Prescribed Grazing Systems

Well-managed grazing systems improve plant health and vigor, enhance water quality and quantity, reduce soil erosion, and improve soil condition.

With prescribed grazing, producers alternate between grazing and resting grazing units in a planned sequence that considers rate of plant growth, level of vegetative cover, and needs of the grazing animal. Studies show that energy savings of up to 21 percent for beef, 89 percent for veal, and 88 percent for lambs and goats are possible for grass-based production compared to conventional confinement.

In Missouri, beef cattle raised and finished on high-quality pasture have shown rapid average daily weight gain of 2 or more pounds and reach a marketable weight within just 20 months, at about half the cost of raising and finishing cattle in confinement. Dairies in New York and Wisconsin found that pastured lactating dairy cows consistently show a higher net farm income from operations over a 4-year period when compared to confined cows, whether measured per cow or per hundred-weight of milk.

Windbreaks and Shelterbelts

In rural areas, well-designed windbreaks can cut home heating costs by 10 to 25 percent. Windbreaks reduce the force of the wind on the exterior surfaces of buildings and thus reduce the cooling effect of the cold air. About 11 percent of the Nation's energy use goes to heating and cooling of residential homes.

A resident of Ft. Collins, Colorado, built a home in a rural area in 1970 and planted a windbreak for protection at the same time. For the next 20 years, he recorded the amount of natural gas used to heat the home. As the windbreak matured, he observed a decrease in gas use with an estimated 40 percent savings overall in the 20-year period.

Energy Conservation in Confined Animal Operations

Simple changes in confined animal operations can help farmers and ranchers achieve significant cost and energy savings. Replacing a worn belt on an electric motor could increase output by 20 percent or more. Well-maintained 48-inch fans in a broiler house cost up to 20 percent less to operate than poorly maintained fans. High-efficiency motors can reduce energy consumption by 3 to 8 percent and might be substituted for other motors. Using heat exchangers in a milking operation could cut electricity used for heating in half. Switching from incandescent to U-tube fluorescent lights in a 40,000-bird broiler operation could save nearly 18,000 kilowatt-hours per year.

NRCS supports conservation practices that save producers money and improve the environmental health of the Nation. For more information on energy-saving conservation practices, including updated cost savings, visit the NRCS "Save ENERGY, Save MONEY" Web site at www.nrcs.usda.gov/energy. The site includes several Energy Tools—on-line energy estimators to help you assess energy conservation options.

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Conservation Practices Contribute to Energy Efficiency and Fuel Savings

Farmers and ranchers can cut input costs, maintain production, protect soil and water resources, reduce the Nation's dependence on fossil fuels, and save money by using the conservation practices described in this brochure. Other options may be available in your area—check with your local NRCS office for more information.

Crop Residue Management

A producer can save up to 3.5 gallons of fuel per acre by going from conventional tillage methods to no-till. No-till is a conservation practice that leaves the crop residue (stalks, stubble, leaves, and seed pods) undisturbed from harvest through planting except for narrow strips of minimal soil disturbance. Good management of crop residue can increase efficiency of irrigation and control erosion. No-till can be used for almost any crop in almost any soil and can save producers labor costs and fuel. It's a sound investment for the environment and the farm.

Irrigation Water Management

Irrigation water management (IWM) plays a crucial role in water conservation and can cut producers' costs. IWM involves applying water in a manner that meets the need of the growing plant while avoiding extended soil saturation and runoff.

According to the 2002 Farm and Ranch Irrigation Survey, approximately 27 million U.S. acres are under sprinkler irrigation. About 80 percent of these acres use center pivot systems. Studies on the High Plains show that converting medium-pressure systems to low-pressure decreases farmers' energy costs up to 13 percent. Converting from high-pressure systems to low-pressure could decrease energy costs almost 40 percent.

Upgrading other types of irrigation systems, such as switching from high- or medium-pressure drip sprinklers to low-pressure, increases efficiency, conserves water, and reduces distribution costs. Diesel-powered pumps are used on about 10 million irrigated acres. A 10-percent improvement in water-use efficiency could reduce annual diesel consumption by 8 gallons per acre.

It All Adds Up to Significant National Energy Savings

- Doubling the amount of no-till acreage (from 62 million acres to 124 million acres) could save farmers and ranchers an additional 217 million gallons of diesel fuel per year.
- Converting irrigation systems from medium and high pressure to low pressure could save more than 1.1 million kilowatt hours of electricity annually.
- Improving water-use efficiency by just 10 percent could reduce diesel consumption by almost 26 million gallons annually.
- Doubling the application of manure-based nitrogen through a nutrient management plan could save up to 100 billion cubic feet of natural gas annually.
- If guidance systems were used on 10 percent of the planted acres in the United States, fuel use could be cut by up to 16 million gallons, herbicide use by 2 million quarts, and insecticide use by 4 million pounds per year.
- Reducing application overlap on 250 million acres of cropland could save more than 1 million tons of fertilizer and pesticides annually.
- The Federal AgSTAR program estimates that biogas systems could recover about 1.3 million metric tons of methane for use in more than 7,000 livestock facilities across the United States.

Nutrient Management

With nearly 40,000 cubic feet of natural gas needed to produce 1 ton of commercial nitrogen fertilizer, nutrient management can result in significant energy savings. Nutrient management involves proper timing and placement of the right amounts of nutrients and soil amendments for adequate soil fertility while minimizing potential degradation of water quality. Appropriate substitution of manure for commercial fertilizer can reduce crop production costs by as much as 20 percent. Producers who use nitrogen-fixing legumes as cover crops or in crop rotations also reduce their need for commercial fertilizer.

Energy costs also may be reduced through use of anaerobic digesters, such as covered lagoons and complete mix digesters. Manure from the anaerobic digesters provides a reliable level of nitrogen fertilizer and can be used to replace commercial fertilizer. Methane produced by the manure allows biogas generators to produce electricity and heat that producers can use onsite. Also, the potential exists to sell the excess electricity to a local electric grid.

Precision Agriculture

Producers can save significant quantities of energy by implementing precision agriculture practices, also known as "site-specific crop management." Producers can specify the farm input needs (including nutrient and pesticide application, tillage and irrigation) throughout an individual field by using a guidance system. A 1,000-acre farm with a continuous corn crop could reduce chemical application overlap from 24 inches to 2 inches, and result in savings of up to 5 percent. Producers find that a guidance system can pay for itself in just 2 to 3 years.

Integrated Pest Management

By incorporating integrated pest management (IPM) techniques into their operations, agricultural producers can reduce energy use and environmental risk while maintaining the quality of their agricultural products. For example, cherry producers who replaced traditional spraying schedules with spraying based on in-the-field microclimate information obtained from monitoring equipment and scouting have reduced fungicide or insecticide applications as much as 25 percent.

Selecting crop varieties that are most suitable to local growing conditions helps reduce pest-related damages. When conservation practices, such as crop rotation and pest management techniques, are used in conjunction with naturally occurring predators, insects, and pathogens, pest populations are further suppressed. IPM activities also help reduce pesticide losses from runoff and leaching; reduce pesticide residues in crops; reduce energy use and production costs; and improve water, soil, and air quality.