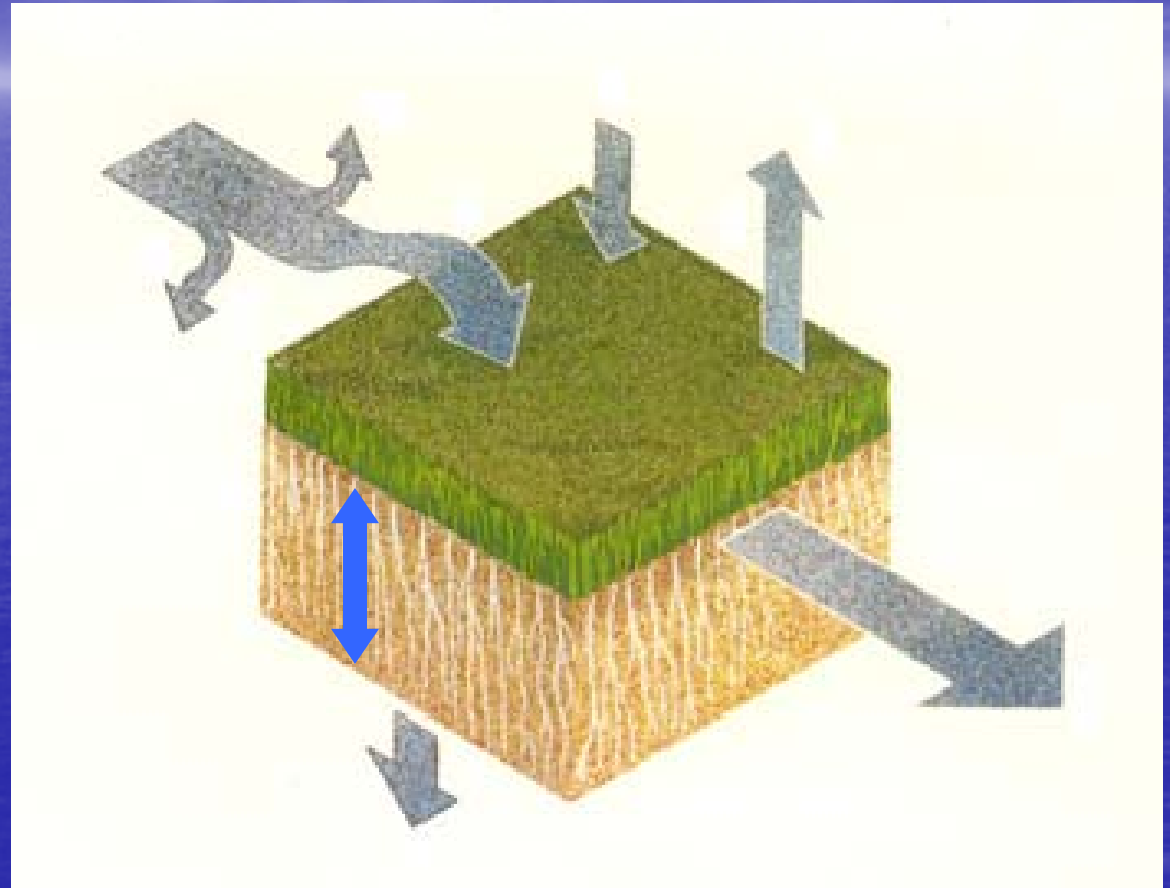


# Demand Method



# Where Does The Water Go?

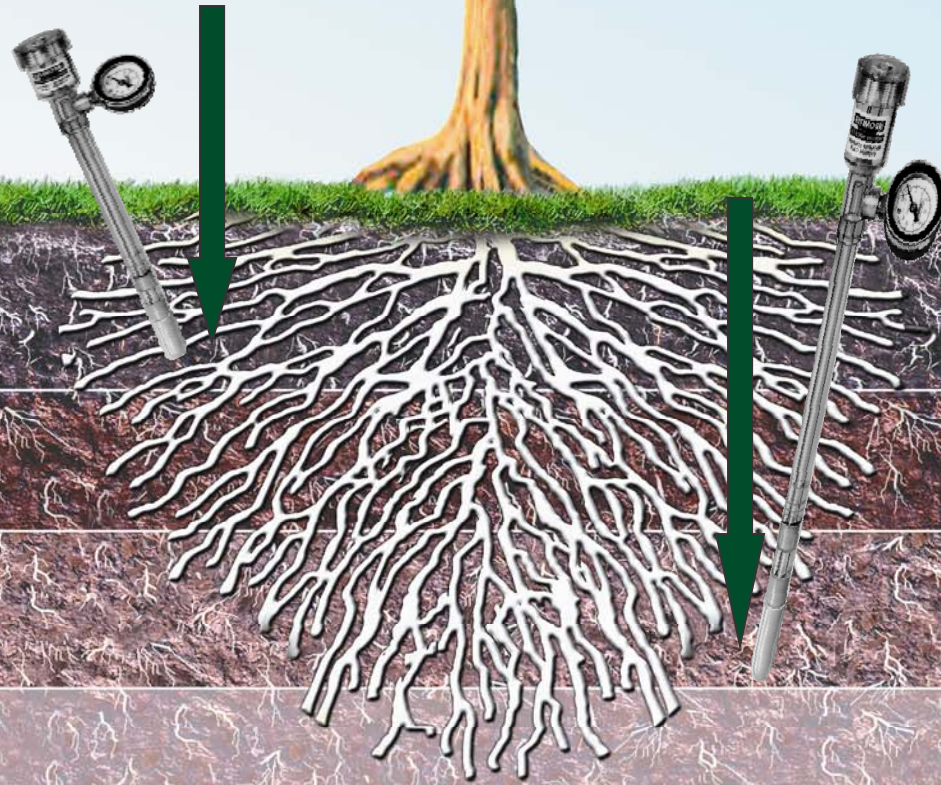
- 💧 Run-off
- 💧 Evaporation
- 💧 Deep percolation
- 💧 Root Zone.



