AGGP-Agroforestry

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MODELLING ECONOMICS OF FIELD SHELTERBELTS ON A SASKATCHEWAN LIVESTOCK FARM

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INTRODUCTION

On a livestock farm, shelterbelts may affect economics of the farm in two ways: One, it may affect the performance of the animals (beef cattle) directly through protection from extreme weather; and Two, through improvement in the production of crops (feed grains) and forages. Further external influences, such as carbon sequestration, may also affect the society at large. All these lead to economic desirability of shelterbelts on a livestock farm from a producer's (private) as well as societal accounting stances.

OBJECTIVES OF THE STUDY AND BRIEF METHODOLOGY

Main research question that is posed is whether shelterbelts are in the best interests of a livestock producer as well as the society if a longer term perspective is taken. The objective of this research was to estimate longer term profitability on a livestock farm in a typical Saskatchewan setting. Three soil zones (Brown, dark Brown and Black) were selected for this analysis to test if location of the farm is a factor in determining the economics of maintaining vs. removal of the shelterbelts.

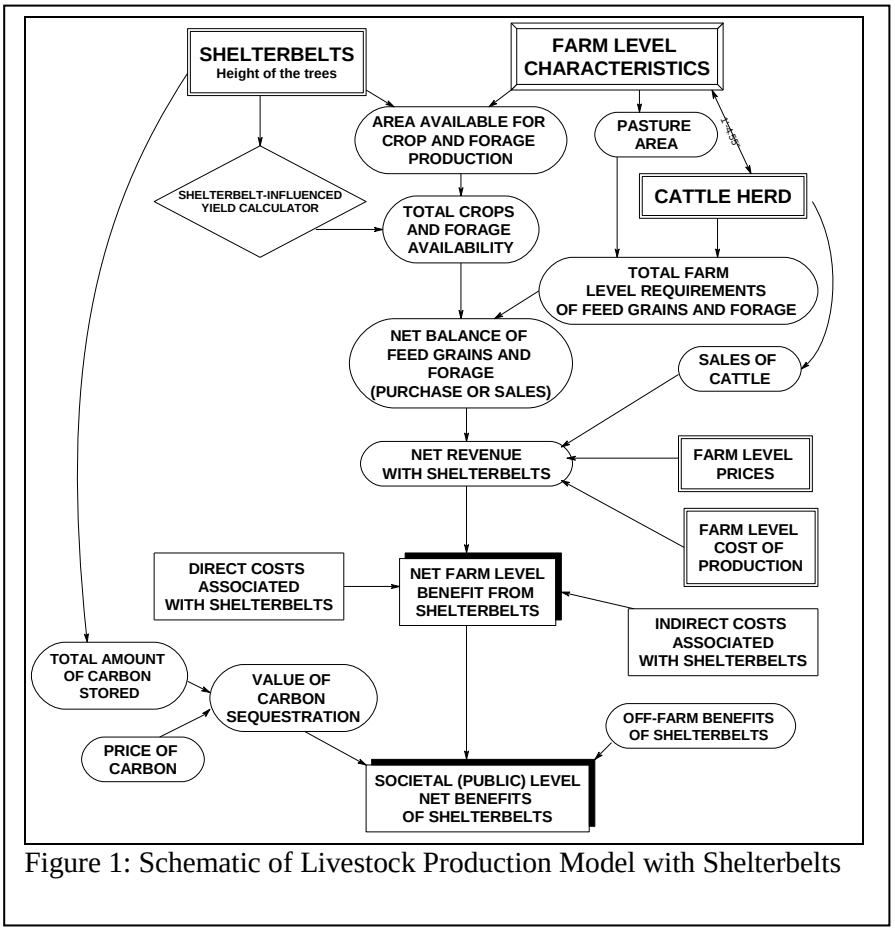

Figure 1: Schematic of Livestock Production Model with Shelterbelts

The study farm had 1699 acres (688 ha) of land along with 354 cow-calf pairs. Typical land use on this farm included area for feed grains (Barley), tame pasture and native pasture.

Livestock were raised using farm grown feeds and forages. If there was a shortage of such inputs, they were procured from the market at market prices. If there was surplus, these products were sold at the current market prices. Cost of production data were obtained from secondary source (Saskatchewan government websites), whereas the crop yields were estimated using yields curves provided by Agriculture and Agri-Food Canada.

Model is Excel based. It simulated the economic performance of the farm over a 50-year horizon. This provides a long-term perspective on the economics of shelterbelts. To make a comparison of various options, the annual net benefits were converted into present value using a discount rate of 5%.

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STRUCTURE OF THE MODEL

The model consists of several Worksheets, each linking with each other. The farm was located in each of the three soil zones of Saskatchewan: Brown, Dark Brown, and Black soil zone, and separate analysis was undertaken for each farm. It used the following as factors affecting profitability: discount rate, price of inputs and outputs, carbon sequestration rates, price of carbon.

RESULTS OF THE STUDY

The results of the model suggest that:

- Maintaining field shelterbelts in the economic interest of the producer in Saskatchewan in all soil zones.
- The highest benefit is received in the black soil zone of $49.5 thousand or $990 per annum (equivalent to $2.80 per cow-calf pair per annum). However, net returns in other two soil zones were fairly close to these value (Table 1).
- Increase in the net revenue is created by larger availability of feed grains and forages, as well improved pasture productivity. These reduces cost of production and increase net benefit to the producer.
- Although livestock performance on this farm could also be affected, poor data did not permit estimation of these benefits.
- These benefits to society increase even more due to accumulated carbon in the trees.

Table 1: Total Net Present Value of Benefits to a Livestock Producer over a 50-year period

Scenario	Gain or loss in $1000
Brown Soil Zone	
No shelterbelts	-$113.3
With shelterbelts	-$159.9
Net Benefit	$46.6
Dark Brown Soil Zone	
No shelterbelts	-$87.6
With shelterbelts	-$136.8
Net Benefit	$49.2
Black Soil Zone	
No shelterbelts	-$75.3
With shelterbelts	-$124.8
Net Benefit	$49.5

FURTHER READING

AGGP Fact Sheet(s): **SASK-22** through **SASK-24**

CONTACT FOR MORE INFORMATION

For further information contact Professor Ken van Rees at the www.saskagroforestry.ca

ACKNOWLEDGEMENTS & COPYRIGHT

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