An Estimation of the Demand for Dried Distiller Grains by the Cattle Feeding Industry: A Combination of Survey Methods and Market Projections

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Abstract

Introduction

Ethanol production in the United States has seen a significant increase over the last ten years. Ethanol plants in the United States produced about 1.8 million gallons of ethanol in 2001, and by 2010 this amount had increased to 13.2 million gallons (RFA, 2012). This number is expected to continue to rise in order to meet fuel mandates in the Energy Independence and Security Act of 2007. As a result, grains such as corn that were once grown for the production of food and livestock are now being sought out for their potential as a fuel source.

Over the time period from 2001 to 2010 the amount of corn used to produce ethanol increased sharply up to about 4 billion bushels, and this number is expected to continue to increase in the future (USDA, 2011). Increased demand for corn from the energy sector has put upward pressure on corn prices which, while welcomed by growers, means higher production costs for producers of livestock. In response, livestock producers have sought out alternative feed sources, including ethanol byproducts, commonly referred to as distiller's grains (DGs).[1]

Using ethanol byproducts as a feed source is not a new idea, and there is a wide range of literature that addresses the potential of DGs to replace corn in the livestock industry. The difficulty of transporting DGs hurts their ability to replace corn. Wet distiller's grains spoil quickly and must be used within a few days, which limits the range of producers with access to those who are close to ethanol plants. Distiller's dry grains are easier to transport, but the transportation costs are considerably higher than those of corn. The nutritional content of

[1] For convenience sake, all ethanol byproducts will be referred to as distiller's grains (DGs) in this paper, unless the reference is to a specific byproduct in which case wet distiller's grains will be referred to as WDGs and distiller's dry grains as DDGs.

distiller's grains is also an issue when considering DGs as an alternative to corn in livestock feed. There is currently some debate on the nutritional content of DGs and their effect on livestock quality.

Anderson, Anderson, and Sawyer (2008) study DG use in Nebraska and Texas feedlots and provides a comprehensive analysis of the issues involved with feeding distiller's grains to livestock, and gives special consideration to the issues of the price and profitability of DGs. The authors show that while DDGs have been less expensive relative to corn, the price of corn and DDGs have also become more closely correlated over time. They also note that the wholesale price of DDGs do not reflect the higher cost of transportation relative to corn; however, at the time this article was written most ethanol production was located in Midwestern states such as Nebraska. As ethanol plants open in Southern states, and as the infrastructure necessary to transport DDGs improves, transportation costs can be expected to go down.

In terms of profitability, the inclusion of DGs as a feed source can improve returns over variable costs at feedlots when compared to a corn based ration (Anderson, Anderson, & Sawyer, 2008). In the study, the highest returns come from a ration that contains 30% WDGs, but this result is specific to Nebraska feedlots. While the inclusion of WDGs in Texas feedlots did improve profitability, the effect was not as great due to differences in infrastructure and the distance that the WDGs have to travel. Distiller's dry grains were shown to only slightly improve profitability over corn based rations. The authors conclude that while DGs do provide the livestock industry a viable replacement for corn, the use of distiller's grains will not necessarily come cheap, and some areas of the country will have a competitive advantage in their use.

Aside from the price of distiller's grains to producers, the other primary consideration related to DG use is its nutritional content. The question of what the optimal amount of DGs to include in a feed ration has not been definitively answered in the literature, and the actual amount of DGs included in feed rations varies across nutritionists. In general the optimal inclusion for DDGs in feedlot rations has been found to be around 16% (Depenbusch, et. al, 2009), but that little difference was found in meat quality with inclusions up to 40% (Mateo, et. al, 2004; Clemens & Babcock, 2008; and Depenbusch, et. al, 2009). Studies that survey the actual practices of feedlots report that DDGs tend to make up about 11%-16% of rations, while WDGs make up about 16-26% of rations (Vasconcelos & Gaylean, 2007; Clemens & Babcock, 2008). The Clemen's and Babcock study reported that about 36% of feedlots surveyed used DGs, and that about 34% of those that did not were considering it.

The research also suggests that the amount of other nutrients included in feed rations may have to be adjusted when shifting from corn to DGs. DiCostanzo (2010) reports that the phosphorous and sulfur content of DGs can vary depending on the plant from which the grains come from. Clemens and Babcock (2008) note that the sulphur, phosphorus, and fat content of rations that include DGs may have to be managed differently than corn rations.

The implication of the above studies is that while distiller's grains have seen limited use as an alternative feed source for livestock producers there is potential for increased use in the future. As corn continues to be demanded by the fuel industry more producers may be willing to switch to using DGs despite lingering uncertainty over its nutritional value. This study surveys nutritionists responsible for cattle in the Midwest and Texas to estimate the current demand for distiller's grains and to understand how the demand for DGs might change in the near future.

