

# High-efficiency irrigation pays off

Increased yields sometimes pay cost of upgrades, experts say.

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COURTESY OF ROBERT WALLACE

A high-efficiency irrigation installation in an alfalfa field near Terrebonne, Ore. Such systems provide 96 to 97 percent water efficiency, experts say.

Irrigation is all about getting water to thirsty plants and trees, from hay fields to orchards to row crops.

To accomplish that as efficiently as possible, farmers and ranchers have changed their methods through the years. When those methods are efficient, there are multiple benefits for the grower: Increased tonnage, improved quality, less water and power waste resulting in lower costs for those two, and possibly a higher price for the crop.

Low elevation precision application (LEPA) and low elevation sprinkler application (LESA) are two of the most recent irrigation methods that are being promoted in the Pacific Northwest.

“With water and power costs, these methods should catch on fast,” said Greg Mohnen, president of the Oregon Hay and Forage Association and manager of hay production for the McGinnis Ranch near Bend, Ore.

Another low elevation irrigation method is the drip system. It’s not new, having been used for many years in orchards where wheel lines and pivots can’t be used. Drip irrigation allows the soil to absorb the water, eliminating any evaporation or runoff.

The LEPA and LESA irrigation methods have been used on the Great Plains of the Midwest and farther east for the past 20 or so years, but they have only been promoted out west for the past few years.

Unlike hand lines, wheel lines and pivot systems where sprinkler heads stand upright and spray water high into the air, the LEPA and LESA systems use a much closer-to-the-ground approach to getting water to the soil and plant roots. LEPA features tubes hanging down from a pivot with nozzles, 12 to 18 inches off the ground, releasing a stream of water. LESA uses the same down setup off a pivot, but the nozzles spray from about 12 inches off the ground.

Mylon Bohle, a forage agronomist with the Oregon State University Extension Service office in Prineville, Ore., said these two methods provide 96 to 97 percent water efficiency because there is minimal wind drift and evaporation of the water.

There is a cost in the thousands of dollars, depending on the acreage, to make the conversion, but it has been proven the results will cover the cost in a year or two.

In addition to the Extension Service, many Pacific Northwest electric cooperatives are promoting LEPA and LESA.

Dale Anderson of Big Bend Electric Cooperative in Ritzville, Wash., said he knows of a hay grower who upgraded two of his pivots, but not a third. On his fourth cutting of hay for the season, the fields with the upgraded pivots produced a ton more per acre than the older pivot.

“The farmer said I could have paid for the upgrades with that extra ton,” Anderson said.

Bohle said a Prineville area hay grower increased his quantity to 5.4 tons an acre with the LEPA system after upgrading from a mid-elevation sprinkler application system that had been producing 2 tons an acre.

In addition to less water and power being used, and less evaporation of water, other benefits of these new systems include less lodging (plants tipping over because of water weight and pressure on their leaves) and possibly less disease from standing water on leaves (research is ongoing to confirm this belief).

For the pumps that power these irrigation systems, switching to a smaller one is an option because the LEPA and LESA systems don't require as much water pressure. Powering a smaller pump is a cost savings. Or there is the possibility that a larger pump can replace two smaller pumps and result in overall savings.

Variable frequency drives can also be installed to improve the efficiency of the electric turbine pumps. The VFDs can be programmed to monitor both the power supplied to the pump and the speed of the motor, decreasing both when needed and resulting in more cost savings.

For hay growers who are members of electric co-ops, those co-ops will provide field audits to help analyze agricultural operations and to help create long-term plans for properties.

"We provide incentive packages ... replacing wheel lines with pivots, replacing sprinklers with nozzles, replacing gaskets, those types of things," said Lynn Culp of Surprise Valley Electric Cooperative in Alturas, Calif.

"There's some really exciting technology out there," Bohle said. "There is a big capital outlay so that might be the reason not to change, but the benefits are proven. I do believe as the word gets out, it'll be like a snowball rolling down a snowy hill and change will be rapid."

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