Ensure your IRRIGATING METHOD ISN'T ALL WET

Plants need water to thrive. Increasing the amount of water available to a small acreage probably isn't possible, but more can be done to irrigate more efficiently.

Whether managing five acres or raising a variety of crops on several hundred acres, irrigation water management (IWM) helps conserve and protect water, soil, energy, and other natural resources. IWM schedules and regulates water application rates to grow healthy plants without wasting water, wasting valuable plant nutrients, and harming the soil.

Excess water from surface or flood irrigation affecting an adjacent landowner is the most common problem with small-acreage irrigation.

Deep percolation, or water soaking in below the root zone and contributing to high water tables in an area, is another common problem with surface irrigation as the high water table can bring salts to the surface of the soil making the soil sterile for plant life. Typical root zone depths are 3 feet for small grains and grass and 5 feet for alfalfa. Seepage from ditches can also contribute to a high water table. Deep percolation can also be a problem if nutrients or salts in the soil are moved into the aquifer.

These problems can be reduced if a landowner changes irrigation sets when necessary. Using gated pipe or lining earthen ditches can also reduce seepage.

A sprinkler system may be best if irrigation sets cannot be changed when necessary or if runoff is a problem. Sprinkler systems use hand-move sprinklers, big-gun sprinklers, and solid set sprinklers. Some newer systems use plastic pipe and sprinklers mounted in plastic pods that can be towed with a four-wheeler when changing irrigation sets.

If sharing irrigation water, neighbors can replace a ditch to individual properties with a common pipeline or create a community drainage ditch for runoff. A rotational water delivery schedule in which each landowner gets water for one day can be used.

Establishing a natural windbreak with trees is an excellent way to help reduce evaporation during irrigation. Benefits may include increased privacy and aesthetics, increased snow storage, improved wildlife habitat, reduced wind, and many more. Irrigation drip systems provide efficient water when establishing a new windbreak.

A sprinkler gun can be used to irrigate irregular-shaped fields and tree and shrub areas. This is a portable system that can be used in multiple locations.

Common water measurement terms, conversions, and relationships

Volume:

1 acre = 43,560 square feet.

Acre-inch: The volume of water required to cover 1 acre 1-inch deep.

Acre-foot: The volume of water required to cover 1 acre 1-foot deep.

1 cubic foot = 7.48 gallons = 62.4 pounds

1 acre-inch = 3,630 cubic feet = 27,154 gallons

1 acre-foot = 12 acre inches = 43,560 cubic feet = 325,851 gallons

1 cubic meter = 1,000 liters = 264.18 gallons

Flow rate:

1 cubic foot per second = approximately 450 gallons per minute

1 acre-inch/hour = approximately 450 gallons per minute = 1 cubic foot per second

Consider the following when deciding when to irrigate and how much water to apply:

Plant types:

Whether irrigating crops, pasture, windbreaks, vegetables, landscapes, or ornamental plantings, different plants use varying amounts of water. In Casper, for example, a grass crop has a seasonal irrigation requirement of 20.8 inches to be well-watered. At the same location, alfalfa would require 22.3 inches, and small grains such as barley and oats require 15.6 inches. The average seasonal irrigation requirement for pasture grass will vary across the state from about 11 inches in Jackson and Pinedale to about 24 inches in Basin and Worland.

Irrigation system:

An irrigation system should match the type of crops grown, topography or physical-site conditions, water supply, climate, soils, and goals of the landowner.

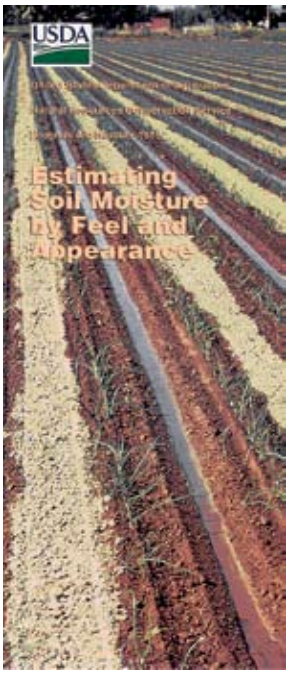
The following systems could be used to apply water. Surface or flood systems use gravity to spread water across the soil or through small channels and are the most labor intensive forms of irrigation but require the least upfront costs. Sprinkler systems apply water at the point of use by a system of nozzles. Water is delivered to the sprinkler nozzles by surface or buried pipelines, or both. Micro-irrigation systems use low-pressure, low-volume discharge devices such as drip emitters or micro sprays and are used effectively for starting a windbreak or watering a garden. Sprinkler systems are the least labor intensive irrigation method but often require the most upfront capital outlay. The amount of water the crops receive varies by system. Irrigation efficiencies (amounts not lost through evaporation or other causes) for surface systems range from 40 to 80 percent; for sprinkler systems, 50 to 90 percent; and for micro-irrigation systems, 55 to 90 percent.

Soil type:

Soil and its water-holding capacity determine the type of system and the timing of irrigation.

The feel-and-appearance method:

The feel-and-appearance method monitors soil moisture to determine when to irrigate and how much water to apply. The feel and appearance of soil vary with texture and moisture content. For step-by-step instructions on this method, download the article "Estimating Soil Moisture by Feel and Appearance" published by the U.S. Department of Agriculture's Natural Resources Conservation Service, at http://www.wcc.nrcs.usda.gov/nrcsirrig/. Several examples of this method are provided. Each photo is followed by a description of the particular soil.



Example of the Feel-and-Appearance-Method

Slightly moist soils will form a very weak ball with well-defined finger marks.

Think of soil as a plant's moisture reservoir. The amount of plant-available water depends on soil depth and texture, weather, and management. Sandy soils typically require twice the frequency of watering than silt or clay soils. Pastures and lawns are similar in water needs and management. Plant rooting depths and water use vary greatly. Learn your soil type and how to manage it. A soil test kit is available from UW CES offices. Among the results will be the type of soil tested.

For most efficient results, water in early morning. Evening watering may increase plant disease problems, and midday watering wastes water because of high evaporation rates.

Gated pipe is an option when irrigating pastures or cropland.

Lynn Cornia is an irrigation engineer and Nancy Atkinson is a public relations specialist with the Wyoming Natural Resources Conservation Service. For more information, contact a local field office by calling (307) 233-6750 or access http://www.wy.nrcs.usda.gov/