Data & Methods

To understand how nutritionist view and use distiller's grains as a feed source, a survey was developed and distributed in partnership with the Texas Cattle Feeder's Association. The survey was sent to nutritionists that develop feed ration for cattle in Texas, Colorado, and the Midwestern states. Nutritionists were asked questions with regard to their current use of DGs, how their use might change depending on the price relative to cereal grains, and how their inclusion of other nutrients might change. Respondents were also questioned as to their location, the number of cattle for which they consult, and the proximity of their operation(s) to an ethanol plant. The survey itself can be viewed in Appendix A.

At the time, survey responses are still incoming. Presently, responses have come from nutritionists with operations in Texas, Nebraska, Colorado, and Kansas, and represent about 1.8 million head of cattle. Although the number of responses to date are too small to allow for any conclusions about future of DG use by the livestock industry, the preliminary results are reported below.

Preliminary Results

To date, all respondents are currently using DGs in their feed rations. The amount used by these nutritionist ranges from 20% to 50% on a dry matter basis which is higher than the optimal amount suggested by the literature. The low end of the range is well within the acceptable range that is cited in the research. The high end of the range is pushing the maximum amount suggested. The maximum amount of DGs these respondents consider technically feasible in a ration ranges from 50% to 80%, which is higher than is suggested in the literature.

Responses pertaining to DG use relative to price indicate that the relative price of DGs to cereal grains will determine how DGs are utilized as a feed source. When the price of DGs is equal to that of cereal grains, respondents were willing to include DGs at levels between zero and fifteen percent. When the price of DGs is half that of cereal grains the level of DG inclusion by respondents increased to between fifty and seventy percent. This is an important result, considering the current price of DGs relative to corn.

Figure one shows the prices of corn, DDGs, and corn gluten feed (a WDG) over the years 2001 to 2010. In the past, the price of DDGs has been low relative to corn, but recently the price of DDGs has risen to levels comparable to those of corn. Considering to higher transportation costs related to DDGs cited by Anderson, Anderson, and Sawyer (2008), the demand for DDGs as a substitute for corn may decrease in the future. When considering WDGs, the price of corn gluten feed is less than that of both corn and DDGs, but the issue of transportation limits it use as a feed. Only those operations close to an ethanol plant could take advantage of the lower price of WDGs, limiting its use as a feed source; however, considering that current respondents put place their operations between ten and one hundred miles of an ethanol plant, so this may not be an issue.

Discussion and Conclusion

Although not enough responses have been received at this time to make any definitive conclusions about the future demand for DGs in the United States, some preliminary remarks can be made. First, the current inclusion of DGs in feed rations may be higher than suggested by past research. This may mean that nutritionists are changing their perceptions of the nutritional value of DGs, or that economic factors have forced a shift to higher DG inclusion. Second, the

relative price of DGs appears to be a factor when nutritionists formulate feed rations. If this is the case, then the transportation costs related to DG use could be an important factor for the demand for DGs in the future. As more responses are received the accuracy of these conclusions can be verified and the demand for DGs heading into the future better understood.

References

Anderson, D., J.D. Anderson, and J. Sawyer. 2008. "Impact of the Ethanol Boom on Livestock and Dairy Industries: What Are They Going to Eat?" *Journal of Agricultural and Applied Economics* 40: 573-79.

Clemens R., and B.A. Babcock. 2008. "Steady Supplies or Stockpiles? Demand for Corn-Based Distillers Grains by the U.S. Beef Industry." MATRIC Briefing Paper 08-MBP 14. Retrieved on August 1, 2011 from http://ageconsearch.umn.edu/bitstream/6051/2/bp080014.pdf

Depenbusch, B.E., C.M. Coleman, J.J. Higgins, and J.S. Drouillard. 2009. "Effects of Increasing Levels of Dried Corn Distillers Grains with Solubles on Growth Performance, Carcass Characteristics, and Meat Quality of Yearling Heifers." *Journal of Animal Science* 87:2653-2663.

DiCostanzo, A. 2010. "Feeding Distillers Grain to Beef Cattle." University of Minnesota Extension. Retreived on August 1, 2011 from http://www.extension.umn.edu/beef/components/releases/02-28-05-DiCostanzo.htm

Mateo, K.S., K.E. Tjardes, C.L. Wright, T.J. Koger, and B.D. Rops. 2004. "Evaluation of Feeding Varying Levels of Wet Distillers Grain with Solubles as Compared to Dry Distillers Grain with Solubles to Finishing Steers." South Dakota State University. Retrieved on August 1, 2011 from http://sdstate.edu/ars/species/beef/beef-reports/upload/BEEF_2004-03_Mateo.pdf

