



IRRIGATION ASSESSMENT

You can improve the health of your plants, help keep local water supplies clean, and save water, energy and money by managing how water is used during irrigation. Keep in mind that the right balance of water for plants creates a healthy crop or pasture. According to the U.S. Geological survey, irrigation to produce our nations food and fiber, accounts for the largest use of fresh water in the United States, totalling 137 billion gallons used each day. You can save water and help keep your streams and groundwater clean by adjusting the way you irrigate. Irrigation Water Management (IWM) is a term for irrigation strategies landowners and farmers employ to help them save water, conserve energy and reduce the amount of contaminants entering water supplies, ultimately improving plant health. This worksheet will help you determine which irrigation water management strategies may fit the conditions on your property.

STEP 1: Assess Your Current Irrigation Practices

Instructions: Complete the following worksheet to identify where you may be able to improve irrigation effectiveness and efficiency. This information will also be useful if you choose to work with a natural resource professional to develop a detailed irrigation plan.

1. Do you irrigate only when plants need water, rather than on a regular schedule?

No Yes

If “no,” be aware that scheduling regular irrigation by the calendar is less effective than watering according to actual plant needs. The weather, plant size and age, plant variety and condition, rooting depth, soil type and soil moisture available at a given time all affect how much and how often you need to water. Generally speaking, the greatest water use is in the middle of the growing season or when plants are growing rapidly and nearing maturity. Young, developing plants use less water as do mature plants. Water use by perennial crops like grass and pasture is different from those crops that mature within the season. Current crop water use information is available from AgriMet (www.usbr.gov/pn/agrimet/). Over-watering can reduce plant quality by drowning roots, stressing plants, causing plant diseases, reducing nutrient uptake, and leaching nutrients and pesticides away from the root zone and into water supplies where they may be harmful. Applying only the amount of water needed will result in healthier plants that will be more resistant to disease and pests.

Consider the following STEPs to determine when to irrigate:

- GATHER information to help you time irrigation application with:**
 - ✓ Crop water use information from AgriMet (www.usbr.gov/pn/agrimet/), historical evapotranspiration data (<https://www.ksre.k-state.edu/irrigate/ettext.html>), and/or on-site weather monitoring equipment.
 - ✓ Crop observations

- ASSESS soil moisture by feel or by using field probes or other instruments**
 - ✓ Soil-probe and estimating soil moisture by feel and appearance
https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs144p2_051845.pdf.
 - ✓ Soil moisture sensors
 - ✓ Estimate soil moisture youtube: www.youtube.com/watch?v=B8hRPziKkAY

- ADJUST your irrigation schedule according to seasonal changes.**

2. Does your system irrigate in a uniform manner across the entire area so that there are no areas that are too dry or too wet?

No Yes

If "no," be aware that properly functioning irrigation equipment that applies water in a uniform manner will have a tremendous impact on irrigation efficiency and plant health. When sprinklers and nozzles deliver water to the ground evenly, you can avoid creating areas that become too wet while others remain too dry.

When equipment delivers water unevenly, it is difficult to determine when and how much to water. This fact is true for areas irrigated by all irrigation systems—sprinkler, drip, and surface. If you do not know whether your irrigation system delivers water evenly across the entire area, you can easily conduct an irrigation system field test, as described in Tip 3 on page 33.

3. Do you inspect your irrigation system (sprinklers, nozzles, pumps, hoses, etc.) to ensure it is functioning properly?

No Yes

If "no," be aware that you may be able to reduce water use, chemical applications, and energy needs simply by keeping your irrigation equipment in good repair. A useful tool to help you conduct a more thorough evaluation of your irrigation system is "Let's talk about agricultural irrigation". This is found online at: <https://www.ksre.k-state.edu/irrigate/>

<http://mesonet.k-state.edu/about/evapotranspiration/>

Potential problems to look for, include:

- Pressure that is too low or too high
- Nozzles that are mismatched or improperly sized
- Plugged nozzles
- Spray deflection or other obstruction to the flow of water
- Drip line with plugged emitters and uneven water distribution
- System leaks - including sprinklers, gaskets, fittings and pipes
- Ditches with dense grass and/or weed growth and poor water control structures

STEP 2: Complete the Irrigation Enhancement Worksheet on the following page
 Use the guide below to complete each section of the Irrigation Enhancement Worksheet.

