AE-1360

Irrigation Water Sample Analysis

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The NDSU Soil and Water Environmental Laboratory has been making soil-water compatibility recommendations since the early 1960s. These recommendations are based on the electrical conductivity (EC) and sodium adsorption ratio (SAR) determined on the irrigation water and the soil series present on the land to be irrigated.

The soil series can be found in county soil survey maps available through local NRCS offices. They also can be found in county Extension offices, local libraries, the NDSU library and the NDSU School of Natural Resource Sciences. Each soil series has been classified as irrigable, conditional or not irrigable.

Compatibility classifications are based on slope, sodicity, salinity, permeability, restrictive subsoil layering or depth to bedrock. The compatibility classifications are based on the limits of the soil's ability to tolerate added salts or sodium. Electrical conductivity tolerance limits range from 1,000 to 3,000 µmhos/cm and SAR tolerance limits range from 6 to 12.

Soil water compatibility recommendations are made based on how high the irrigation water salinity and sodicity are relative to the tolerance limits of the soils to be irrigated. For example, we may have an irrigation water with an EC of 1585 and an SAR of 5.9. We could use this water on a soil such as a Hecla, which has tolerance limits of 3000 µmhos/cm for EC and 12 for SAR. On the other hand, this water would not be compatible with a Bearden soil, which has tolerance limits of 1,500 µmhos/cm for EC and a SAR of 6.

Soil-water compatibility determinations should be done before irrigation systems are established. Failure to obtain compatibility recommendations can result in soil hardening, becoming impermeable and losing productivity. Even where soil-water compatibility recommendations have been obtained, and soils and water have been found to be compatible, soils should be sampled to a minimum depth of 6 feet in 1-foot increments and analyzed for pH, EC and sodium. This should be done before irrigation commences in a field and again every three to five years. This allows the irrigator to monitor any detrimental changes that may be occurring due to irrigation and become problems before they cause major soil degradation.

Soil-water compatibility recommendations can be obtained for $35 from the Soil and Water Environmental Laboratory at North Dakota State University with the submittal of a water sample and legal description of the field to be irrigated. **Use the form that follows.**

A soil-water compatibility recommendation for irrigation can be only as good as the information supplied. **Please fill the form that follows.**

Sampling Instructions

Use a clean ½- to 1-pint bottle. **DO NOT** use a bottle that contained any chemicals, such as bleach or agricultural chemicals. Rinse container several times with the sample water before filling. If the sample is from a well, pump the well for 10 to 15 minutes to obtain a representative sample.

Note

Water to be used for drinking is tested by the North Dakota Health Department Laboratory at Bismarck, N.D. Water to be used for livestock is tested by the Veterinary Science Department at North Dakota State University in Fargo, N.D.

NDSU
Extension Service
North Dakota State University
Fargo, North Dakota 58105

For more information on this and other topics, see: www.ag.ndsu.edu

 Web-4-08

Irrigation Water Sample Analysis Form

Name _____ Date _____/_____/_____

Address _____ Phone _____

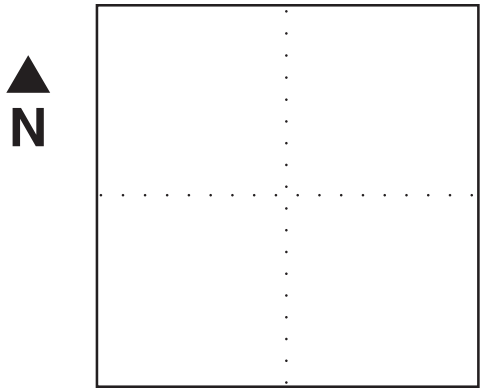
_____

Location of area to be irrigated:

Township No. _____ Range No. _____ Section No. _____ Quarter _____

County_____

Indicate irrigated area and water source (with an X) on the section map



Water Source:

- ❑ Farm well
- ❑ Irrigation test well
- ❑ Irrigation production well
- ❑ Depth of well _____ feet
- ❑ Other sources, please specify

_____

_____

Kind of Soil: Has a map of soil suitability for irrigation (ND Soil 8 Form) been prepared by the Natural Resources Conservation Service? ❑ Yes ❑ No

If mapped, send copy with water sample.

If soil has not been mapped, make sure the location of land to be considered for irrigation is clearly stated above so the best available soils information can be used for the recommendation.

Expected Use: Irrigation: field scale _____

Irrigation: lawn and/or garden_____

Other _____

Crops to be grown _____

Mail to: Soil and Water Environmental Laboratory
North Dakota State University
202 Waldron Hall
P.O. Box 5575
Fargo, ND 58105
phone: (701) 231-7864

Cost: $35 per sample
Make check payable to
North Dakota State University