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## Windbreaks An Old System with a New Look

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## An Old System with a New Look

As early as the 18th century, field windbreaks were used to provide protection for marginal lands. During the 1930's, hundreds of miles of wide multiple-row windbreaks were established throughout the Great Plains. Today, many of these windbreaks are over-mature and in need of renovation or they have been removed. Yet, the need for wind protection today is every bit as great as it was 50 years ago.

To accommodate modern farming methods and equipment, narrow, 1 and 2 row windbreaks have been designed. These windbreaks, when properly located, are capable of providing complete protection of a field while utilizing as little as 5.5% of the land area (Figure 1).

```
*****  
Total acres: 160  
*****  
Tree acres: 8.7 (5.41%)  
*****  
Tillable acres: 151.3  
*****  
Spacing: 16.8H (420 ft)  
*****  
Effective windbreak ht:  
    25 ft after 20 yrs  
*****  
Single row windbreaks  
*****  
Row width: 20 ft
```

Figure 1. Single row windbreak system designed to provide complete protection for a 160 A field after 20 years.

Research on the effects of windbreaks on crop production has been conducted at the Agricultural Research and Development Center near Mead, Nebraska. These studies have indicated an average increase in wheat yields of 15% and in soybean yields of 25%. A recent review of windbreak influences around the world indicated a positive crop response for a number of crops under numerous climatic conditions (Table 1). The question remains, however, ARE WINDBREAKS A SOUND ECONOMIC INVESTMENT? Can the benefits, increased crop yields and decreased wind erosion, compensate for the land dedicated to the windbreak?

<u>Crop</u>	<u>Field/Years</u>	<u>% Increase</u>
Spring Wheat	190	8
Winter Wheat	131	23
Barley	30	25
Oats	48	6
Corn	209	12
Soybeans	17	13

By the use of a capital budgeting approach we determined the additional net cost and revenue generated by a windbreak investment over the windbreak's effective life. More specifically, we used the net present value (NPV) of income method where by the value of the investment at some time in the future is expressed in today's dollars. Figure 2 presents the net present value after 50 years of the windbreak investment illustrated in Figure 1. A crop rotation of soybeans, wheat, corn, corn with a range of average yield increases was assumed in the analysis.

From the data it is apparent that yield increases of as little as 5-7% result in positive net present values and indicate that the windbreak investments are economical. Given the assumptions of profit-maximization, and complete certainty, one should accept those investment alternatives where net present values are positive, and reject those where net present values are negative.

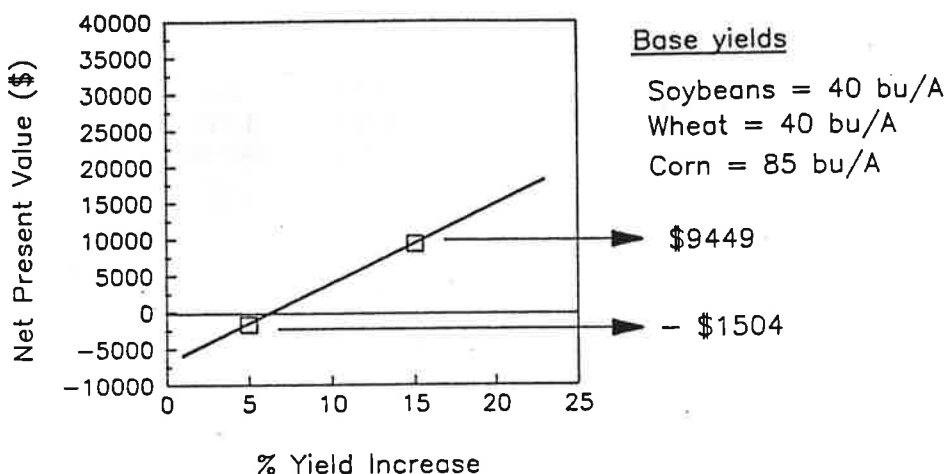


Figure 2. Net present value after 50 years of a soybean, wheat, corn, corn rotation over a range of average yield increases resulting from the protection of the windbreak described in Fig.1.

### Wind Erosion Benefits

In addition to the benefits received from increased yields, the value of wind erosion control must be added to the economic analysis. The net present value of lost production per year due to soil erosion is illustrated in Figure 3. Total economic losses over the 50 year rotation can add as much as \$2500 to the net present value of the windbreak investment with as little as a 0.1% loss in production. As erosion losses increase, the net present value of the windbreak system increases. Furthermore, windbreaks are a recognized practice in CRP and will be considered as conservation compliance begins to influence eligibility for programs.

### Other Benefits

Other benefits also flow from the inclusion of windbreaks and other tree plantings on the farm: 1) Energy conservation at the farmstead; 2) Snow control; 3) Livestock protection; 4) Wildlife habitat; and 5) Aesthetics. The value of some of these benefits in dollars is much harder to assess and perhaps is best left to the individual.

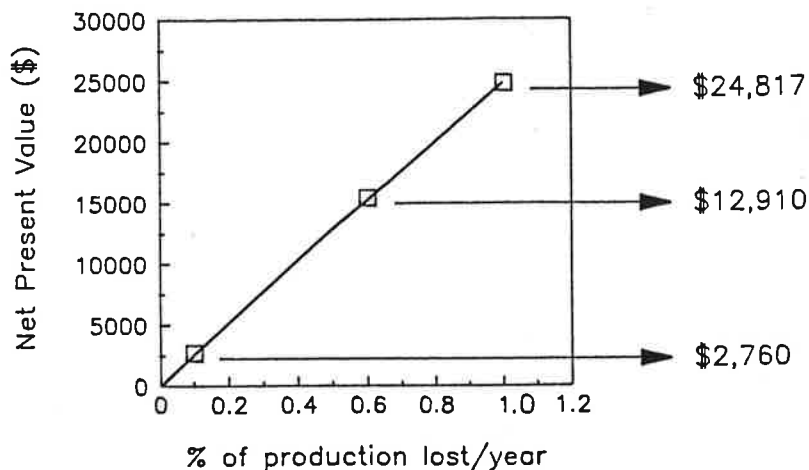


Figure 3. Net present value of the production lost to wind erosion over a 50 year period.