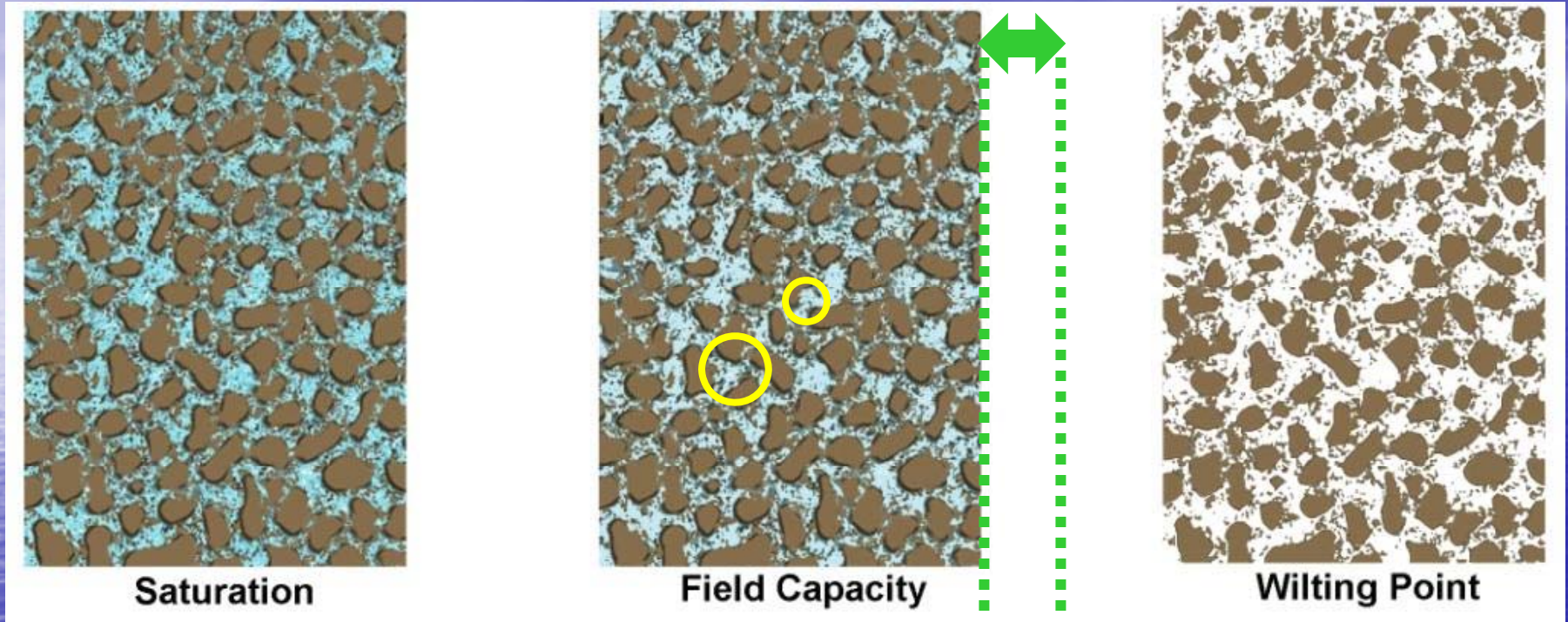
# Water Extraction Chart

*Idealized soil water extraction pattern.*

**40%**  
**30%**  
**20%**  
**10%**



# Water Holding Capacity



Saturation

Field Capacity

Wilting Point

FC

50%  
MAD

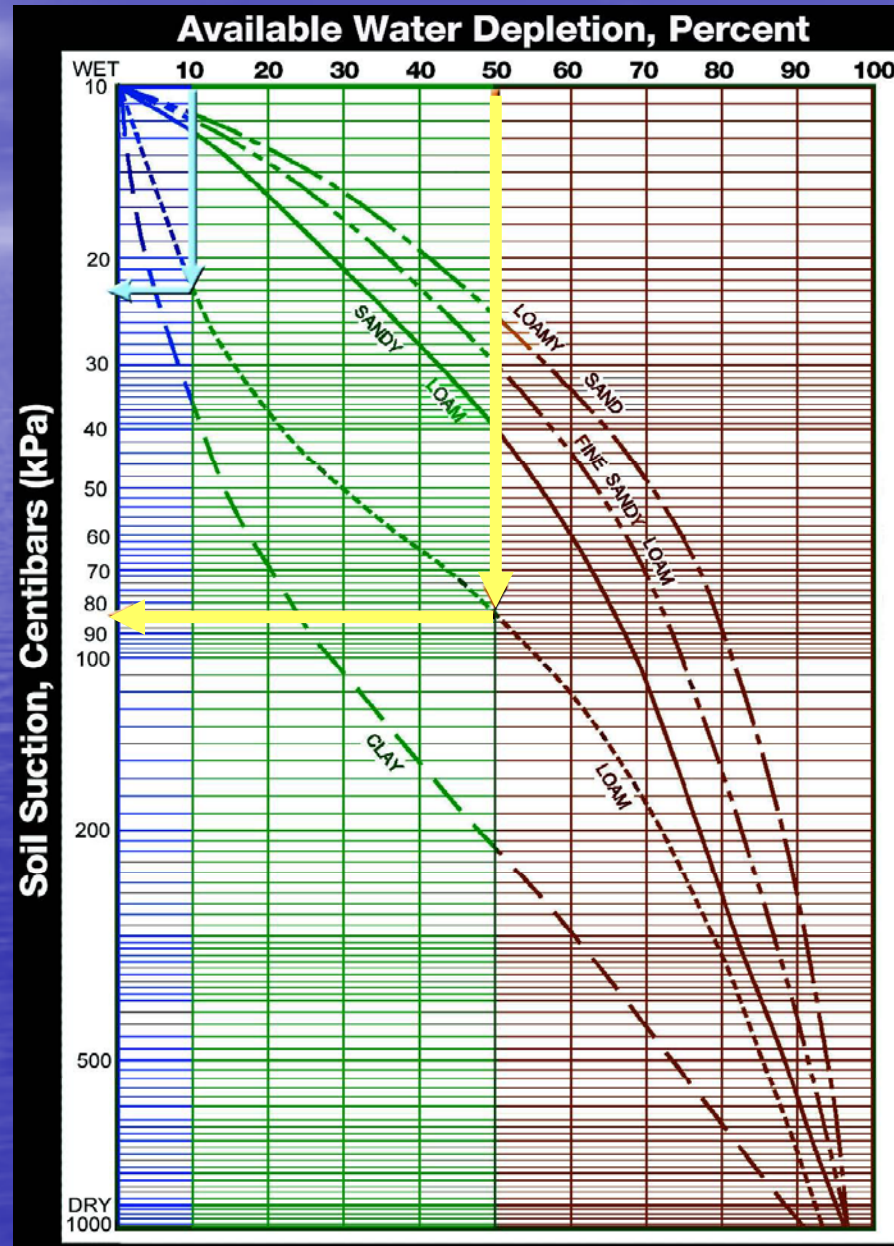


0

33 to 80

1500

# Agronomy Journal Water Retention Curves



Loam soil  
50% depletion  
85 cb

What Is

# SOIL WATER TENSION?

# Big Gulp Principle



# Low Soil Water Tension

High level of soil  
moisture means  
a low level of  
root suction





