



## ECONOMICS AND ENERGY EFFICIENCY OF ALTERNATIVE INPUT AND CROP DIVERSITY STRATEGIES

*Introductory Research Report W2008-50*

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### BACKGROUND

Declining commodity prices coupled with rapidly rising input costs are causing many producers in western Canada to question the merits of conventional high-input agricultural production systems. In response, producers have become increasingly interested in extending and diversifying their cropping systems and in adopting low-input and organic management practices. However, diverse and low input systems will only be successful if they can compete economically with the traditional production system.

Conventional agriculture relies on synthetic inputs like fertilizers and pesticides, while organic systems have been criticized as being more dependent on mechanical tillage. Researchers are interested in determining whether organic management practices are more efficient in their net use of energy considering both inputs (off farm inputs and fuel) and outputs (energy from crops).

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### OBJECTIVES

The research objectives are to assess nine cropping systems with differing levels of input usage and cropping diversity to compare:

- a) Production costs, economic returns, and riskiness; and
- b) Non-renewable energy inputs, energy output, and energy use efficiency.

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### RESEARCH APPROACH

These analyses draw on data from the first 12 years of the Alternative Cropping Study being conducted in the Dark Brown soil zone at the Agriculture and Agri-Food Canada, Scott Research Farm. This is a long term rotational trial

that was begun in 1995 and continues today. There are nine different treatments which are combinations of the two following factors:

Three levels of input usage:

- Recommended rates of inputs as required
- Reduced use of pesticides, fertilizers and fuel
- Organic management with non-chemical pest control, legume green manure, and later seeding dates

Three levels of cropping diversity:

- Low crop diversity
- Diversified using annual grains
- Diversified using annual grains and perennial forages

Although an analysis of the economics and energy balance of these cropping systems has been completed recently (2006), there have been significant changes in both energy costs and commodity prices. This study will assess the completed second phase of the rotation at Scott, with updated costs for inputs and grain prices.

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