

Economic Analysis of Alfalfa Harvest Management Decisions

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This presentation provides an economic framework for analyzing operation management of alfalfa harvests to provide decision support. This framework is used in AlfAdvisor, a webbased decision support software for helping farmers analyze alfalfa harvest decisions. AlfAdvisor is a website that allows farmers to determine the best day to harvest their alfalfa stand and provides an estimate for each day of the breakeven cost of tedding the hay after cutting. AlfAdvisor is being trialed for use in New York and Wisconsin.

Substantial losses in forage quality after cutting can be caused by rainfall, prolonged drying, and mechanical damage. Therefore, planning the timing of the cutting to minimize the expected losses and avoid bolting is a complex and multifaceted decision. Relying on lab analysis is slow and costly, and traditional anecdotal approaches for determining when to cut often leave out important information. By combining available information into an accessible web application, AlfAdvisor will help farmers reduce yield and quality losses.

The AlfAdvisor application uses real-time satellite imagery of the field in a machine learning model to estimate the yield and nutritional value of the alfalfa stand over a seven-day horizon. This provides estimates of the value of the stand for each day as feed for dairy cows or for market sale. An hourly, 10-day weather forecast for the field location is used to estimate drying rates for cut hay using a standard drying rate model (Rotz and Chen 1985). This information provides a drying window based on the expected moisture at cutting and the target moisture.

Utilizing operations such as tedding and crimping can help speed the drying process, but they have their own potential for yield and quality losses from leaf shatter and often require additional passes over the field. When large rain events are coming, these operations can be worth it, but avoiding these operations when they are not needed can save the farmer time and money. The AlfAdvisor application provides the farmer with a breakeven value for tedding based on expected losses from mechanical damage, the expected drying window, and forecasted rain events. This helps the farmer determine if the additional passes for tedding and raking are worth the fuel and labor costs.

This presentation will present the AlfAdvisor application and the calculations used for the economic analysis to help farmers utilize the available information when making their alfalfa harvest decisions.