# High Soil Water Tension

Low level of  
soil moisture  
means a high  
level of  
root suction



# Field Capacity

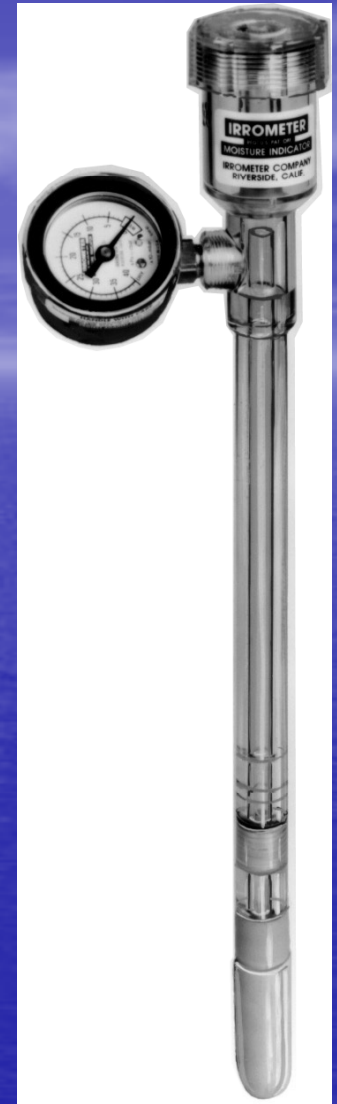




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# Technology Options

- 💧 Two sensor types
- 💧 Manual data collection
- 💧 Automatic data collection
- 💧 Remote data collection
- 💧 Automation.



# IRROMETER's

- 💧 Tensiometer/direct method
- 💧 Not affected by:
  - 💧 Water quality
  - 💧 Soil temperature
  - 💧 Soil types
- 💧 Simple & reliable
- 💧 Manual or automatic
- 💧 Control Systems.

