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Energy Efficiency and Conservation in Agriculture

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INTRODUCTION

India is currently following a development path which aims to remove income and energy poverty of millions of households. As a result, energy requirements of the country are expected to rise. While India's energy intensity is on a decline due to structural changes in the economy and improvement in energy efficiency, overall energy requirements would grow due to growth in economic activity. Energy efficiency and conservation are integral to sustainable agriculture. Efficiency means increasing the work or yield per unit of energy; conservation means reducing total energy usage fuel and electricity use on farms is just as important to sustainability and energy savings, as use of soil and water. Energy efficiency is an integral part of sustainable agriculture. While U.S. farms have almost doubled their average energy efficiency over the past 25 years, most farms still have good opportunities to save energy and money.

When the terms "conservation" and "efficiency" are distinguished from each other, "conservation" generally means reducing total energy usage (for example, using fewer gallons of fuel), while "efficiency" means increasing the work or yield per unit of energy (for example, getting more miles per gallon). Some farms and ranches are able to capture substantial energy savings by maintaining equipment better, improving building efficiency, and/or installing new high-efficiency motors or lighting.

In many cases, the energy needed to heat water or refrigerate agricultural products can also be reduced through conservation and application of more efficient technologies.

Agricultural producers can reduce the energy required to heat and cool their homes and farm buildings by sealing the exterior to reduce air infiltration and increasing the insulation properties of all exterior walls, windows, and doors.

Greenhouse operations

Greenhouse operations can reduce heating costs by implementing conservation measures or make better use of alternative fuels such as waste vegetable oil, shelled corn, or wood to reduce or eliminate the consumption of fossil fuels

Livestock operations

Livestock operations can be designed to limit the energy they need to house and raise animals. Efficient use of tractors and field equipment can optimize the use of fuel and reduce the number of operating hours.

Irrigation efficiency can be improved through equipment changes, pump and motor maintenance, or better management that closely monitors crop irrigation needs.

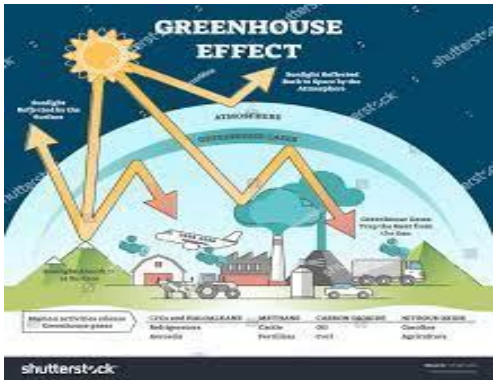
Grain-producing farms can reduce energy consumption and lower their costs by improving their grain drying system. Other farming practices such as grazing livestock, cycling nutrients through manure and cover crops, and rotating crops to control pests can also reduce energy use.

A significant portion of the energy costs of agriculture comes from sources such as fertilizers, pesticides, and other inputs that require significant energy to produce and apply. (The term "indirect energy use" is generally used when energy is consumed off the farm, as in the manufacturing of fertilizer.) Making efficient use of nutrients on the farm, especially nitrogen fertilizer, is an effective way to reduce agricultural energy. Nutrient management plans, soil testing, banding fertilizers and pesticides, and precision agriculture similarly help reduce energy use.

Greenhouses

Greenhouses do their job most successfully using designs and siting for energy efficiency and maximum light transmission. Greenhouses must optimize crop growth and energy use by allowing sunlight in during the day, retaining as much heat as possible during cold weather, and providing sufficient ventilation to avoid excessive interior temperature and humidity.

Where possible, greenhouse construction materials with the highest insulation values should be used. Proper glazing material decreases energy loss while still allowing the natural spectrum of light inside to facilitate the healthy growth of the plants within. When heating greenhouses, some fuels have a higher heat value than others and some heating units have a greater efficiency.



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