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CC257 Energy Conservation in Agriculture

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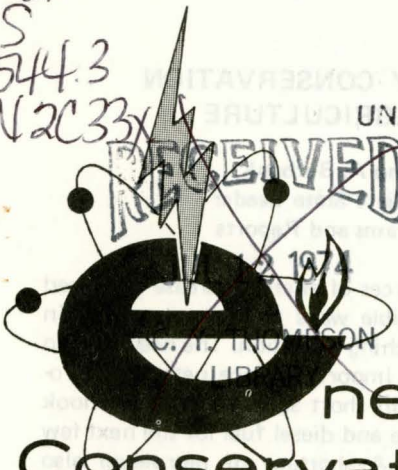
CC 257



Energy Conservation in Agriculture

A SUMMARY OF ENERGY AND COST SAVING OPPORTUNITIES

Extension work in "Agriculture, Home Economics and subjects relating thereto," The Cooperative Extension Service, Institute of Agriculture and Natural Resources, University of Nebraska-Lincoln, Cooperating with the Counties and the U. S. Department of Agriculture
J. L. Adams, Director

ENERGY CONSERVATION IN AGRICULTURE

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Programs and Reports

As costs for sources of energy increase you need to consider all possible ways to conserve energy in your farming or ranching operation. The need to plan ahead is even more important since petroleum products are currently in short supply and the outlook for gasoline, propane and diesel fuel for the next few years is uncertain. A shortage of petroleum also affects the supply of other products you use on the farm, especially fertilizer.

Under these conditions of short supply and increasing cost you need to take a careful look at how energy is used on your farm or ranch. Here are some questions you might ask:

1. How much of each type of petroleum product did I use in each of the past two years?
2. Will I need more or less than that amount during this year?
3. What does my supplier say about the amount of product he may be able to supply me this year?
4. What changes could I make in my farming or ranching program to reduce the amount of fuel needed?
5. If fertilizer is also in short supply, how can I best use the fertilizer available to me?
6. If one type of fuel becomes unavailable, what alternate fuels could I use?

Energy Saving Opportunities

Machine Operations

- Reduce field operations where possible. Consider substituting disking for plowing, chopping stalks by disking, using slot planting or the till-plant system if equipment is available, listing shallow in the old row, or substituting herbicides for tillage operations.
- Eliminate unnecessary travel and engine idle time.
- Choose operations that have lower energy requirements.
- Load the engine as near to 75% of capacity as possible. For light loads, shift up and throttle back. Avoid overloading the engine and check the load

frequently. If the engine responds quickly and smoothly when the speed control is opened quickly, you still have some reserve power.

- Perform regular maintenance checks on all tractors and engines to increase power and improve fuel economy. Follow the recommendations in the operator's manual.

Irrigation

- Irrigate when the crop needs it.
- Use the most precise method of scheduling irrigations for your system. Tests show that many farmers over-irrigate, which wastes energy, fertilizer and water, increases costs and lowers net profits.
- Consider off-peak use of electricity for irrigation. Full capacity systems (900 gpm on 130 acres) on deep soils of medium to fine texture could be operated about one-half the time during July and August and still reach top yields. Off-peak use could result in considerable savings for your rural power supplier and eventually for you.
- Install (tailwater) reuse systems on all surface irrigation operations. A reuse pump saves money and energy because it only requires a 5 HP motor. In contrast, lifting water 100 feet plus the pressure in gated pipe requires a 40 HP electric motor.
- Consider installation of an automated surface irrigation system which permits more precise scheduling with less labor. The auto-surface system with reuse has an irrigation efficiency of 92 percent.
- With surface irrigation, use some method to slick the furrow before the first irrigation to shorten the time required to get the water down the furrow. Combine the slicking operation with the furrowing operation to save trips through the field.
- Irrigate every other furrow and irrigate the same furrow each time. This will save time in getting water through the field the first time and each succeeding time. Tests show yield results are as good with every other furrow irrigation as with irrigating every furrow.
- Operate your pumping plant efficiently. The average pumping plant operates at 80% of the Nebraska Performance Standard. Have your plant checked and adjusted or re-engineered to meet the Nebraska Standards.

Crop Storage and Drying

- Harvesting the crop as silage eliminates energy required for drying. Shelled corn, grain sorghum heads, ear corn, or whole plants can be ensiled. Harvest early, at 25-30% moisture, pack well and cover for good grain silage. Grain going into bunkers should be coarsely ground.
- Preserve grain with organic acid for livestock feed. Acids must be applied by weight uniformly and thoroughly. Acids are corrosive to galvanized steel. At present their costs are higher than drying costs. Large piles of acid treated corn need aeration to prevent spoilage.
- Use natural air drying for grain below 24% moisture. The layer-in-bin method does not require heat, but it does require more handling and management.
- Partial drying with heat to 21% moisture will save LP gas. Drying is finished with natural air.
- The dryeration process is a variation of partial drying where the grain is dumped from a batch or continuous flow dryer while hot and transferred to a cooling bin. After being cooled, the drying is completed with natural air.
- Consider a supplemental electric heater for drying grain with 24% moisture or below. Proper air flow must be maintained.

More Information

Contact your local County Extension Agent. The County Extension Office can supply you with more information about opportunities for saving energy. The Extension Office also has publications on related topics that could help you reduce your cost of operation and save energy around home as well as on the farm or ranch. Publications available include:

- Energy Uses In Nebraska Agriculture - CC 255
- Keeping Livestock Buildings Warm - EC 70-791
- Energy Conservation in the Home
  - There Is an Energy Crisis - EC 73-2025
  - Kitchen - EC 73-2026
  - Inside the House - EC 73-2027
  - Building and Remodeling - EC 73-2028
  - Cooling - EC 73-2029
  - Heating - EC 73-2030
  - Outside the House - EC 73-2031
- Machine Operations
  - Nebraska Till-Plant System - EC 61-714
  - Nebraska Tractor Test Data
- Irrigation
  - Fertilizing Through Center Pivots - G 73-20
  - Top Yields With Least Water - G 73-58
  - Efficient Irrigation - EC 58-704
  - It Pays to Test Your Irrigation Pumping Plant - EC 60-713
  - Scheduling Irrigations by Electrical Resistance Blocks - EC 71-752
  - Furrow Irrigation of Nebraska Soils - EC 71-771
  - Your Pumping Plant May be Using Too Much Fuel - EC 68-775
  - Management and Re-Use of Irrigation Runoff Water - EC 69-777
- Grain Storage and Drying
  - Grain Drying With Less Energy - G 73-51
  - Organic Acid Preservation For Grain - G 73-52
  - How to Sell Wet Grain - G 74-76
  - Guide for Batch-Drying in a Bin - CC 196