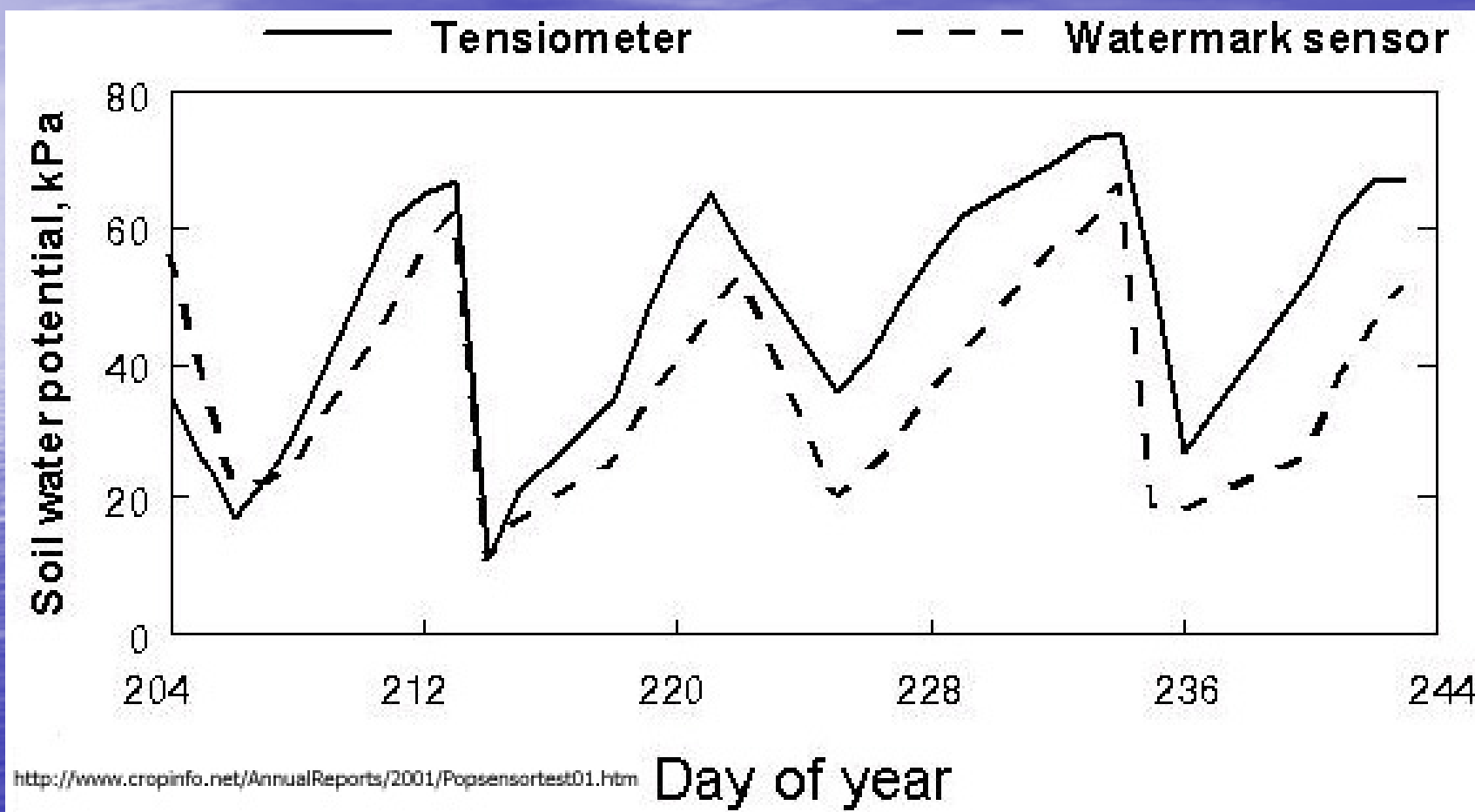


# WATERMARK Sensors

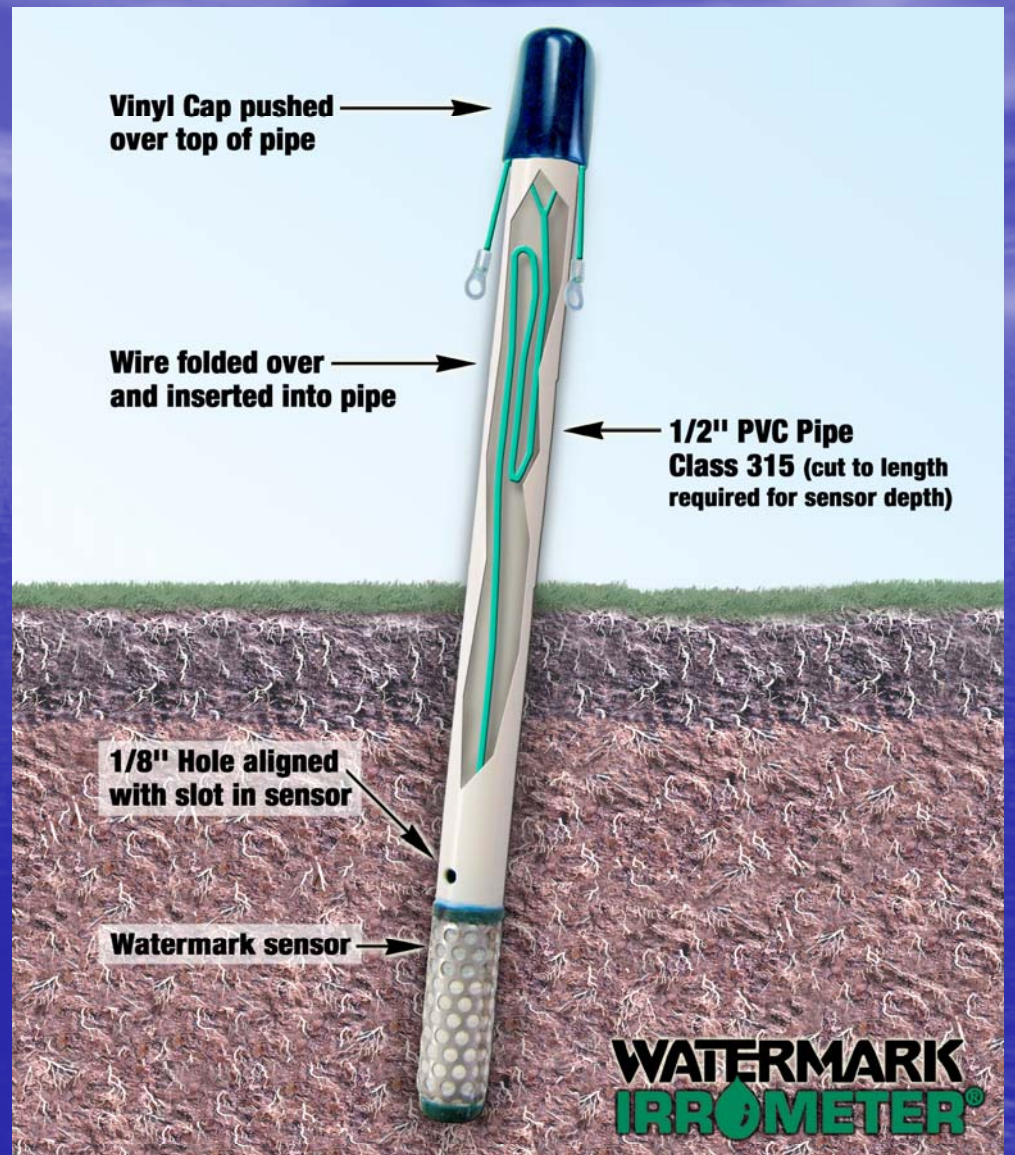
- 💧 Low cost
- 💧 Works in most soils
- 💧 Indirect method
- 💧 Salinity buffering
- 💧 No freezing
- 💧 Soil temperature
- 💧 Manual or Automatic
- 💧 No maintenance
- 💧 Stable proven calibration.



