

Louisiana Irrigation

Irrigation Scheduling Made Easy: Using the 'Look and Feel' Method

Why schedule irrigation?

Accurate irrigation scheduling maximizes the benefits of irrigation while minimizing potential negative impacts of over-irrigation or under-irrigation.

Over-irrigation (too much water)

- Drowns roots, stressing plants
- Encourages root diseases
- Reduces nutrient uptake
- Cools soil, reducing root growth
- Leaches nutrients and pesticides from the root zone to groundwater
- Reduces crop quality
- Wastes money

Under-irrigation (too little water)

- Reduces crop yield
- Reduces crop quality (fruit or vegetable size)
- Reduces plant growth
- Weakens plant

Many people schedule irrigation by the calendar rather than by plant need. Calendar-based scheduling can be very inaccurate since plant water needs and the amount of soil water available to plants are affected by factors such as climate, plant size, soil type and rooting depth.

The goal of accurate irrigation scheduling is to replace soil water lost by evaporation and plant use as precisely as possible. To accomplish this goal, you need to accurately assess soil moisture content. Then you can determine the need for irrigation and how much water to deliver.

Irrigation scheduling can seem complicated. It doesn't have to be. Anyone can use a simple, effective method known as the "look and feel" method to determine when to irrigate.

How does it work?

This method is based on three simple ideas:

1. Soil is at "field capacity" when it is holding as much water as possible after the excess has drained away. Similarly, a wet sponge is at "field capacity" when it holds all the water it can without any dripping away.
2. It is best to irrigate when half of the water is depleted.
3. Your goal when irrigating is to return the water to field capacity.

So all you need to know to schedule irrigation is:

- What is the effective root zone of your crop, pasture or orchard?
- What does the soil look like when half of that water is gone?
- How much water should be applied to return to field capacity?

When to schedule irrigation.

Step 1. Determine the effective root zone depth

- Determine the rooting depth of the trees or plants to be irrigated based on site-specific considerations (Table 1). Be mindful of intrusive clay or plow layers that may prohibit water movement. Consult a crop production guide your LSU AgCenter extension agent if you have questions.



Table 1. Effective rooting depths for common Louisiana crops.

Crop	Effective Rooting Depth (in)
Corn	40
Cotton	55
Soybean	40
Rice	20
Sugarcane	60
Sorghum	40
Wheat (winter)	47
Wheat (summer)	63
Sweet potatoes	47
Pecans	100
Turfgrasses ¹	
Bermuda grass	6 -18
Centipede grass	6 - 12
St. Augustine grass	8 - 16
Annual Ryegrass	6 - 12

¹Rooting depth of these turfgrasses is greatly influenced by soil type, compaction, cultural practices and weather.



Step 2. Evaluate soil moisture.

- Use a probe, auger or shovel to take a soil sample from the rooting depth(s).
- Squeeze each sample until it forms a ball. Usually, gentle pressure is sufficient.
- Look carefully at the soil ball:
 - Are there loose sand grains or small clumps of soil?
 - Are there clay stains on your fingers? A little? A lot?
 - Does the ball hold together when bounced gently in your hand? (A very fragile ball breaks up with one bounce; a fragile ball breaks up with two or three bounces.) Using Table 2, estimate the soil texture and determine how much water is left in the soil. If soil moisture is 50 percent depleted, it's time to irrigate.

Step 3. Apply the correct amount of irrigation water.

- Multiply the recommended irrigation depth (from Step 2) times the depth of the effective root zone to find out how much irrigation water you need to apply to return the soil to field capacity.

Example: Suppose your irrigation field is a sandy loam soil with a 15-inch root zone. You feel the soil and observe that it forms a weak ball that falls apart. Based on the guidelines given in Table 1, you can irrigate 0.3 to 0.4 inch of water per foot of root zone depth. For a 15-inch (1.25 feet) root zone depth, the permissible irrigation amount is:

$$0.3 \text{ inches/foot of root zone} \times 1.25 \text{ ft} = 0.38 \text{ inches}$$
$$0.4 \text{ inches/foot of root zone} \times 1.25 \text{ ft} = 0.50 \text{ inches}$$

The recommended irrigation amount is between 0.38 and 0.50 inches.

- Apply only the amount of water needed to return the soil to field capacity. Consider the efficiency of your irrigation system when calculating how much water to apply. Check with your county LSU AgCenter extension agent or irrigation supplier for irrigation system efficiency estimates.

Table 2. 'Feel' guidelines for estimating the amount of plant-available water to be replaced with irrigation as a function of soil texture.				
Available Water Remaining in the Soil	Sands Loamy Sand	Sandy Loam	Clay, Clay Loam, Sandy Clay Loam	Sandy Clay Loam Loam
100% (i.e., field capacity)	When ball is squeezed, no free water appears on soil but wet outline of ball is left in hand			
Suggested Irrigation	None	None	None	None
75% to 100%	Wet soil; forms a fragile ball	Forms a ball that breaks easily	Forms a ball; very pliable	Easily ribbons between thumb and forefinger; feels slick
**Suggested Irrigation	0.1 to 0.2 inch	0.2 to 0.3 inch	0.2 to 0.4 inch	0.2 to 0.4 inch
50% to 75%	Soil is moist; forms a fragile loose ball	Forms weak ball that falls apart	Forms ball; slightly plastic; slightly slick	Soil is moist; forms ball and slight ribbon
**Suggested Irrigation	0.2 to 0.3 inch	0.3 to 0.4 inch	0.3 to 0.5 inch	0.3 to 0.6 inch
25% to 50%	Appears slightly moist; forms a very fragile ball	Appears dry, will not form a ball	Somewhat crumbly but holds under pressure	Forms ball under pressure; somewhat pliable
**Suggested Irrigation	0.3 to 0.5 inch	0.3 to 0.6 inch	0.3 to 0.6 inch	0.3 to 0.7 inch
0% to 25%	Dry, loose, single-grained, flows through fingers	Dry, loose, flows through fingers	Powdery, dry; easily breaks into powdery condition	Hard, cracked; may have loose crumbs on soil surface
**Suggested Irrigation	0.3 to 0.5 inch	0.3 to 0.6 inch	0.3 to 0.7 inch	0.3 to 0.7 inch

**Suggested Irrigation = Suggested amount of irrigation, per foot of effective root zone depth, to replenish soil moisture to field capacity.

You may want to know... What is the field capacity for my soil?

- Determine the soil water-holding capacity of the different soil horizons within this rooting depth. This can be found online at the Web Soil Survey. This is a map-based tool targeted for use by the public that provides interpretations, data and soil maps for parishes all over Louisiana. Soil water-holding capacities are found in the Soils Data Explorer, Soil Reports, Soil Physical Properties, Physical Soil Properties. (<http://websoilsurvey.nrcs.usda.gov/app/>).
- To determine how much water is in the rooting zone when the soil is at field capacity, multiply the rooting depth times the water-holding capacity.

Example: If the rooting depth of a soil is 10 inches and the water-holding capacity is 0.2 inch of water per inch of soil, the rooting zone holds 2 inches of water at field capacity (10 inches x 0.2 inch = 2 inches).

Adapted from:

Crouse, D, K.A. Shaffer, and R. Sheffield. 1997. Certification Training for Animal Waste Management System Operators. North Carolina State University. AG-538 A & B.

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Authors

Ron E. Sheffield, Ph.D.

Water Resources Engineer
Department of Biological and Agricultural Engineering

David C. Weindorf, Ph.D.

Soil Classification/Land Use
School of Plant, Environmental and Soil Sciences



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