



# Irrigation Water Management Fact Sheet

Applicable to conservation practice - 449

USDA Natural Resources Conservation Service - North Dakota

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## What is Irrigation Water Management

Irrigation water management is managing the rate, amount, and timing of water application according to the seasonal crop needs, giving consideration to the soil intake and water holding capacities. Application frequency and water quantity used are managed to obtain optimum yields using the appropriate amount of water, based on soil moisture and crop water use.

## Benefits of IWM

Use of sound IWM principles can ensure dependable yields, improve crop quality, reduce labor, reduce the potential runoff or deep percolation below the root zone, manage salinity in the soil, and reduce irrigation-induced erosion.

## Planning Considerations

*Consider the effect(s) on:*

- ✓ Downstream flows and/or aquifers that would affect other water users
- ✓ Water tables in providing a suitable rooting depth for anticipated land uses
- ✓ Erosion and the movement of sediment, sediment-attached, and soluble substances carried by runoff on water quality
- ✓ Nutrients and pesticides on surface and ground water quality
- ✓ Water control on the salinity of soils, soil water, or downstream water
- ✓ Water levels on soil nutrient processes such as plant nitrogen use or denitrification
- ✓ Wetlands or water-related wildlife habitats

## Management

- ✓ Operate the irrigation system only when necessary, to furnish water for crop needs. Use *North Dakota Extension Publication AE-792 "Irrigation Scheduling by the Checkbook Method"* for evaluating soil moisture by feel and appearance. Other methods include plant signs (crop critical moisture stress periods), atmometer, evaporation pan (applying appropriate factors), tensiometers, electrical resistance blocks (moisture blocks), and crop water stress index (CWSI gm). Leave room in the plant root zone for containing water infiltration from rainfall events.
- ✓ Losses of irrigation water to deep percolation and runoff from irrigation can carry nutrients from and pesticides into ground and surface water. Avoiding spills from agricultural chemicals, fuels, and lubricants will minimize potential pollution hazards to ground and surface water.

*All programs and services are offered on a nondiscriminatory basis.*

- ✓ All crops grown or being considered by the operator, should be characterized for rooting depths, peak and seasonal consumptive use rates, and impacts on production water shortages during important growth periods.
- ✓ A suggested irrigation schedule should be developed describing how the irrigation system can effectively meet the seasonal needs of the crop. This schedule must be flexible enough to meet the varying crop growth rate demands and seasonal needs of the crop.
- ✓ In general, high yielding crops are most sensitive to moisture stress in the reproductive (flowering and early seed fill) stages of growth. A common irrigation scheduling guideline is to prevent the soil moisture deficit from exceeding 50 percent of the available soil moisture holding capacity in the root zone. Potatoes withstand a smaller moisture deficit, commonly 35 to 40 percent. Consult Table 1 of the Extension publication AE-792, noted above, to determine the approximate available soil moisture holding capacity for various soil textures. For soils that do not have a restrictive infiltration layer and have an adequate supply of water throughout the root zone, 40 percent of the crops water usage occurs in the upper ¼ of the root zone, 30 percent in the second ¼ of the root zone, 20 percent in the third ¼ and 10 percent in the bottom ¼. Under these conditions, crops such as corn will extract 90 percent of water in the upper 3 feet of the root zone.
- ✓ Field visits during the growing season should be made to ensure there are no irrigation-induced erosion or runoff problems due to excessive application.

**To Apply This Practice**

Apply irrigation water, as needed, based on the crop needs and available rainfall in the growing season; refer to IWM plan for information. Document crop water needs and irrigation applications with the Checkbook Method (or other approved method).

**Maintaining This Practice or Component**

Make sure all measuring devices, valves, sprinkler heads, surface pipeline, and other mechanical parts of the system are checked periodically and worn or damaged parts are replaced as needed. Always replace worn or improperly functioning nozzles with properly designed size and type. Check system periodically for leaks. Maintain pumps, piping, valves, and electrical and mechanical equipment in accordance with manufacturer's recommendations. Check and clean screens and filters to prevent unnecessary hydraulic friction loss and to maintain water flow necessary for efficient pump operation.

Protect pumping plant and all associated electrical and mechanical controls from damage caused by livestock, rodents, insects, heat, lightening, water, sudden power failure, and sudden water source loss. Provide and maintain good surface drainage to prevent water ponding around the pump and electrical equipment. Ensure all electrical/gas fittings are secure and safe. Always replace worn or excessively weathered electric cables and wires and gas tubing and fittings when first noticed. During non-seasonal use, drain pipelines and valves, secure and protect all movable equipment (i.e. wheel lines).

**For Additional Information or Assistance**

Contact your local NRCS office to create a site specific plan for installation of an IWM to install this practice.

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