# WATERMARK = Tensiometer?



# WATERMARK "on a stick"



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# Handheld Meter Reading



# Automatic Data Collection



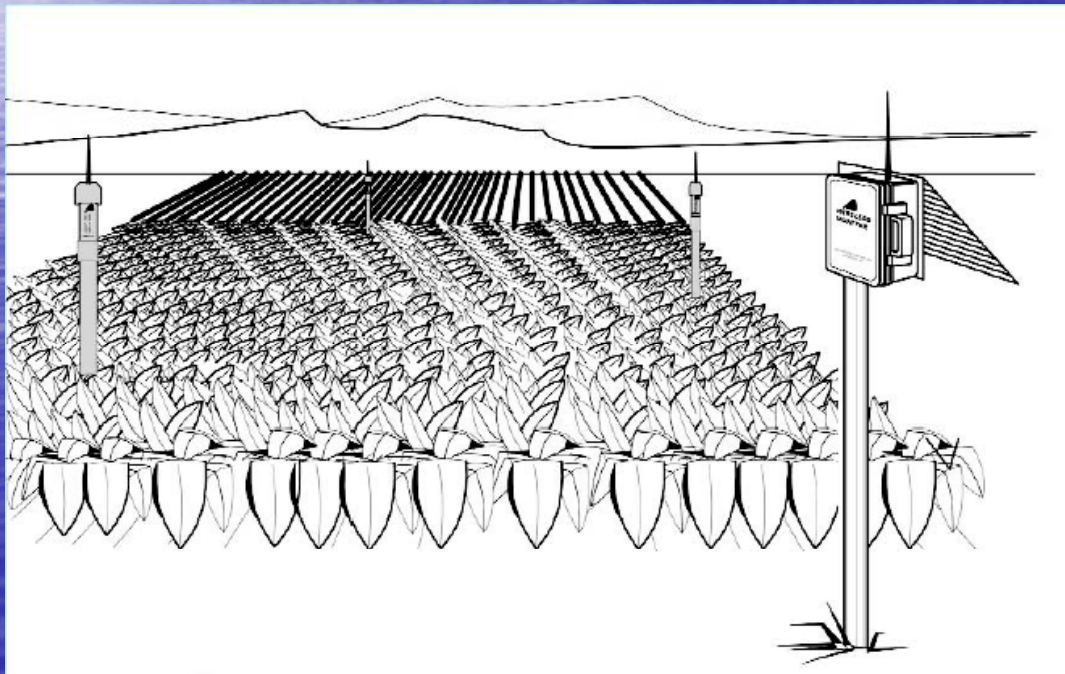
# 900 Monitor

- 💧 8 Sensor Inputs
- 💧 Sensors wired directly
- 💧 User Programs reading intervals
- 💧 9V battery powered .

