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Fuel Use for Field Operations

This NebGuide discusses common grazing problems and offers solutions.

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The amount of fuel used for field operations depends on many factors, including correct tractor-implement matching, proper tractor ballasting, condition of the tractor and implements, depth of tillage, idle time, and soil type and condition. The tillage practices used for a particular crop will be a major factor in the fuel needed for a complete production cycle.

Good estimates of fuel requirements are necessary for planning purposes. If fuel use records are available and reflect the soil conditions and management practice for a particular farmstead, they should be used. However, if specific records are not available, average fuel use values presented in this publication can be used. The data were derived from a two-year study involving fuel usage of farmers throughout Nebraska.

Peak demands for gasoline and diesel fuel occur at various times of the year. *Figures 1 and 2* represent the Nebraska agricultural gasoline and diesel fuel demands for a calendar year. Due primarily to spring tillage and planting, May and June are the peak demand months for diesel fuel. October is the peak demand month for gasoline because of the use of gasoline-powered combines. June and July are also high demand months due to a predominance of gasoline-powered haying equipment. For a particular farm, the timing and amount of fuel required will depend on the cropping practices and equipment used.

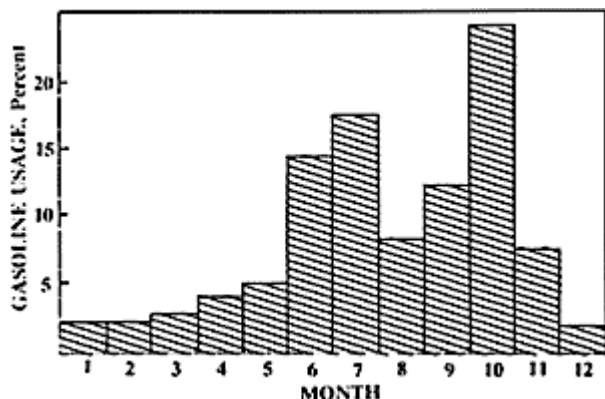


Figure 1. Gasoline demand for field operations.

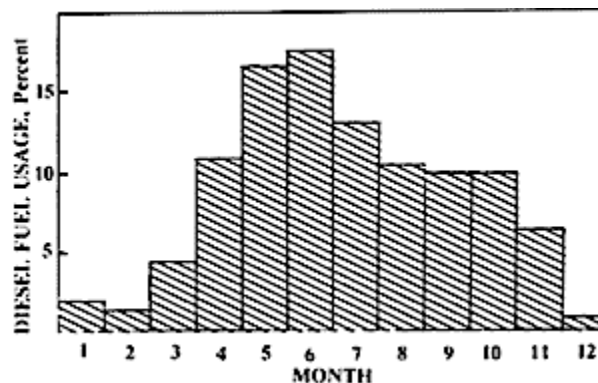


Figure 2. Diesel fuel demand for field operations.

Average diesel fuel use values for common field operations are shown in *Table I*. As a general rule, fuel use for wheat and fallow operations is less than that for row-crops (corn, sorghum, and soybeans). This is due mainly to shallower tillage depths and lighter soil types. The values presented are for a predominate loam soil. For lighter soils, sandy and sandy loams, reduce the values by 15 to 20 percent for primary tillage and 10 to 15 percent for secondary tillage and cultivation. For heavier soils, clay loams and clays, increase the values by 35 to 45 percent for primary tillage and 15 to 20 percent for secondary tillage operations. Average diesel fuel use values for haying operations are given in *Table II*.

Fuel use for transporting harvested crops and hay can also be estimated (*Table III*). The values are based on a per acre basis and therefore vary because of the different yields from the various crops. If tractors and wagons are used for hauling, double the fuel use values from the table.

Fuel use values in all of the tables are given in diesel fuel gallons per acre. Multiply the diesel fuel values by 1.42 to estimate gasoline requirements.

The following example illustrates the use of the fuel use tables to estimate overall fuel requirements.

A total of 500 acres is planted to dryland corn. The production sequence is fertilizer application, two diskings, surface planting, spraying, cultivation of half of the corn and combine harvesting. The harvested corn is transported 15 miles by truck to the elevator. In this example, the annual diesel fuel requirement is 2,978 gallons when the fuel use for each operation is added. *Table IV* summarizes these computations.

Table I. Average diesel fuel use in Nebraska.**		
<i>Operation</i>	<i>Row Crops</i>	<i>Wheat and Fallow</i>
	<i>Gal/A</i>	<i>Gal/A</i>
	Tillage	
Disking	0.75	0.75
Field Cultivating	0.76	0.44
Chisel Plowing	1.16	0.62
Moldboard Plowing	2.24	1.36
Sweep Plowing	*	0.74
Springtooth Harrowing	0.66	0.55
Roller Pack	0.77	*
	Planting	
Drilling	*	0.39
Lister	0.51	*
Rotary Bed	1.37	*
Surface	0.50	*
Till-Plant	0.60	*
	Weed Control	
Cultivating	0.43	*
Rodweeding	*	0.54

Rotary Hoeing	0.25	*
Spraying	0.21	*
	Harvesting	
Chopping silage	1.77	*
Combining (self propelled)	1.22	0.72
Sugar beets	1.54	*
	Miscellaneous	
Chopping stalks	0.52	*
Ditching	0.49	*
Knifing Fertilizer	0.59	0.63
* Operation not performed.		
** To convert to gasoline, multiply by 1.42.		

Table II. Average diesel fuel use for haying in Nebraska.	
Operation	Gal/A
Mowing	0.57
Windrowing	0.59
Raking	0.33
Baling	0.47
Stacking	0.85
Chopping silage	0.97

Table III. Average diesel fuel requirements for transport. (Values are for trucks; if tractors and wagons are used, double the value.)		
Commodity Hauling	Gal/A 1st mile	Additional mile
Ear Corn	0.29	0.17
Shelled Corn	0.18	0.11
Soybeans	0.07	0.04
Small Grain	0.09	0.05
Hay, conv. bales	0.14	0.11
Hay, 1-ton stack	0.15	0.11
Hay, 3-ton stack	0.07	0.05
Haylage	0.20	0.20
Corn Silage	1.40	0.90

Table IV. Diesel fuel use estimation example.

A total of 500 acres is planted to dryland corn. The production sequence is fertilizer application, two diskings, surface plant, spraying, cultivation of half the corn and combine harvesting. The harvested corn is transported 15 miles to storage.

Operations in Sequence	Fuel Use	Area	Total Diesel Fuel
	Gal/A	acres	Gal
Knifing fertilizer	0.52	500	295
Disking	0.75	500	375
Disking	0.75	500	375
Surface plant	0.50	500	250
Spray	0.21	500	105
Cultivate	0.43	250	108
Combine	1.22	500	610
Transport (truck)*	1.72	500	860
-----Total			2978
* 0.18 gal/A = 1st mile plus 14 miles @ 0.11 gal/A = 1.72 gal/A.			

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