Economics of Confining Cows and Calves

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The beef industry is suffering from a shortage of forage including grazing land. Because of ethanol production from corn, corn production has increased creating two important feed resources. The obvious resource is the distillers grains, and to a lesser extent gluten feed. Both of these feeds are excellent sources of protein and energy in forage based diets.

The less obvious feed resource resulting from the ethanol industry is the corn residue resulting from the increased corn production. The ratio of grain to forage has remained relatively constant over the past 30 or 40 years so as more corn is produced, more corn residue is produced as well. For example, we produce about 42 million tons of corn residue in Nebraska annually. By my calculations, the most the current cattle industry could use is 4.7 million tons. So the opportunity for the cattle industry is to utilize the corn residue and ethanol byproducts in an economical manner.

Certainly, there are other feed resources available. The very simple, straightforward way to economically evaluate feed resources is to determine the cost per unit of energy — we are using TDN (*Table 1*). Corn was priced at $7.50 and $5.50/bu. Interestingly, hays at the prices we used, were higher per lb of TDN than corn. Distillers grains and corn or wheat residues were generally similar and much less expensive than corn or hay. Synergy is a blend of gluten feed and distillers and would be economical but limited to the Columbus, NE area. The dry commodities were priced based on reported values in Feedstuffs Magazine. Dry gluten feed appears to be a good buy and midds might be a good buy in some cases.

Corn silage is an alternate method of harvesting corn residue compared to baling. The price of silage increases relative to corn as corn price declines. At $7.50/bu corn the silage was a very economical source of energy but somewhat less economical at $5.50. At cheaper corn, the silage may not be a good option.

Based on this analysis, we have used wet distillers grains and corn or wheat residue as the diet for our confined cows. The ratio has ranged from 30 to 60% distillers (dry matter basis). Because cost per unit of TDN is similar between the distillers and residue, the cost is similar on a per day basis for the different ratios of distillers to residue.

Confinement Cow System

We established a confinement cow system in April of 2012 with 42 cows at each Scottsbluff and Mead, NE. We purchased bred cows that were bred to calve in June and July. Our logic for summer calving was less mud in the feedlot and calves weaned (January) at a better calf market. We replaced culled cows in April, 2013, with bred cows from the same source the original herd was originated from. The cows were bred in the feedlot by natural service and calves weaned at 205 days of age. Diets were a mixture of corn stalks or wheat straw and wet distillers grains. Some wet beet pulp was used at Scottsbluff. Quantity of feed fed to the cows and calves was recorded so feed costs can be accurately estimated.

Systems Scenarios

For economic analysis, seven cow/calf systems are used. Three systems represent production in the Nebraska Sandhills (Griffin et al., 2012). Four years of data were reported on each of March, June, and August calving herds. The June and August calving dates fall on either side of the June/July dates in the confinement cow system. Two additional systems represent Eastern Nebraska production systems (Anderson et al., 2005; Warner et al., 2013). The first system is based on summer grass, corn stalk grazing and hay feeding. The second system (Warner et al., 2013) is an experimental system where the pairs are double stocked and the other ½ the feed supplied is distillers grains and cornstalks.

The final two systems are the total confinement system described previously and an hypothetical system based on a combination of the confinement system and the June and August calving systems in the Sandhills. In those June and August calving systems, calves remained on the cows

Table 1. Feedstuff Costs Per Pound of TDN

	TDN	*% Corn Price*	*$/lb DM*		*$/lb TDN*	
Corn	83	100	$.158[1]	$.116[2]	$.190	$.140
CGF	100	87	$.129	$.095	$.129	$.095
Soyhulls	70	88	$.131	$.096	$.187	$.137
Midds	75	76	$.113	$.083	$.151	$.111
Beet Pulp	90	92	$.137	$.100	$.152	$.111
Synergy	105	85	$.134	$.099	$1.28	$.094
Distillers Grains	108	100	$.158	$.166	$.144	$.106
Straw[3]	43	—	$.064	$.044	$.149	$.103
Stalks[3]	43	—	$.064	$.044	$.149	$.103
Corn Silage[4]	70	—	$.091	$.075	$.130	$.107
Alfalfa[3]	55	—	$.139	$.084	$.253	$.152
Hay[3]	53	—	$.128	$.072	$.241	$.136