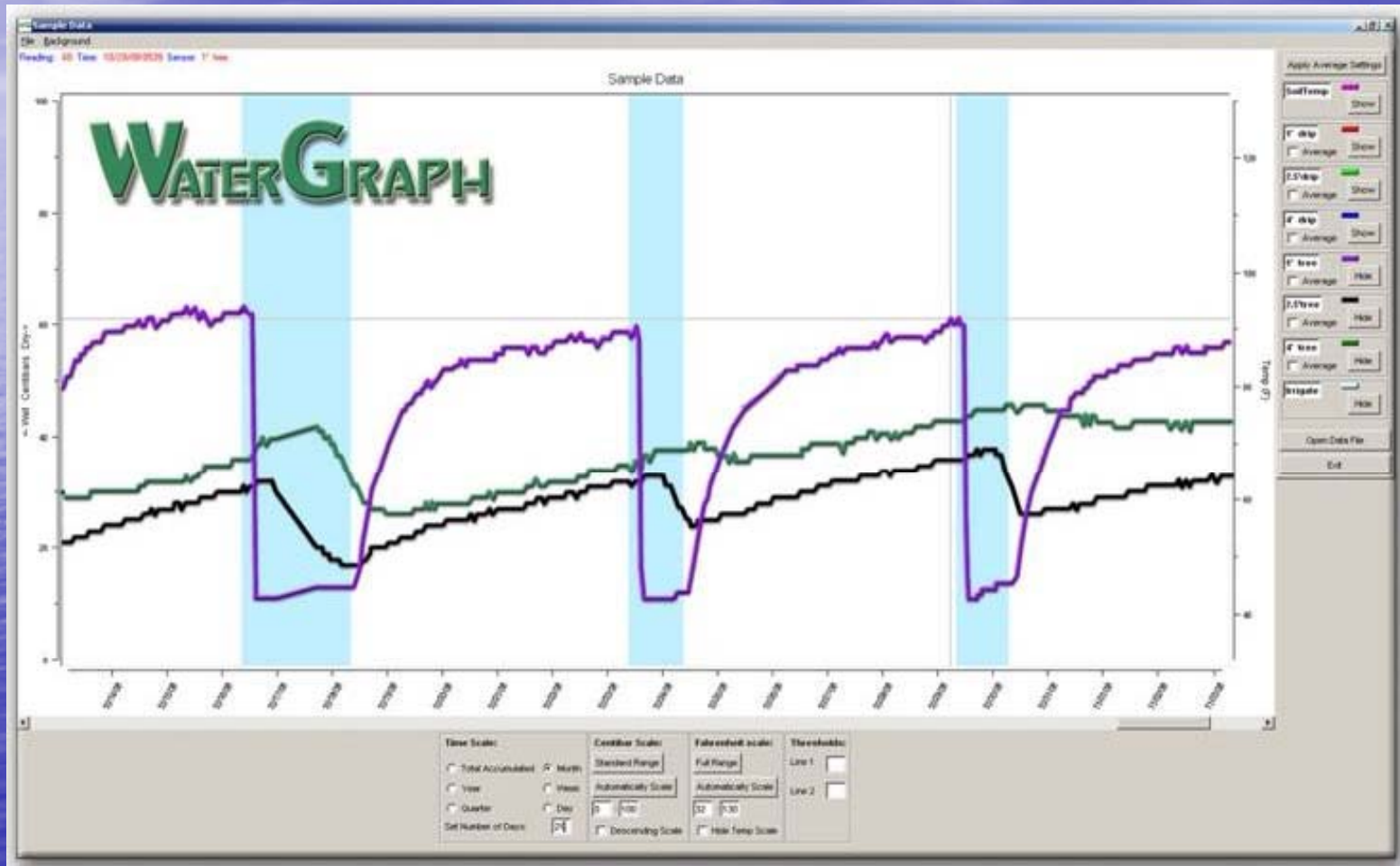


# 950 Wireless Monitor

- 💧 64 sensor inputs
- 💧 Eliminates field wiring
- 💧 Saves installation time
- 💧 1500 ft. (457 m) range.



# WaterGraph Software



# Remote Data Access

- 💧 Brings data to user
- 💧 Long Range Radio
- 💧 Cellular Gateway
- 💧 Satellite Modem
- 💧 Battery power with solar charging.



# Web Based Services

- 👉 Users can view data on any Internet connected computer
- 👉 Web Reporting Service (WRS)
- 👉 Cellular Data Service (CDS)
- 👉 Satellite Data Service (CDS).

