



**12. Coupling Field Demonstrations and Simulation Model to Increase Energy and Crop Water Use Efficiency for Corn Production**

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Energy costs coupled with limitations in water availability are threatening the sustainability of irrigation in the state. Energy cost for irrigation rose almost 100% for typical Nebraska irrigators from the spring of 2003 to the summer of 2006 and predictions are that it will rise at least another third in 2007. The rising cost of fuel and the limited availability of water supply make producing maximum crop yield with minimal input imperative.

Nebraska growers need scientifically-based and practical management strategies that can aid them in their decision making process to enhance crop water use efficiency and reduce energy use to achieve maximum profitability. Growers are looking for answers on how to make a maximum use of limited irrigation water and how to manage irrigation water to reduce pumping cost.

Crop simulation models with the capability of “real-time” assessment of crop and soil water status and yield prediction based on historical climate data represent a powerful new tool to help improve irrigation decisions and increase water-use efficiency – especially for situations where the amount of available water supply is less than the full requirement for maximum crop yield. Our proposal will validate and demonstrate a decision-support tool for real-time irrigation scheduling when irrigation water supply is limited in a series of on-farm demonstrations over a three-year period, and release the new tool as a software program for use by crop producers, crop consultants, and industry professionals. This tool will be used to assess energy requirement for different irrigation regimes to aid growers, state and federal agencies to make better-informed management decisions.