NRCS Help Improves Irrigation System Resulting in Water and Fuel Savings

By: Joanna Pope, NRCS Public Affairs Specialist

Phelps County farmer Vernon Nelson knew that he wanted to upgrade his irrigation system from flood irrigation to center pivot. With over 3,000 irrigated acres Nelson wanted a system that was more efficient. The Natural Resources Conservation Service (NRCS) worked with Nelson to design an irrigation system that is now providing significant savings in diesel costs and inches of water pumped.

Joanna Pope, NRCS

NRCS Civil Engineer Technician Kim Swanson (left) custom designed Phelps County farmer Vernon Nelson's center pivot. NRCS' assistance resulted in tremendous water and fuel savings.

Nelson visited the NRCS office in Holdrege, Neb. There he learned how the Environmental Quality Incentives Program (EQIP) could help him upgrade his irrigation system and that NRCS could provide technical help.

EQIP is a voluntary conservation program that provides eligible farmers and ranchers financial and technical help with conservation practices on agricultural land. The Ground and Surface Water Conservation funds, available through EQIP, help landowners maximize water savings on irrigated land. This includes the conversion to more efficient irrigation systems – like center pivots. Nelson now has three center pivots installed through EQIP and is currently working on installing a fourth.

"NRCS provides a real service. EQIP helps you get the pivot paid for, and the NRCS staff makes sure the pivot system is installed right," Nelson said.

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>
> **- Vernon Nelson, Phelps County farmer**

Making sure the pivot is properly engineered and operating efficiently takes time and skill. Each pivot installation is unique. NRCS engineering staff Allen Gehring and Kim Swanson worked with Nelson to custom design his center pivot system.

"There is no 'one size fits all' when it comes to installing a pivot," Swanson said. "The amount of water the well can pump, the efficiency of the pump, soil types, topography, crop rotations and other factors all need to be considered if a pivot is going to operate at its optimum efficiency."

A properly installed center pivot can greatly reduce the amount of water applied to a field each year. Nelson calculated from his flow meter that the amount of water he was pumping before the center pivots were installed was about 21 inches per acre. After the center pivots were installed the amount of water applied dropped to an average of 12 inches per acre.

Nelson was so impressed with his water and fuel savings he installed center pivots on all of the 3,000 irrigated acres he operates. The conversion on these acres equals an average water savings of over 730,000 gallons per year!

The potential water savings for Phelps County is huge, according to Swanson.

"Let's assume that all of the fields that switch to pivot irrigation save an average of nine inches of water. There have been about 78 EQIP contracts in Phelps County converting fields to pivot irrigation. That means these EQIP pivots are pumping about 2 billion fewer gallons of water each year, and that's just in Phelps County alone," Swanson said.

The energy saved by converting to a pivot is also substantial. Since the well is not pumping as much, less energy is needed. Nelson figures that he is now saving about $7,000 a year in diesel costs.

Nelson had been using no-till on a small scale for about five years, but after converting to center pivots Nelson has planted all of the acres he operates using no-till. Converting to no-till has saved Nelson even more water and energy.

No-till only minimally disturbs the soil during planting. By not disturbing the soil the moisture in the soil does not evaporate as easily since it is not exposed to the air by tillage. The high level of residue left on a no-till field also works as a sponge that absorbs and holds moisture on the field. Nelson figures that he is now saving an additional six inches of water by switching to no-till. Keeping the water on the field also improves soil quality by reducing erosion and runoff.

No-till also results in fuel savings. No-till means fewer trips across the field with the tractor – no hilling, disking, or cultivating. This saves wear and tear on machinery and reduces the amount of fuel needed to grow a crop. Nelson estimates that switching to no-till has saved him about 8,000 gallons of fuel a year.

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Swanson is currently working with Nelson on his fourth center pivot installation. Since the existing pump will not be upgraded for a center pivot, Swanson is working with Nelson to ensure the pivot installed will work as efficiently as possible with the existing pump.

"The system I designed is balanced to provide optimum pump, fuel and water efficiencies for the total irrigation system," Swanson said.

For landowners like Nelson having that kind of expertise is invaluable.

Joanna Pope, NRCS

After switched to no-till Nelson is saving an estimated 8,000 gallons of fuel a year.

"Everyone at NRCS has been great. Their assistance is an asset to the farming community. If landowners aren't using their assistance, then they're missing out," Nelson said. ♦