



AGGP-Agroforestry

AN ECONOMIC EVALUATION OF FIELD SHELTERBELT IN SASKATCHEWAN

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Field shelterbelts are one kind of agroforestry system where trees and shrubs are planted on filed of crops in a linear arrangement. They have been a common feature of agricultural landscapes in Saskatchewan since the 1930s and mainly used for protecting crops from wind and soil erosion. However, recently a trend of increasing field shelterbelt removal has been observed. The existing literature indicates that producer's decisions to remove field shelterbelts are often based on immediate economic gain. However, there is a lack of research on the long term economic impact on producers from maintaining field shelterbelts. Location of the farm may also affect shelterbelt economics, which also is not well understood. Therefore, this research aims to evaluate economic desirability of field shelterbelts from producer's perspective in three primary agricultural soil zones of Saskatchewan – Black soil zone, Dark Brown soil zone and Brown soil zone.

OBJECTIVES OF THE STUDY AND BRIEF METHODOLOGY

- The objective of the research is to evaluate net private benefits (costs) of maintaining field shelterbelts in the three soil zones in Saskatchewan.
- A study farm representing the typical farm of each soil zone was synthesized. The average farm size and major crop production activities were calculated based on Statistics Canada (2016) data. Simulations were carried out over a 60-year period.
- This study considered three different scenarios:
 - (i) Base Scenario: Farm has no field shelterbelts.
 - (ii) Scenario One: Farm has established and maintained field shelterbelts consisting of the shrub caragana.
 - (iii) Scenario Two: Producer decides to remove 40-year-old shelterbelt and engages in crop production activities for the remaining period.
- As costs and revenues of each scenarios are generated at different time period, the net benefit of field shelterbelt was converted into present value using a discount rate of 8.86%



RESULTS OF THE STUDY

- Among the three soil zones, shelterbelts provided a positive return to producers only in the Dark Brown soil zone of Saskatchewan (From table 1 and 2). However, in terms of per ha and per year basis, the changes in producers' net present value (benefits) brought about by shelterbelts in all three soil zones were found to be almost negligible.





- The net benefit of maintaining shelterbelts in the Black and Dark brown soil zone are negative. Where the net loss is larger in Black soil zone due to annual crops having lower yields under the protection of shelterbelts. Low crop yield response to shelterbelts in this soil zone might be one of the main reasons for the negative NPV value.
- Cost of shelterbelt establishment was the major expenditure in establishing the shelterbelts. Cost of purchased seedling contributed 97% to the total. As sensitivity analysis of this study showed that 10% decrease in shelterbelt cost can increase per ha net return by 5.56% in dark brown soil zone.
- Government cost sharing program may help the producers in all soil zones, but may be even more effective in Brown and Black soil zones. In these soil zones, shelterbelts were estimated produce a negative net benefit to producers.

Scenarios	Black Soil Zone		Brown Soil Zone		Dark Brown Soil Zone	
	Farm area (ha)	NPV \$/year	Farm area (ha)	NPV \$/year	Farm area (ha)	NPV \$/year
1.NoField Shelterbelts	384	\$12,248	462	\$14,692	515	\$16,114
2.Field Shelterbelts Establishment	384	\$11,848	462	\$14,614	515	\$16,206
3.Field Shelterbelts Removal	384	\$11,641	462	\$14,338	515	\$15,875

Scenarios	Black Soil Zone		Brown Soil Zone		Dark Brown Soil Zone	
	NPV \$/year	(\$/ ha) per year	NPV \$/year	(\$/ ha) per year	NPV \$/year	(\$/ ha) per year
1.Field Shelterbelts Establishment	(\$400.00)	(\$1.00)	(\$79.00)	(\$0.17)	\$92.00	\$0.18
2.Field Shelterbelts Removal	(\$607.00)	(\$2.00)	(\$354.00)	(\$0.77)	(\$239.00)	(\$0.46)

FURTHER READING

CONTACT FOR MORE INFORMATION: SASKAGROFORESTRY.ca/

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