water spouts

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Plan to Attend These Irrigation Workshops

- **Dec. 10, 2009 – Bismarck Best Western Ramkota Inn**

  This workshop is held in conjunction with the North Dakota Water Users Association's annual convention. The Missouri Slope Irrigation Development Association (MSIDA), NDSU Extension Service and North Dakota Water Users Association are sponsors. The convention will include an irrigation exposition where suppliers display their products and services.

  Topics covered will include pivot sprinkler uniformity, a Devils Lake irrigation project update, the Natural Resources Conservation Service Agricultural Water Enhancement Program (AWEP), NDAWN (North Dakota Agricultural Weather Network), fertigation and fertility management, grain storage, grain drying options and new irrigation technology.

- **Dec. 15, 2009 – Grand Forks County Office Building, 151 4th St. S.**

  This workshop will have presentations on groundwater permits, NDAWN, pivot sprinkler uniformity, fertility management, tile drainage under irrigation and winterizing irrigation systems. Preregistration is required by Dec. 11. The registration fee is $10 and includes lunch.

  Contact is Willie Huot, (701) 780-8229, *Willie.Huot@ndsu.edu.*

- **Dec. 16, 2009 – Turtle Lake, American Legion Hall, 23 2nd Ave. E.**

  This workshop will have presentations on water service contracts from the McClusky canal, groundwater permits, fertility management, irrigation power rates and economics of irrigation development; a Garrison Diversion irrigation development update; and a farmer panel on irrigation development experiences in the area.

  Contact person is Mike Liane, (701) 652-2951, *Mike.Liane@ndsu.edu.*

- **Dec. 17, 2009 – Williston Research Extension Center, Ernie French Building**

  This workshop will have presentations on rental rates and crop budgets, strip tillage, NDAWN, the NRCS Agricultural Water Enhancement Program (AWEP), soybean and dry bean production, broadleaf crop disease issues and pivot sprinkler uniformity, and a Nesson Valley research update.

  Contact is Chet Hill, (701) 774-4315, *Chet.Hill@ndsu.edu.*

A workshop mail piece will be sent in November. If you have any suggestions for additional topics to cover at any of these workshops, please contact me by mail, phone or e-mail.

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Update on the New Agricultural Water Enhancement Program (AWEP)

The North Dakota Irrigation Association (NDIA) has entered into a partnership with the Natural Resources Conservation Service (NRCS) to complete irrigation water conservation programs under the NRCS's Agricultural Water Enhancement Program (AWEP). Approximately $1 million was allocated to producers in fiscal year 2009 to improve water conservation on irrigated lands. The total funding requested for the next five years is about $3.8 million.

Water conservation programs that have been submitted to the NRCS under the Environmental Quality Incentives Program (EQIP) will qualify for implementation under this partnership. The purpose of this program is to promote irrigation water conservation and improve water quality by converting to more water-efficient irrigation systems or modifying existing systems or management. Irrigators who previously have submitted projects under the EQIP program should contact their local NRCS office as soon as possible if they are interested in implementing these programs. Ranking and implementation criteria will be similar to those used previously for irrigation system modification. Irrigators will be provided cost-share incentives as in the past to implement these changes on their irrigation systems and management.

In addition to improving water conservation and quality programs, the AWEP also will include other water and soil management techniques to achieve overall natural resource improvements under irrigated agriculture. Innovations may include energy conservation, peak-flow pumping, off-stream storage, water-control facilities, and on-farm measures for soil and water conservation.

The NDIA will work closely with the NRCS in establishing standards, procedures and financial assistance criteria to implement these programs. The programs will be administered through the local NRCS offices as they have been in

the past. NDIA will support, provide input, monitor and report on the AWEP projects.

To be eligible for 2010 funding, producers must sign an application by Nov. 2, 2009. Applications can be signed at your local NRCS office and are **not binding**. If you have a program or potential program, an application should be signed by this date.

If you have questions or would like to discuss this program, please contact your local NRCS office or contact us at the North Dakota Irrigation Association office.

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Interesting North Dakota Irrigation Statistics (2007 data)

Total cropland acres in North Dakota	27,500,000
Number of acres irrigated (2008 data)	260,000
Percentage of cropland irrigated	1%
Major irrigated crops (acres):	
Corn	114,671
Potatoes	33,068
Wheat	17,935
Alfalfa	17,800
Dry edible beans	16,805
Soybeans	15,045
Sugar beets	13,264
Barley (malt & feed)	12,041
Subtotal	**240,629**
Miscellaneous irrigated crops: *mixed forage, oats, field peas, onions, grass, rye, sorghum, flax, safflower, canola, carrots, millet, lentils and triticale*	**9,332**
Total irrigated acres	**249,961**
Total agricultural receipts	$6,084,218,000
Total receipts from irrigated crops	$216,000,000
Irrigation revenues as percent of total	3.5%
Total harvested acres	22,035,717
Irrigated acres in major crops	240,000
Gross return per irrigated acre	$901
Gross return per dryland acre	$276
Dryland acres needed to equal 1 irrigated acre	3.26

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Summary of the Devils Lake Basin Water Utilization Test Project

Due to a wet climatic cycle since 1993, rising surface water levels in the Devils Lake Basin in northeastern North Dakota have led to a search for flood mitigation measures. One such measure proposes that irrigation from surface water sources could be used to reduce a portion of flows from the upper basin into Devils Lake. The Devils Lake Basin Water Utilization Test Project was conducted with the following objectives:

- Determine how much additional water can be utilized via sprinkler irrigation of agricultural crops compared with the water utilization of nonirrigated crops in the basin
- Evaluate the effects of irrigation on representative soil map units within the basin
- Extrapolate the results from the test project to the broader basin

The project was conducted on 10 irrigated field sites in the basin during the 2006-08 growing seasons. Intensive monitoring was conducted to measure rainfall, irrigation, soil moisture, deep percolation and ground water levels. These measurements were used to guide irrigation management decisions during the project.

