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Cattle CODE: Coproduct Optimizer Decision Evaluator

Abstract
Expansion of the corn-based ethanol industry in recent years has resulted in a growing supply of coproduct feeds. These coproducts result in significant improvements in cattle performance and are often priced lower than corn on a dry matter basis. Along with these benefits to feeding ethanol coproduct feeds, cattle feeders must also account for additional transportation costs to originate the coproducts and for added expenses to handle, mix, and deliver the feed ration within the feedlot. An economic budget model, called Cattle CODE, was created to help feeders, nutritionists, and Extension educators evaluate these nonlinear effects across unique feeding situations.

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Introduction

Rapid expansion in ethanol production has occurred in recent years throughout the Corn Belt, particularly Nebraska and Iowa. Corn-based ethanol production not only results in the production of ethanol fuel and carbon dioxide, but also a high-protein, high-energy livestock feed product. With further expansion of the ethanol industry projected through 2015, supply of these feed coproducts (e.g., wet and dry distillers grains plus solubes, wet and dry gluten feed, etc.) will increase, while corn available for livestock feed decreases.

Therefore, livestock producers must identify economically efficient ways to substitute ethanol coproducts for corn in their rations.

Feedlot cattle can utilize large amounts of these coproducts. Research has demonstrated that average daily gain and feed conversion improve when cattle are feed ethanol coproducts (Erickson, Bremer, Klopfenstein, Stalker, & Rasby, 2007). Additionally, coproducts are typically priced at a discount to corn price (on a dry matter basis) despite their high protein and energy content. Dietary inclusion levels of coproducts vary due to a number of factors, but typically are restricted to less than 50% of a traditional feedlot ration (dry matter basis). One important factor that limits use, despite better performance and cheaper price, is the high cost associated with transporting these coproducts with high moisture contents (some exceeding 70% moisture) from the ethanol plant to the feedlot.

Cattle feeders must evaluate the tradeoffs between projected improvements in cattle performance and additional transportation and handling costs associated with feeding coproducts with varying prices. An economic budget model, called Cattle CODE (Coproduct Optimizer Decision Evaluator), was developed to estimate the marginal changes in profits associated with a change in any parameter that affects coproduct feeding costs. Cattle CODE allows cattle feeders, Extension educators, consulting nutritionists, etc., to input their own unique feeding situations and evaluate outcomes of multiple decision variables (e.g., coproduct type, coproduct price, transportation difference, etc.). Cattle CODE is available at <http://beef.unl.edu> under the Bi-product Feeds Tab.

Economic Factors for Feeding Coproducts

Cattle Performance

Research studies conducted at the University of Nebraska–Lincoln concluded that feeding coproducts in the form of wet and dry distillers grains plus solubles (WDGS and DDGS) and wet corn gluten feed (WCGF) up to 50% of dry matter (DM) content in feedlot diets resulted in improved cattle performance compared to feeding predominately corn-based diets. Weight gain and feed efficiency were maximized for WDGS and DDGS at approximately 25-35% of the diet on a DM basis (UNL Beef Reports). Cattle performance equations were developed from this research and were used in Cattle CODE to predict improvements in cattle performance for various coproduct dietary inclusion levels.

Economics with Days Fed

Improving cattle performance through increased weight gains and improved feed efficiencies results in fewer days on feed in a feedlot for cattle to reach the same finished weight. Decreasing days on feed typically reduces yardage and interest expenses. Further, when cattle are more efficient at converting feed to weight gain, the total amount of feed consumed to obtain a desired weight gain decreases. These factors were incorporated into the Cattle CODE model.

Moisture

Moisture content of coproducts affects dry matter transportation costs for hauling the coproducts from an ethanol plant to the feedlot. Additionally, the feedlot will have higher costs associated with hauling, handling, and mixing wetter diets as it prepares and delivers rations within the feedlot. These are important factors given the high moisture content of some coproducts, and the Cattle CODE model adjusts for this.

Outputs Derived from Cattle CODE

- Predicted daily weight gain, feed efficiency, and days fed for cattle to reach a desired finished weight
- Transportation costs for coproducts per head during the feeding period
- Diet DM content, diet costs per ton DM, total feeding costs per head
- Feeding cost per pound of weight gain, profit or loss per animal, marginal return per head to feeding coproducts compared to feeding predominately corn

Application of Outputs

These outputs are useful for cattle feeders as they can predict how their cattle will gain and convert feed when fed coproducts at a specified dietary inclusion level compared to feeding a traditional, corn-based diet. Days on feed can then be calculated to determine the time needed for the cattle to reach a desired finished weight.

The most applicable part of Cattle CODE is its usefulness in combining cattle performance, number of days the cattle are on feed, trucking costs of hauling coproducts to the feedlot, and greater handling and feed delivery costs at the feedlot. This full-budget model includes the primary factors that affect economics of profit or loss associated with feeding coproducts.

Illustrative Results

Considering an example feeding situation can illustrate the impact of the budget numbers generated by Cattle CODE. Suppose a cattle feeder is evaluating feeding WDGS at 10 to 50% of diet DM with corn priced $3.70/bushel and WDGS at 95% of the corn price (DM basis) and has to haul the WDGS 60 miles from the ethanol plant. Cattle CODE estimates the marginal return to feeding WDGS at 10, 20, 30, 40, and 50% dietary inclusion levels were $21, 33, 37, 33, and 22 per head, respectively.

Because expected increases in ethanol expansion are likely to increase corn prices, Cattle CODE can incorporate a "what if" scenario with different corn prices. Increasing the corn price resulted in lower profits per head; however, the return to feeding coproducts is slightly higher at higher dietary inclusion levels.

Cattle feeders, nutrition consultants, and Extension educators can evaluate their own unique feeding situations using Cattle CODE, available at<http://beef.unl.edu>. Doing so can provide cattle performance projections and evaluate profit impacts from feeding various types of coproducts with different moisture contents and transportation costs.

References

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