

## Herbicide Use Has Resulted in a Significant Reduction in Energy Use

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*Leonard Gianessi and Ashley Williams*

The cost of fuel for farm operations remained inexpensive through the 1950s and '60s, but increased dramatically following the energy price shocks of 1973-74 and 1980-81. Fuel price has increased dramatically in recent years (Figure 1). Energy price increases significantly altered the pattern of energy use on U.S. farms, resulting in a large decrease in direct energy use (Figure 2). Since the late 1970s, the direct use of energy by agriculture has declined by 26%, while the energy used to produce fertilizers and pesticides has declined by 31% [1].

The decline in agricultural energy use resulted in a significant reduction in agriculture's share of the nation's total energy usage. In 1978, the total direct and indirect energy used in agriculture accounted for about 5% of U.S. energy use [2]. Currently, the direct energy use in U.S. agricultural production represents about 1% of total U.S. energy consumption while the indirect energy use to manufacture the pesticides and fertilizers represents about 0.5% [1].

Agriculture has made dramatic efficiency gains in energy use. Since 1973, farm output has grown 63% while direct energy consumption has declined 26%. As a result, direct energy use per unit of agricultural output is 50% less today than it was in the 1970s (Figure 3).

Herbicides have been a main factor for the decrease in energy use [4]. The energy price increases stimulated an increase in conservation tillage, reducing fuel consumption relative to conventional tillage [5]. The additional energy embodied in herbicide use in reduced-tillage systems is much less than the energy conserved by reduced tillage [6]. A moldboard plow consumes 17 times more diesel fuel per acre than an herbicide sprayer. A row-crop cultivator requires 0.4 gallon/acre per trip while a herbicide sprayer requires 0.1 gallon/acre [7].

The Conservation Tillage Information Center (CTIC) has estimated a savings of 3.9 gallons of direct fuel use per acre by going from conventional tillage to no-till [8]. By 2008, the number of no-till acres reached 88 million, implying an annual fuel savings of 343 million gallons.

### References

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