

CONSERVING FUEL ON MONTANA FARMS



Rising fuel costs are impacting farmers across Montana. In 2005, Montana farmers spent \$185.6 million dollars on fuel, up from \$133.6 million in 2001¹. While there is little you can do to combat the price you pay for fuel, you *can* take measures that will reduce fuel consumption and save money.

This publication provides useful tips to help you start saving fuel on your farm today. Many are free or low-cost measures that can provide immediate savings. Others have an associated cost, but offer a cost-effective payback. We focus on energy conservation in three areas:

- Fuel storage
- Vehicle operation and maintenance
- Field practices



Fuel Storage

Did you know that about 120 gallons of fuel can be lost each year through evaporation or leaks in storage tanks? You can reduce that loss to about 15 gallons per year by following these steps:



- Keep fuel tanks well-shaded.
- Paint tanks white or aluminum to reflect the sun's heat. Light colors reduce evaporation losses.
- Use pressure-relief vacuum caps rather than conventional gas caps.
- Keep storage tanks full, especially in the winter, to prevent water condensation.
- Lock fuel tanks when not being used.

- Regularly inspect your tanks for leaks. During those inspections, tighten connections between the storage tank outlet and the pump, check valve packings, and check for seepage at the nozzle. Be especially vigilant at inspecting underground storage tanks since leaks can cause groundwater contamination.

Vehicles and Equipment

Perform maintenance. Keeping your farm vehicles and equipment in top operating condition will save fuel and money, help reduce repair costs, and minimize harmful exhaust emissions. Well-maintained vehicles and equipment also are more reliable and will last longer. Common maintenance measures include getting regular tune-ups; replacing air, oil and fuel filters routinely; changing oil as recommended by manufacturers; and using the proper grade of oil. Refer to your owner's manual for specific maintenance measures for your equipment.

Ensure that gas caps fit properly. Caps that are damaged, loose, or missing altogether will cause fuel to vaporize.

Minimize idling times. Modern electronically-controlled diesel engines need only about 10 minutes to sufficiently warm up and cool down. Idling equipment beyond what is necessary wastes fuel.

Install an electric headbolt heater and timer on equipment. It is less expensive to warm engines with electricity for a controlled period of time than it is to use liquid fuel. Three hours is generally sufficient to warm an engine.

Reduce excess weight on vehicles. Lighter loads consume less fuel than heavier ones.

Keep your tires properly inflated. Having just one tire under-inflated by 6 psi can increase fuel consumption by 3 percent, not to mention reducing the tire's life. Cold temperatures decrease the air pressure in tires, so check tire pressure regularly, when tires are cold. Check your owner's manual for your tractor or other equipment for information on correct inflation pressure.

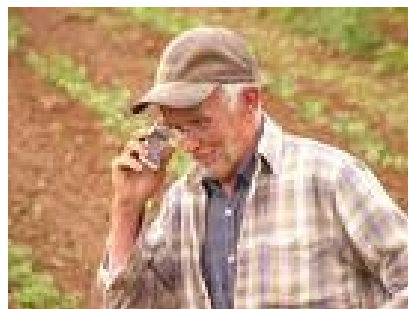
Have wheels aligned and balanced. Proper alignment and balance, like proper air pressure, helps minimize the resistance from your tires that can reduce fuel economy.

Avoid unnecessary driving. Technologies such as cell phones and radios can be used to solve problems from the field, rather than driving. Combine errands into a single trip, if possible.

Upgrade to more fuel-efficient models. When it's time to replace your equipment, compare fuel requirements of different makes and models. A higher purchase price can be partially offset by lower fuel costs. The Nebraska Tractor Test Laboratory conducts performance tests of tractors, including fuel performance. Test reports for many tractor makes and modes are available online at <http://tractortestlab.unl.edu>.

Did you know?

- One fouled spark plug or one stuck valve lifter can increase fuel use by 10 to 15 percent.
- Blocked air filters can increase fuel consumption by as much as 20 percent.



Field Practices

According to the National Agricultural Statistics Service, Montana wheat farmers use about 3.4 gallons of diesel and 1.0 gallon of gasoline per acre. By changing your field practices, you could significantly reduce your fuel use.

Conservation or Reduced Tillage

Depending on your location, crop, and management style, you may be able to adopt minimum tillage as a method for reducing energy requirements. In conservation tillage, or reduced tillage, crops are grown with minimum cultivation. Fuel savings vary, but could be as much as \$10 per acre compared to traditional tillage methods². And, you can cut tractor use in half with no-till methods³. The trade-off is the possible increase in the amount of extra chemicals used for weed control and fertilizer.