[1]$7.50/bu.
[2]$5.50/bu.
[3]Ground, straw/stalks $115 and $80/ton, alfalfa $250 and $150/ton, grass hay $230 and $130/ton
[4]Corn silage 8.5 and 9.5 x corn price.

while the pairs grazed cornstalks until April 1. Therefore, the calves were weaned at greater ages than 205 days. The hypothetical system then is confinement feeding from April 1 to October 1, calving in June and July and stalk grazing from October 1 to April 1. During stalk grazing the pairs are supplemented with 3 lb (dry matter) of distillers grains to meet the protein needs of the lactating cow and of the calf, assuming some consumption by the calf. The June and August calving pairs in the Sandhills were only supplemented with 1 lb of supplement daily and calf performance was good. However, 1 lb/d of supplement appears to be less than the requirement.

Economic Analysis

A spreadsheet was developed with the inputs from the seven systems (*Table 2*). Assumptions:

1. Cow ownership cost is similar across systems. We assume $200/cow plus $50/cow for breeding.
2. We assumed bred cows were purchased in April and cull cows sold in March. Therefore, the same number of cows was maintained year around.

Table 2. Seven Cow/Calf Systems

	GSL[1] March	*GSL[1] June*	*GSL[1] August*	*D/H[2] Supp*	*D/H[3] Supp*	*Conf.[4] —*	*Conf.[5] Stalks*
Grass, d	180	215	215	170	85	—	—
Stalks[6], d	120	195	180	105	105	—	209
Hay, lb dm	1645	—	—	1500	1500	—	—
Stalks, lb dm	—	—	—	—	1485	2738	1295
Dist. Gr/lb dm	45	150	150	105	848	4106	1943
Wean wt., lb	521	557	504	471	509	480	580

[1]Gudmundsen Sandhills Lab, March, June and August Systems.
[2]Dalbey Halleck System, Southeastern, NE.
[3]One half grass replaced with distillers and stalks.
[4]Confinement system.
[5]Confinement six months, stalk grazing six months.
[6]Includes days assigned to calves.

3. Of cows pregnant, we assumed 95% weaning rate based on data from our first year with the confinement project and the data from the Sandhills.

4. All calves were marketed, no replacement heifers retained. Sale weight was based on actual weight at weaning and not adjusted to 205 days because three of the systems were designed to leave calves on the cows for more than 205 days (late weaning? An interesting concept).

5. Costs were varied to predict calf breakeven prices in the seven different scenarios. The base prices are listed in *Table 3* based on $5/bu. corn and current grass prices.

Table 3. Base Prices for Economic Analysis

Grass, $40/mo/pair	$1.33/day
Cornstalk grazing	$.60/day
Distillers grains[1], $190/ton	$.105/lb dm
Hay, $130/ton	$.0722/lb dm
Baled stalks/straw, $80/ton ground	$.0444/lb dm
Labor/yardage[2]	$.10/d
Mineral	$10/yr
Cow cost	$250/yr

[1]Based on 100% of corn at $5/bu, 90% dm price.
[2]$.10/d for cows in conventional systems; $.20 for cows supplemented on pasture and $.45/d for cows in feedlot.

Economic Outcomes

In the conventional systems, breakeven prices for calves, including both steers and heifers ranged from $1.352/lb to $1.575/lb (*Table 4*). The Sandhills system using June calving had the lowest breakeven, likely because no hay was used and cornstalk grazing is economical. The highest breakeven of these four scenarios was the Eastern Nebraska system, likely because of the amount of hay fed. These differences are relatively small, and with the assumptions we have made, may not be very different. Interestingly, the June calving system is completely opposite the confinement system in terms of philosophy — no harvested feeds versus 100% harvested feeds. The average breakeven of the four conventional systems was $1.47/lb.

The complete confinement system had a breakeven of $2.14/lb which is obviously greater than $1.47. It is also greater than the current or projected price of calves. Therefore, we have developed the hypothetical confinement/stalk grazing system. The breakeven of $1.36/lb is within a reasonable range. This system seems logical because the beef industry is short on grass and long on cornstalks. Yardage is an important consideration in these confinement systems. Is $.45/d too much for a dry cow and is $.45/d too little for a pair? If one charges $.45/d for a calf in addition to the cow it would add $.192 to the breakeven for the total confinement system and $.07/lb to the breakeven for the confinement/stalk grazing system.

