

Irrigation Water Management

The art of timing and controlling
water applications to meet crop
needs



Where the Water Goes

- Stored in root zone (used by plants)
- Lost by surface runoff
- Lost by deep percolation
- Lost by evaporation



Benefits

- Maximize Production
- Save Energy Costs
- Decrease Labor
- Decrease Un-desirable Vegetation



Methods

- Check Book Method
- Monitor Soil Moisture



Definitions

- Soil Water Holding Capacity (In)
- Soil Intake Rate (In/Hr)
- Maximum Allowable Depletion (MAD) (%)
- Evapo-Transpiration (ET) (In)



Evapo-Transpiration

- Atmometer
- Weather Stations
 - [Ccc.atmos.colostate.edu/%7ecoagmet/](http://ccc.atmos.colostate.edu/%7ecoagmet/)
 - Other



Maximum Allowable Depletion (MAD)

- Grass 50-60%
- Small Grains 50%
- Alfalfa 40-70%



Critical Period

- Grass – Early Spring, Early Fall
- Small Grains – Boot and Bloom Stage
- Alfalfa - Early Spring and after cuttings



Rooting Depth

- Grass 30 Inches
- Small Grains 4 Feet
- Alfalfa 8 Feet



Symptoms of Water Stress

- Grass – Dull Green Color – Wilting
- Alfalfa – Darkening Color - Wilting
- Small Grains – Dull Green Color
 - Firing of lower leaves



Balance Sheet

Date	MAD	ET	Rain	Irrigation	Depletion
8/14	2.25				0
8/15		.5	0		.5
8/16		.5			1
8/17		.25			1.25
8/18		.5	.25		1.5
8/19		.5			2.0
8/20		.25		3.0	0

Monitoring Soil Moisture

- Hand Feel Method
- Tensiometers
- Watermark Sensors
- Soil Probe



Cost Summary

- Tensiometers \$70
- Watermark Meter \$300
- Watermark Sensors \$10
- Atmometer \$350
- Soil Probe \$45



Useful Equations

Irrigators Equation

$$Qt=Ad$$

- Q = Flow Rate (CFS)
- t = Time (Hours)
- A = Area (Acres)
- d = Depth (Inches)

- $d=Qt/A$
- $Q=Ad/t$
- $t=Ad/Q$
- $A=Qt/d$



Useful Equations

- Nozzle Size (Q) = (In/HR x Area) / 96.3
- In/Hr = (Q x 96.3) / Area

OR

- Inches = (CFS x Hours) / Acres

