Repairing irrigation pumps can increase your profits

Repairing worn irrigation pumps is a profitable move, according to U. S. Department of Agriculture researchers.

Research on a well at Texas A&M University Research Field at Etter proved this beyond a doubt. Having pumps in good repair was good business before high priced energy, but is now a necessity say Dr. Arland Schneider, Agricultural Research Service Engineer, and Dr. John Shipley, Texas Agricultural Experiment Station Economist, from the USDA Research Center at Bushland.

They carefully measured pump efficiency and cost and found that replacing a worn-out pump bowl assembly decreased electricity cost from $22.48 to $15.69 per acre-foot. Calculations showed that reduced electricity cost will pay for the repairs in the 1977 pumping season.

The old pump at the Etter Research Field was installed in 1964, and pumped 1,000 gallons per minute until 1972. Then it started pumping erratically and dropped to 500 gallons per minute by 1976, according to Dr. Shipley.

That was not enough water to carry out experiments at the Research Field. Rather than just change the pump, Shipley took the problem to Dr. Schneider. They decided to do a thorough study on the pump to determine both energy cost and efficiency of operation. With good information in hand, the scientists could then calculate the profitability of making repairs.

The worn-out pump produced 500 gallons per minute, and lifted water 290 feet, but the pump operated at only 49 percent efficiency. Installing the new pump bowl assembly increased the pumping rate to 750 gallons per minute. With a higher pumping rate, drawdown increased and total lift was 325 feet. Under these conditions, pumping efficiency was increased to 79 percent.

Repairs cost $3,228.00, but the scientists figured that repayment would take only 143 days of pumping.

The researchers point out that water cost can be calculated rather easily. Pumping rate, energy consumption, and energy cost must be known or determined. Accurate pumping rates can be measured with an inline propeller-type meter.

Water meters can be equipped with quick couplers and placed anywhere in a surface irrigation pipe. The meter records the number of gallons of water passing through the pipe. Keeping records for one hour gives an accurate output for a well. "A meter costs about $400.00 but would be a good investment," Dr. Schneider says. "Knowing the amount of water being applied to crops is just good business," he continued.

Keeping track of natural gas or electrical energy use for at least 2 hours on company meters gives an accurate measure of energy consumption. The cost of fuel or electricity must be known also. An acre-inch of water is 27,000 gallons. With these figures in hand, a little arithmetic gives the cost of an acre-foot of water.

The following calculations were made by Schneider and Shipley before repairing the well at Etter. It took 64.8 kilowatt hours of electricity to run the pump one hour. Electricity cost 3.2 cents per kilowatt hour. Multiplying the two figures gives a pumping cost of $2.07 per hour. At 500 gallons per minute, the well produced 30,000 gallons an hour. Dividing 27,000 into 30,000 gallons shows that the well pumps 1.11 acre-inches per hour. Water cost per acre-inch is $2.07 divided by 1.11 or $1.87. Multiplying $1.87 by 12 shows that cost per acre-foot of water is $22.44.

Calculating pump efficiency is more complicated and the two scientists suggest obtaining outside help.