Intensive and extensive soil sampling was conducted to monitor physical, chemical and morphological properties of the soils at the test sites. Numerous soil cores were taken to characterize the soils at the beginning, middle and ending phases of the project. Soil electrical conductivity surveys were conducted at field scale to determine the extent and changes in soil salinity. The soil sampling and monitoring was an integral part of the project because even if significant amounts of water could be utilized during the project, irrigation could adversely affect the long-term productivity of the soils if implemented on nonirrigable or conditionally irrigable soils.

Evapotranspiration (ET), the combined effect of water loss from the soil evaporation and transpiration through plants, was estimated for the 2006 season using a remote sensing approach. The Surface Energy Balance Algorithm for Land (SEBAL) was used to estimate ET using Landsat 5 imagery on a pixel-by-pixel basis and ground-based weather data.

A portion of the basin, 54 percent, comprised what we refer to as the "footprint" of the ET study area. The SEBAL method assumes a portion of the net radiation received at the land surface is used to heat the air, another portion of the energy is used to heat the soil and the remainder is used to evaporate water. The last component, water evaporation, is assumed to be equivalent to ET for crop-covered areas.

Landsat imagery is useful for this method because the images are readily available, cover a relatively large area (115-mile scene width) at medium resolution (98-foot by 98-foot pixel size), and contain a thermal band in addition to visible and reflected infrared bands. The thermal band is the critical component for energy balance computations.

The 2006 season was the best year for irrigation in the project, as some of the farmer-cooperators applied nearly 10 inches of irrigation that year compared with averages of less than 3 inches in 2007 and 2008. Moreover, the 2006 season presented what was likely the best-case scenario for using irrigation to remove water from the Devils Lake basin via irrigation. Weather records from the Cando station of the North Dakota Agricultural Weather Network (NDAWN) indicated that 2006 was the driest May through September period from 1995 through 2008. The 2006 season also exhibited the highest evaporative demand for the same years. As a result, the SEBAL analysis of ET for 2006 most likely represented the best-case scenario for quantifying the upper limit of the gains in ET that could be achieved by irrigation compared with non-irrigated crops.

The ET maps produced by the SEBAL approach were overlaid on crop and soil maps to determine crop- or soil-specific ET values for the 2006 season. This technique allowed us to estimate, for example, that the median value of corn ET was 17.2 inches and the median value for wheat ET was 15.6 inches in the "footprint" area. For comparison, median corn ET values at two of the sites in the test project were slightly larger than 17.2 inches and ET values at two other sites were somewhat smaller than 17.2 inches.

It appears that in a best-case year and at the sites with the highest ET, the gain in ET associated with irrigation was in the range of 1 to 2 inches. This is considerably less than an ET gain of 5.4 inches for irrigated vs. nonirrigated crops that were estimated in a previous study. Additional simulations were conducted to determine whether correlations existed between ET and different soil types, but the results are beyond the scope of this article.

The results for soil salinity have not been completed to date because additional sampling during the 2009 growing season has been required. Half of the sites were inaccessible for fall 2008 soil sampling due to wet conditions and late or no crop removal. Subsequent laboratory work and data analysis will be conducted during late 2009 and early 2010.

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Fall Maintenance Irrigation Checklist

- ❑ Chlorinate the well.
- ❑ Drain pipes, valves, tanks and centrifugal pumps.
- ❑ Protect pump-out risers and other equipment from livestock.
- ❑ Close or cover any openings that might invite rodent entry.
- ❑ Check all motor and pump openings to make sure they are properly screened to keep rodents out.
- ❑ Lubricate all pump and motor bearings and shafts.
- ❑ Lock the control box in the "OFF" position.
- ❑ Spray electrical contacts with contact cleaner to displace dirt and moisture and prevent corrosion.
- ❑ Replace panel door seals if hard or broken to keep moisture and dust out.
- ❑ Check the level of oil in the reservoir and change the oil if it is discolored.
- ❑ Loosen the packing gland if used.
- ❑ Loosen any belts.
- ❑ Remove the flow meter and pressure gauges and cover the holes.
- ❑ Store the gated and straight pipe so they can drain.
- ❑ Inspect the gaskets in portable pipes.
- ❑ On center pivots, check all gearboxes for moisture accumulation, lubricate all fittings, check the water drain valve on each span, remove and clean the system end cap, drain all water-carrying lines and drain the booster pump case.
- ❑ Park the center pivot into or with the prevailing wind (northwest or southeast).
- ❑ Winterize stationary engines.

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