- Unit: Indicate each irrigated section of your property
- Deadline: Indicate a deadline for completing your irrigation goals
- Goal: List your goals for each irrigated section of your property
- Action: Describe methods for achieving your goals and included a list of the resources and assistance you may need to achieve your goals

Unit: <i>SW field</i>	Deadline: <i>January 2018</i>
Goal: <i>Improve water efficiency</i>	
Action: <i>Determine irrigation schedule based on plant needs</i>	

Irrigation Enhancement Worksheet continued →

Unit: _____ **Deadline:** _____

Goal: _____

Action: _____

Unit: _____ **Deadline:** _____

Goal: _____

Action: _____

Unit: _____ **Deadline:** _____

Goal: _____

Action: _____

Unit: _____ **Deadline:** _____

Goal: _____

Action: _____

Unit: _____ **Deadline:** _____

Goal: _____

Action: _____

Unit: _____ **Deadline:** _____

Goal: _____

Action: _____

TIP: 1 Determine Your Soil Texture

- ✓ Irrigation management depends on the texture of your soil. Sandy soils drain water quickly and do not store much water for plant use after irrigating. Clay soils, however, tend to drain poorly and can become waterlogged.
- ✓ How does the soil feel when wet?
 - Silky Smooth → SILT
 - Coarse and gritty → SAND
 - Sticky → CLAY
 - Combination of all of the above → LOAM

TIP: 2 Determining When And How To Irrigate✓ ***When do I need to irrigate?***

Irrigate when the soil moisture drops to about 50 percent of its water-holding capacity in the top 2 feet of soil. Check the moisture content by squeezing several handfuls of soil taken at depths of 6 inches, 12 inches and 18 inches. Irrigate before the soil at 18 inches begins to crumble in your hand, since most of the plants' roots are above 18 inches.

✓ ***How long should I irrigate?***

In general, irrigate sand soils for short periods (2-3 hours) and clay soils for longer periods (9-12 hours). Ask your farm supply store or local NRCS office to recommend the correct size spray nozzle for your soil type and your irrigation system. When it rains, see if the rain has gone deeper than the soil surface before considering it a source of water for the plants you are growing.

TIP: 3 Conducting An Irrigation System Field Test Sprinkler System

1. Place "catch cans" in different spots within the irrigated area. Empty tuna cans or other similar containers work well; just be sure that the catch cans you use are all the same size. Also, be sure to conduct the test only when the wind speed is less than 8 mph to ensure accurate results.
2. Place the catch cans evenly across the area you are evaluating. The number of cans needed depends on the size of the area. Generally, you will want to use as many as possible, placing them in a five-foot by five-foot grid.
3. Run your irrigation system for the usual amount of time. Note which catch cans receive water from more than one sprinkler or nozzle.
4. After irrigating, compare the water level in the different catch cans to identify where adjustments are needed.
5. At this time, you may also want to dig small holes in the ground in different areas or use a soil probe to evaluate soil moisture levels. You may notice areas where the soil has absorbed more or less water than others. If so, you might decide to adjust your irrigation system to account for the different soils.

Conducting an Irrigation System Field Test (Cont.)

Drip Irrigation System

Measure the amount of water delivered from each of several emitters and compare the results. Also, probe the soil to determine the depth of infiltration in areas around the field.


Surface Irrigation System

Determine the uniformity of application for a surface irrigation system by probing the soil after irrigating to measure the depth of infiltration. Include measurements at regular intervals throughout the field to determine the uniformity of application.

TIP: 4 Irrigation System Options

Irrigation Method	Common Systems	Water Efficiency	Install Cost	Operation Cost	Typical Use
<i>Micro-Drip</i>	Poly Tubes, lay flat tubes with inline and online emitters.	High	High	Medium	Orchard, Vineyard, Row Crops, Nursery Crops, Landscaping, Gardens
<i>Sprinkler Irrigation</i>	Hand Lines, Wheel lines, Micro Sprinklers, Solid Set, Pivots, Pod Lines, Linears, Big Guns, Travelling Guns	Medium to High	Medium	Medium	All Agricultural/ Nursery/ Landscape/ Garden applications
<i>Flood Irrigation</i>	Controlled Flood, Wild Flood, Gated Pipe, Siphon Tubes	Low	Medium to low	Low	All Agricultural Crops. Row Crops, Forage Crops, Rice

Gather Additional Information and Assistance

*Review your answers to the previous questions and identify where you may be able to make improvements to your irrigation operations. Consider seeking professional assistance to develop a detailed **Irrigation Water Management Plan**. If you would like additional information or assistance, contact one of the entities listed below:*

- ✓ Kansas Conservation Districts
<https://kacdnet.org/districts/>
- ✓ Natural Resources Conservation Service
www.ks.nrcs.usda.gov
- ✓ K-State University Extension Service
<https://www.ksre.k-state.edu/>
- ✓ Kansas Department of Agriculture
<https://agriculture.ks.gov/>

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