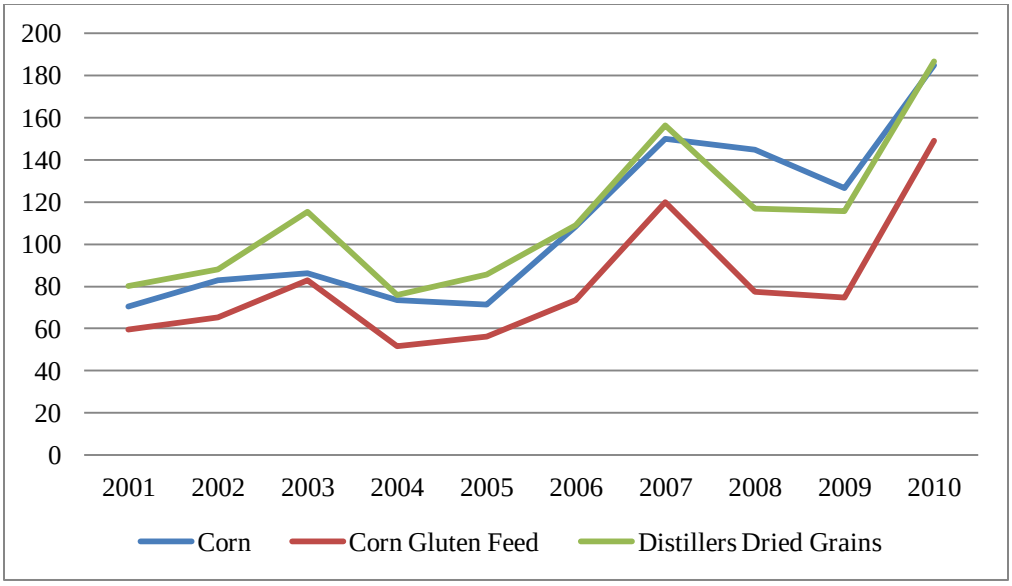
Renewable Fuels Association (RFA). 2012. "Industry Resources: Co-Products." Retrieved January 16, 2012 from http://www.ethanolrfa.org/pages/industry-resources-coproducts.

U.S. Department of Agriculture, Economic Research Service. 2012. *Feed Grain Database: Custom Queries.* http://www.ers.usda.gov/data/feedgrains/CustomQuery/Default.aspx#ResultsPanel. Accessed June 16, 2012.

United States Department of Agriculture (USDA), National Agricultural Statistics (NASS). 2000-2011. "QuickStats." Retrieved on September 10, 2011 from http://www.nass.usda.gov/.

Vasconcelos, J.T. and M.L. Galyean. (2007). "Nutritional recommendations of feedlot consulting nutritionists: The 2007 Texas Tech University survey." *Journal of Animal Science*. Retrieved on August 25, 2011 from http://jas.fass.org/content/early/2007/06/25/jas.2007-0261.citation.

Figure 1. Prices of corn, DDGs, and corn gluten feed, 2001-2010.



Source: ERS, 2012

Appendix A. Copy of Survey Sent to Nutritionists

This is a survey by the Department of Agriculture and Applied Economics at Texas Tech University regarding the use of distiller's grains (DGs) in feed rations used by the cattle industry. The results of the survey will be used to determine how the demand for DGs by the cattle industry might look in the future. Please answer the following questions about your practices to the best of your ability. If you have any questions please contact Andrew Wright at andrew.p.wright@ttu.edu or Darren Hudson at darren.hudson@ttu.edu.

The first four questions are about the use of DGs in a feed ration. Please answer the questions based on your current practices.

1) Do you currently use DGs in your feed rations?

Yes No

If yes, please indicate the percentage of DGs in your dry matter formulation.

0-10%	**50-60%**
10-20%	**60-70%**
20-30%	**70-80%**
30-40%	**80-90%**
40-50%	**90-100%**

2) What is the highest percentage of DGs in a ration that you consider to be technically feasible?

_____%

3) Do you or would you use a starch to supplement the use of DGs in a feed ration?

Yes No

If yes, relative to a cereal grain based ration, for each level of DDG inclusion listed below please indicate in percentage terms the amount of starch you would include.

Level of DGs in ration	**Level of starch supplement in ration**	
10%	_____	**%**
20%	_____	**%**
30%	_____	**%**
40%	_____	**%**
50%	_____	**%**

4) Relative to a cereal grain based ration, how would the amount of macro and micro nutrients in a ration change with the inclusion of DGs?

Macro Nutrients			**Micro Nutrients**		
Increase	**Decrease**	**No Change**	**Increase**	**Decrease**	**No Change**

The next question is meant to gauge how a change in the DG or cereal grain price would affect the use of DGs.

5) If the relative price of DGs to cereal grains were to change, how would your inclusion of DGs change? For this question the DG price is given as a percentage of the cereal grain price. For each relative price, please indicate the maximum amount of DGs you would be willing to include in a ration.

Relative price of DGs to cereal grains	**Maximum level of DG inclusion**	
100%	_____	**%**
90%	_____	**%**
80%	_____	**%**
70%	_____	**%**
60%	_____	**%**

50% _____ **%**

The last three questions are for information purposes.

6) In order to estimate how many cattle would be affected by changes in distiller's grain usage, please estimate how many head of cattle for which you consult annually.

_____

7) In which states do you consult?

_____

8) On average, how close is your operation(s) to an ethanol producing plant?

Less than 10 miles	**Between 10 & 50 miles**	**Between 50 & 100 miles**	**More than 100 miles**