Table 4. Breakeven Calf Prices at Several Price Scenarios

	GSL[1]	*GSL*	*GSL*	*D/H*	*D/H*	*Conf.*	*Conf.*
	March	*June*	*August*	*Supp*		—	*Stalks*
Base prices[2]	1.478	1.352	1.475	1.575	1.556	2.142	1.357
Dist[3], 85/5	1.476	1.347	1.470	1.572	1.528	1.998	1.301
Dist[4], 85/4	1.475	1.342	1.465	1.568	1.498	1.845	1.241
Grass[5], $50	1.600	1.485	1.623	1.701	1.588	1.998	1.301
Grass[6], $72	1.864	1.777	1.945	1.974	1.686	1.845	1.241
Stalks[7], $115	1.478	1.352	1.475	1.575	1.628	2.284	1.413

[1]See *Table 2* for system descriptions.
[2]Base prices from *Table 3*.
[3]Distillers grains at 85% of $5/bu corn.
[4]Distillers grains at 85% of $4/bu corn.
[5]Grass at $50/mo.
[6]Grass at $72/mo.
[7]Baled stalks at $115/ton ground.

Changing Variables

The price of distillers grains is a primary factor in the cost of confinement or partial confinement systems. The same is true for any other commodities being fed. Distillers grains and commodities such as gluten feed, soyhulls and midds tend to follow corn price. Therefore, as corn price declines or increases, the price of distillers grains follows. During the past year, distillers grains have been between 95 and 105% the price of corn. This high value is likely due to the lack of supply of corn, less alcohol production and lower supply of distillers grains. When corn was $4 to $6/bu, distillers grains tended to be 80% to 90% the price of corn. As corn price has declined from $7.50 to $4.50, the price of distillers grains has declined but it is not clear if the price will decline to 80% to 90% that of corn.

The calf breakeven declined by $0.144/lb in the confinement system when distillers grains were priced at 85% the price of corn (*Table 4*). If corn priced declined to $4/bu and distillers was priced at 85% the price of corn, then the calf breakeven declined another $0.153/lb but the breakeven was still $0.40/lb above the conventional systems. The hypothetical confinement/stalk grazing system also responds to distillers grains (corn) price because of the amount of distillers grains fed in both the confinement phase and the stalk grazing phase. This system appears to be very competitive with conventional systems.

In the base system, the price of grass is based on survey work by our Ag. Econ. Dept. and was $40/mo/pair. Grass is scarce and the price will likely increase. If the price is increased to $50/mo/pair, breakevens increase to about $1.60/lb. The price would need to increase to $72/mo/pair to create breakevens similar to breakevens for the confinement system with distillers grains priced at 85% of $4/bu corn.

The other two feed resources that could change in price are the baled corn residue and stalks for grazing. The supply of corn residue greatly exceeds demand. Therefore, if supply/demand economics work, the price of baled residue should not change dramatically. An increase of baled stalk price from $80/ton ground to $115, increased the calf breakeven in the confinement system by $0.142/lb.

Stalk grazing is very economical. It enhances the economics and makes the hypothetical confinement/stalk grazing system appear to be very economical. Based on supply/demand economics, stalk grazing should remain very competitive. Many factors affect this practice. Most corn fields are owned/managed by farmers who do not own cattle. Cows at GSL must be trucked 80 miles to corn stalk fields because there is little or no corn in the Sandhills. This cost could be $30 to $60 for a cow or pair and would add $0.10/lb or more to the breakeven. Alternatively, cows kept in a feedlot would likely be in a corn producing area and cornstalks may be within short trucking or even driving distance. This potentially enhances the competitiveness of the confinement/stalk grazing system.

Summary

The cow/calf industry is challenged by diminished forage resources, especially summer grazing. There is an abundance of corn residue available for use in confined feeding situations. Distillers grains and gluten feed work very well as supplements to residues and may be the least expensive sources of energy. However, the cost of feeding cows in confinement for 365 days/year is too high for it to compete with conventional systems. We have proposed an hypothetical system based on six months in confinement and six months grazing stalks. This system appears to be very competitive with conventional system.

References

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