**Web Based Services**  
**IRROMETER**

- World wide access to automatically collected data
- View multiple sites from any web connected computer
- Monitor soil water status for optimum crop yield and quality
- Make irrigation scheduling decisions based on "real time" data
- Share report card and water information with all site locations
- Remotely adjust valves at each point
- Track soil moisture conditions during extreme weather events
- Provide secure access to data anytime and anywhere

**For over 50 years**  
IRROMETER has been helping growers and consultants monitor soil moisture data. Now we can bring the data to your computer at the touch of a mouse.

**Web Reporting Service**  
When used in conjunction with a NETWORKED monitor and associated hardware, users can view the collected data via the reporting service anywhere they have access to the internet. Customers who want to use their own web connection can do so using company servers to our Web Reporting Service. For customers looking for a dedicated cellular connection, see the Cellular Data Service. This provides the monitoring reporting service as well as the cellular connectivity to securely access the monitor data.

**Cellular Data Service**  
Other services allow access to the full range of data collected by the monitor including soil moisture, soil temperature, ambient temperature, rainfall, pressure and irrigation events. Users can view multiple monitoring sites from any computer connected to the internet. With IRROMETER's Web Based Services, improve efficiency in just a click away.

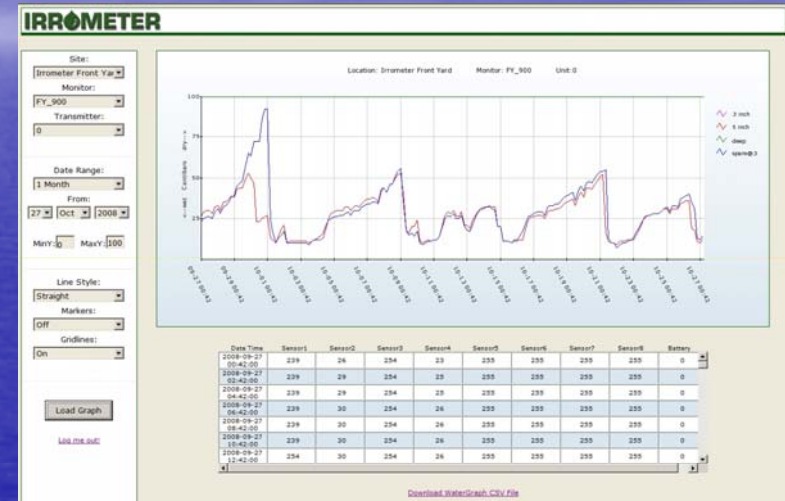
**Cellular Data Service**  
provide remote automatic collection of data from IRROMETER, soil or soil moisture monitoring stations via IRROMETER's "IRRO" cellular network. IRROMETER's cellular network provides secure access to data anytime and anywhere.

**IRROMETER**  
New! IRROMETER's new cellular service will allow you to monitor your soil moisture from anywhere, anytime. Call today for more information.

2009 IRROMETER

# WEB Based Data Display

- 💧 Data automatically collected
- 💧 Password protected
- 💧 Worldwide access to data.





Sounds great...  
but how much does it cost?

# Senor Placement

- 💧 Two sensors placed at different depths = one sensing station
- 💧 One sensing station per 10-20 acres
- 💧 60 acre field.



# Sensor Placement



# Cost per Acre Over Five Years

(Monitoring 60 acres with a five year product life)