In conventional tillage, the operator normally will plow, disk, and harrow before and after planting. Reduced tillage minimizes these operations by either eliminating seedbed preparation or combining it with other field operations like planting. For example, strip or zone tilling methods till only a small area where seed is planted. Ridge and mulch-till methods require fewer trips across the field.

Some practices that will minimize secondary tillage are:

- Prepare the seedbed just ahead of planting to reduce the chances of rain between preparation and planting, and the possibility of having to reseed. Prepare a seedbed only in the row area, leaving the middle rough.
- Combine operations. For example, combine the final seedbed preparation with planting, the fertilizer operation with a tillage operation, and so on.
- In areas with minimal weed problems, use herbicides that don't require incorporation. Or plant at optimum time to combat weeds by crop competition, reducing the need for herbicides.

Tractor Operation

Use the correct size equipment for the job. Choose the smallest, lightest tractor appropriate for the job to get the best fuel mileage. If you use equipment with too much or too little horsepower for the job, your fuel efficiency will decline dramatically.

Gear up and throttle down. You can improve fuel efficiency by about 20 percent by reducing engine speed (RPM) and shifting into a higher gear for jobs that require less than 65 percent of full engine power.³

Operate at the recommended speed. Power requirements increase with increased speed, resulting in greater fuel use. Consult your owner's manual for speed recommendations.

Use proper ballast. An insufficient ballast can create excessive tire slippage and increase fuel consumption, not to mention premature engine wear. Remove extra ballast for lighter loads. You'll get better fuel economy, reduce soil compaction, and your equipment will last longer.

Matching Equipment to Task

Ask yourself if certain practices can be slowly siphoning your energy dollars. Take a look around and see where better planning or a small investment might save energy and money in the long run. For example:

- Would a larger seed hopper decrease trips to refill planters?
- Is your disk so small that it takes an extra pass between rows, or is it so excessively wide that it requires too much horsepower?
- Are you using a full-sized vehicle for spraying, spreading, rock picking, and other tasks, instead of a small, lightweight vehicle, such as an ATV?

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Average Fuel Requirements for Farming Tasks ⁵		
Operation	Gallons Per Acre	
	Gasoline	Diesel
Plow 8 inches deep	2.35	1.68
Heavy offset disk	1.33	0.95
Chisel plow	1.54	1.10
Tandem disk, stalks	0.63	0.45
Tandem disk, chiseled	0.77	0.55
Tandem disk, plowed	0.91	0.65
Field cultivate	0.84	0.60
Spring-tooth harrow	0.56	0.40
Spike-tooth harrow	0.42	0.30
Mulch treader	0.42	0.30
Rod weeder	0.42	0.30
Sweep plow	0.84	0.60
Cultivate row crops	0.63	0.45
Rolling cultivator	0.49	0.35
Anhydrous applicator	0.91	0.65
Planting row crops	0.70	0.50
No-till planter	0.49	0.35
Till plant (with sweep)	0.56	0.40
Grain drill	0.49	0.35
Combine, small grains	1.40	1.00
Combine, corn and grain sorghum	2.24	1.60
Mower (cutterbar)	0.49	0.35
Mower conditioner	0.84	0.60
Swather	0.77	0.55
Rake, single	0.35	0.25
Rake, tandem	0.21	0.15
Baler	0.63	0.45
Sprayer	0.14	0.10
Rotary mower	1.12	0.80
Haul small grains	0.84	0.60
Grain drying	8.40	6.0

Averages, based on values from agricultural engineers in several states.

References:

¹ Value Added to the U.S. Economy by the Agricultural Sector, Montana, USDA,

http://www.nass.usda.gov/Statistics_by_State/Montana/Publications/economic/value.htm

² Nicolai, Dick, Liz Gorchma, and Donna Bittiker, “Fuel Savings: Farm/Ranch Enterprise,” South Dakota State University Cooperative Extension Service, Pub No. #Ex14095, 2006.

³ “Fuel savings pump bucks back into farmers’ pockets,” Purdue University Agriculture Dept., February 7, 2006.

⁴ Rogers, Glen. “Saving Fuel Expense with the Farm Tractor Combine?,” University of Vermont Extension, October 2005.

⁵ Downs, H.W. and R.W. Hansen. “Estimating Farm Fuel Requirements,” Colorado State University Cooperative Extension, Pub No. 5.006, June 2006.

