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Do high N prices justify feeding soybean hulls?

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According to the

United States Department of Agriculture (USDA), the price of nitrogen (N) fertilizer increased more than 120 percent between 2000

and 2007. More alarming are the unexpected periods when the price of N spikes well above the trend price. For instance, between 1972 and 1974, the price of N increased by more than 150 percent. A similar price spike occurred between 2006 and 2008. Interestingly, these price spikes typically last for about two years and then revert back to trend levels. The USDA also reports that farmers respond to N price spikes by reducing the quantity of fertilizer they purchase and apply to their crops and pastures. This often leads to reductions in yields and grazing duration, even during periods of favorable growing conditions.

To address this issue, data from a scientific grazing study conducted at the Noble Foundation on wheat forage was used to determine how stocker cattle are expected to perform economically when they have access to soybean hulls as both a feed supplement and as a potential substitute for N fertilizer. Four different grazing treatments were evalu-

ated in the study, including a conventional farmer practice of applying 150 pounds per acre of N (N150); an application of only 50 pounds per acre of N (N50); a system that applies 50 pounds per acre of N and provides stocker cattle access to soybean hulls at a rate of 0.75 percent of their body weight per day (N50/SBH); and a system that applies 150 pounds per acre of N and access to soybean hull pellets at a rate 0.75 percent of cattle body weight per day (N150/SBH).

Estimates for gross revenue for each system were calculated assuming

that farmers would receive a value of gain for all cattle for all systems equal to \$1 per pound. Estimates of net return were calculated for a number of N and soybean hull market price scenarios, ranging from favorable to unfavorable. The current market prices for south-central Oklahoma are 70 cents per pound of N and 13 cents per pound of soybean hulls.

Animal performance measures and economic results are reported in Table 1. Notice that for the current local market price scenario (SC5), the results indicate that producers would

Table 1. Measures of Animal Performance and Expected Value for Revenue, Cost and Net Return by Grazing System

Animal/Economic Measure:	Fertilizer/Feed Grazing System			
	N150 ¹	N50 ²	N50/SBH ³	N150/SBH ⁴
Average daily gain (lb/d/hd)	2.43	2.20	2.53	2.48
Grazing days	302	268	296	338
Total gain (lbs/acre)	736	591	749	842
Revenue (\$/acre)	736	591	749	842
Total cost: Pn = \$0.70/lb and Psbh = \$0.10/lb (\$/acre)	257	173	328	431
NR SC1: Pn = \$ 0.50/lb and Psbh = \$0.05/lb (\$/acre)	511	428	504	524
NR SC2: Pn = \$ 0.50/lb and Psbh = \$0.13/lb (\$/acre)	511	428	388	393
NR SC3: Pn = \$ 0.50/lb and Psbh = \$0.15/lb (\$/acre)	511	428	359	360
NR SC4: Pn = \$ 0.70/lb and Psbh = \$0.05/lb (\$/acre)	479	417	494	493
NR SC5: Pn = \$ 0.70/lb and Psbh = \$0.13/lb (\$/acre)	479	417	378	362
NR SC6: Pn = \$ 0.70/lb and Psbh = \$0.15/lb (\$/acre)	479	417	349	329
NR SC7: Pn = \$ 1.00/lb and Psbh = \$0.05/lb (\$/acre)	432	402	478	446
NR SC8: Pn = \$ 1.00/lb and Psbh = \$0.13/lb (\$/acre)	432	402	362	315
NR SC9: Pn = \$ 1.00/lb and Psbh = \$0.15/lb (\$/acre)	432	402	333	282

¹Conventional farmer practice when N prices are at trend.

²Farmer practice when N prices spike above trend.

³Farmer practice when N prices spike above trend plus soybean hull pellets.

⁴Conventional farmer practice when N prices are at trend plus soybean hull pellets.

NR - Net return

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earn the greatest net return by applying 150 pounds of N per acre, which is what the typical conventional practice is for the Southern Great Plains region. In cases where the market price of N and soybean hulls is most attractive (SC1), producers would earn the greatest net return by applying 150 pounds of N and providing soybean hulls to their stocker cattle. For a market scenario that represents a

nitrogen price spike above the current trend price, the most economical system depends greatly on the price of soybean hulls. In a case where soybean hulls can be purchased for \$100 per ton or less, the best system is to apply only 50 pounds of N and supply soybean hull pellets. Conversely, in situations where soybean hulls are priced at \$260 per ton or greater, the best system would be to apply the

conventional rate of 150 pounds of N per acre.

Additional years of animal performance data are required to have more certainty regarding the economic results. However, preliminary results suggest that a producer would only benefit from substituting soybean hulls for N fertilizer during N price spike periods when they are at a price of \$100 per ton (5 cents per pound). ■