How energy efficient are U.S. farmers?

DOVER, Del — The productivity of American agriculture is unquestioned, but some people think it's been achieved through a wasteful use of energy.

Critics of modern farming methods hold to this view in spite of the fact that only 2.5 percent of the nation's energy is consumed by agriculture.

"This seems a modest share, considering how it has been used to ease the burden of field work for farmers and provide an abundant supply of high-quality food for the

William H. Mitchell

rest of us," says University of Delaware extension agronomist William Mitchell.

He says there's no evidence that farmers need any incentive to conserve energy other than the profit motive.

"Since profits are closely tied to crop yields, energy cutbacks must be weighed in terms of their effect on yield," says Mitchell "If we conserve energy but reduce production, we'll end up both cold and hungry "

Before they reject modern agricultural technology, the folks who make a big whoopla about saving energy on the farm had better take a close look at the real energy wasters there, says Mitchell.

Take irrigation, for example. This is an energy-intensive practice, but it has the potential to more than double corn yields. More nitorgen, more seed and more lime are needed to grow corn under irrigation, and more gas is needed to dry the additional grain produced. On balance, irrigation could be considered an energy-efficient practice because, with it, relatively more energy (in the form of grain) is produced than is consumed.

This was decidedly true last summer when yields on many drought-stricken fields were only 15 bushels. At 1600 K cal of energy per pound of corn, the harvested grain from those fields matched the energy needed for production. But none was left to cover harvesting, hauling, drying and storage needs

It actually took more energy to produce and handle this dry land corn than what was contained in the harvested grain.

With similar production inputs but by adding 12 inches of irrigation water and 100 more pounds of nitrogen, the yield on many Delaware farms was boosted to 160 bushels an acre. The 145 bushel increase, containing 13 million k cal of energy, was achieved at an estimated energy cost of 2.8 million k cal for the water and nitrogen. Irrigation and additional nitrogen made it possible to recover 4.6 units of energy for each unit invested in the crop.

Through this is a lower recovery rate than would be expected with conventional tillage at the 100 bushel yield level, it is a vast improvement over the negative value obtained in 1980 without irrigation, says Mitchell. Last summer the energy spent producing dry land corn on many farms was pretty much wasted energy.

Energy use in crop production has been the focus of a number of recent studies at the University of Delaware Agricultural Experiment Station.

Station researchers have compared the energy demands of various tillage systems to find out which is most efficient. They have also studied the use of leguminous cover crops as a source of biological nitrogen.

These studies show that by combining no-tillage with a nitrogen-producing cover, such as hairy vetch, Delmarva farmers can grow corn using about 40 percent of the energy reqired for conventional tillage — with no drop in yield.

Besides using cover crops to supply some of the nitrogen needed to grow corn, Mitchell suggests farmers take a closer look at how they're using this nutrient in general.

"Fertilizer nitrogen is the highest energy input in the cornfield," he says. "In the interest of using it effectively to achieve maximum economic yields, careful thought should be given to application rates."

Growers should be realistic about their yield goals both with and without irrigation, says the agronomist. More available water and higher moisture levels through irrigation and no-tillage justify higher plant populations and higher yield goals. And these call for more nitrogen than needed under other systems.

He also thinks farmers need to examine application methods carefully. Where possible, nitrogen should be sidedressed or dribbled down the row. Urea should be incorporated to avoid ammonia losses. And emphasis should be placed on application of nitrogen through the irrigation system.

Nitrogen applied this way is carried to the soil surface by 20,000 to 30,000 gallons of water per acre, so essentially it can be considered a broadcast soil application.

"There is no evidence," says Mitchell, "that it is

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