\$ IRROMETER instruments = \$2.23

\$ WATERMARK's with Hand-held  
Meter = \$1.81

\$ WATERMARK's with 900 Monitor  
(wired) = \$2.21

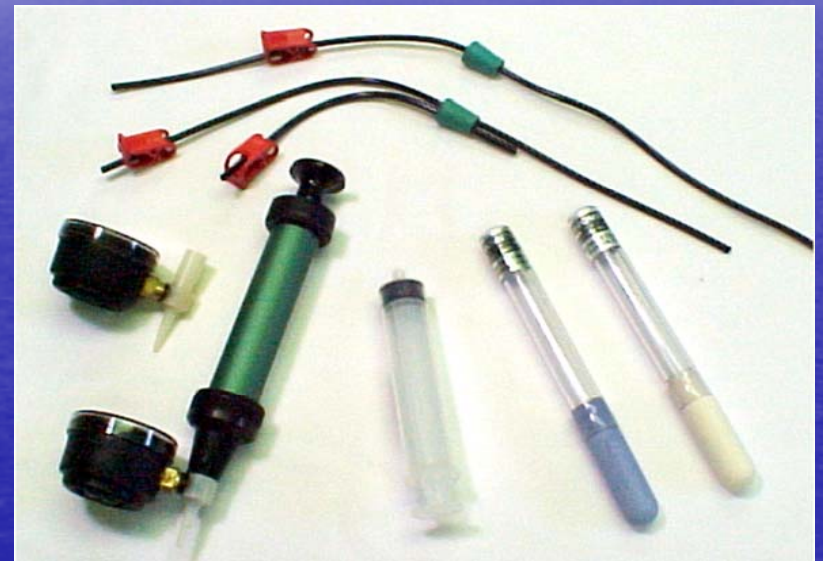
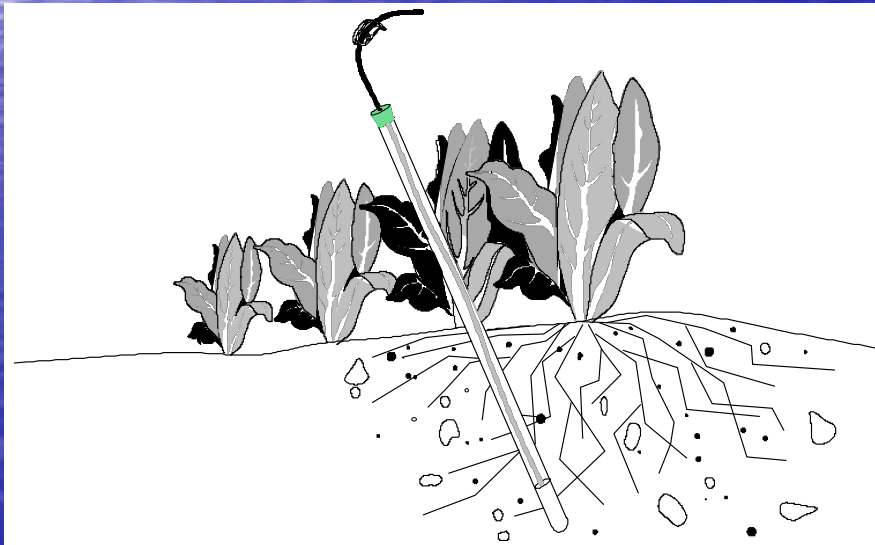
\$ WATERMARK's with 950 Wireless  
Monitor = \$5.67.

How much does it cost?

The real question is how much  
are you going to save?

# Soil Solution Access Tube (SSAT)

- 💧 Collect soil water samples
- 💧 Simple
- 💧 Inexpensive.



# Agricultural Design Guide

**IRROMETER CO.**  
*...simple tools for optimizing irrigation, worldwide.*

Moisture Sensor  
 Agricultural  
 Irrigation  
 Design  
 Manual

**TYPICAL IRRIGATOR or WATERMARK PLACEMENT - 130 Ac. CENTER PIVOT**

ALTERNATE I      ALTERNATE II

ALWAYS USE TWO (2) IRRIGATORS OR WATERMARKS PER LOCATION, ONE SHALLOW AND ONE DEEP.

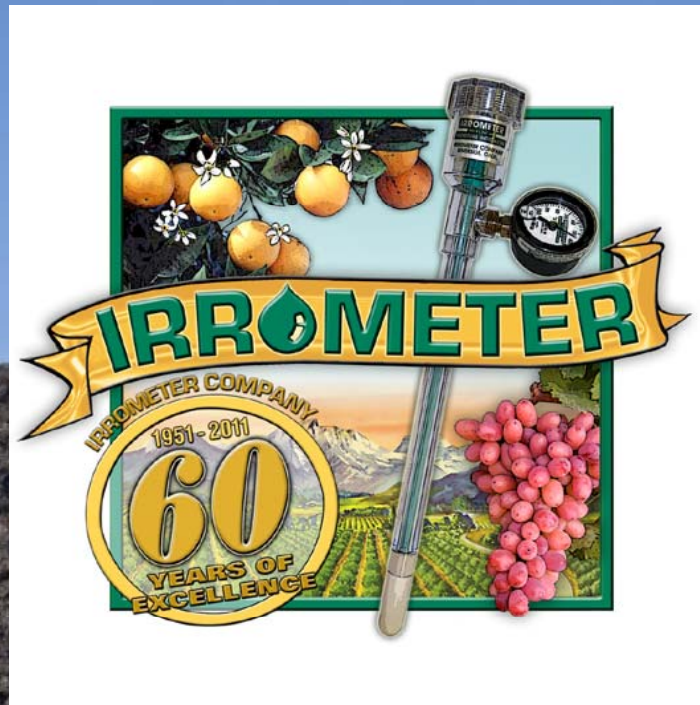
A = BETWEEN TOWERS 2 AND 3  
 B = BETWEEN TOWERS 4 AND 5  
 C = BETWEEN TOWERS 6 AND 7  
 D = BETWEEN TOWERS 8 AND 9  
 E = BETWEEN TOWERS 3 AND 4 (START POSITION)  
 H = BETWEEN TOWERS 7 AND 8 (START POSITION)  
 I = BETWEEN TOWERS 3 AND 4 (FINISH POSITION)  
 J = BETWEEN TOWERS 7 AND 8 (FINISH POSITION)  
 E AND K = "HOT SPOT" - LIGHTEST SOIL - QUICKEST TO DRY  
 F AND L = BEST PRODUCTION AREA IN FIELD

**Notes:**

- Set shallow sensors at approx. 25% of the crop rooting depth.
- Set deep sensors at approx. 75% of the crop rooting depth.
- Sensors near start and finish positions should be a few sprinkler diameters away from the actual start/finish line.

**Irrigators or Watermarks on Center Pivot**      10/24/05

# Questions?



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