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Management Implications for Cattle as a Result of Drought

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The unusual weather conditions of 2007 have created many management problems for Kentucky beef producers. The late spring freeze severely damaged the first cutting of hay, reducing yields by as much as 50%. The hot, dry weather that has occurred since has limited pasture growth and has many producers very short of hay and out of pasture. Producers are wondering how they are going to cope with both issues at the same time. While good management decisions can not make it rain, they can help producers hang on in the most economical manner possible.

Culling Considerations

The first step in good management is deciding if some cows should be culled. Generally we would say that lower productivity cows and open cows should be sold when pasture and hay is limited. Pregnancy check as soon as possible and sell all cows that are open and possibly some that are very short bred. Other cows that should be considered for culling, even if they are bred, are those with calves that are well below the average weight of the calf crop. You cannot afford to feed low productivity cows this winter. Any cow with a physical defect such as bad feet, arthritic joints, bottle teats or a broken down udder should also be considered for culling in short feed times.

While producers should cull open and poor producing cows in drought years, they must carefully consider whether it makes economic sense to cull productive cows. Stock cows, without calves at side, have been averaging between $650 and $750 across the state this fall. In the spring of 2007, cow calf pairs were selling for $850 to $1000. If pasture conditions improve next spring, 2008 prices for cow-calf pairs will likely be even stronger. In many cases, it may be cheaper to feed the cows you own through the winter than try to buy back in the spring.

Another consideration is the quality of your cows. If weather does improve next spring, many producers will be looking to re-stock their herds and will certainly be keeping their better quality cows. If this is true, the quality of cow-calf pairs on the market next spring will likely not be very high. A producer who has good quality cows should think hard about selling this fall with the intention to replace with pairs next spring. It is very possible that he or she would be buying poorer quality replacements next spring. Finally, there are several tax considerations when selling more than usual numbers of breeding stock due to weather. These should be discussed with your tax professional before making a decision.

Alternative On-Farm Feeds

A second consideration should be to determine if potential alternative feeds are available on the farm. Is there a corn crop on your or a neighbor's farm that will make too little grain to justify harvest? If so, chopping this crop as silage may be a viable alternative. Drought silage is different than normal corn silage and requires different feeding management. Drought silage has less energy and generally higher crude protein content than normal silage. The energy value should be adequate for dry or lactating cows but not growing cattle. On a percentage basis, drought silage likely will have a higher crude protein content compared to normal silage but there will be lower values of true plant protein and more non-

protein nitrogen forms in the drought silage. This means that supplements containing urea or other NPN compounds will not be well utilized with drought silage. Producers without silage equipment should consider custom choppers and having the silage blown into bags or placed on the ground and covered with plastic.

Drought stressed corn should not be cut and baled as dry hay, nor should it be grazed. The nitrate content of drought corn will likely be high, especially if high levels of fertilizer were applied. The nitrate content will not dissipate in the standing material or dry hay. If the nitrate content is high enough, toxicity will occur. When allowed to ferment as silage, the nitrate content can be reduced by 40 to 60% through the process of fermentation.

Other crops such as soybeans can be baled and fed as dry hay without major nitrate concerns. Soybeans should be cut and rolled while all the leaves are still green for the best quality feed. As the leaves yellow and dry, the stem composes a greater percentage of the feed and stem digestibility is quite low compared to soybean leaves.

Even with the effects of drought on hay and pasture, timely rains in many areas have allowed for early corn to make a decent grain crop. Grain yields of 120 bushels will leave 4 to 5 tons of residues per acre in the field. The residue will consist of dropped grain, leaves, husks, cobs and stalks. One acre of residue will provide high quality nutrition to a dry cow for about 30 days due to selective grazing. Protein supplementation will be needed for grazing periods longer than 30 days. Many stalk fields could be grazed using temporary electric fencing and above-ground water systems, thus providing excellent inexpensive nutrition for the dry cow.

When grazing of corn crop residue fields is simply not possible, the fields can be baled. Baling leaves much of the highest quality material in the field and is much less desirable than grazing. However, when it is the only choice for utilization, it is acceptable. Cattle will not perform as well on baled stalks as when grazing, thus requiring much more supplementation. Example rations for dry cows consuming baled stalks are shown in Tables 1 and 2. In some cases, additional rumen nitrogen is necessary for optimal rumen fermentation and stalk utilization, thus a protein block has been included. Consumption rate needed is small, generally a half pound or less daily.

Table 1. Example Rations With Baled Corn Stalks: Mid-November

Ration	**1**	**2**	**3**	**4**	**5**
Stalks	12.5	10	10	10	10
SB Hulls	3.5	10	3.3	2.2	
C. Gluten Feed	4.0		3.3	4.4	6.1
Corn			2.3		2.3
DDGS				2.2	
Protein Block		X	X		
Limestone	.1		.1	.1	.25
IRM mineral	.25	.25	.25	.25	.25

1200 pound pregnant, dry cow in mid-November; Corn stalks containing 48% TDN and 5.0% CP on dry basis

Table 2. Example Rations With Baled Corn Stalks: Mid-January					
Ration	**1**	**2**	**3**	**4**	**5**
Stalks	12.5	11	12.5	10	12.5
SB Hulls	11	11	5.5	4.5	3
C. Gluten Feed	1.1	2	5.5	4.5	3
Corn					5.7
DDGS				3.3	
Protein Block	X	X			X
Limestone			.1	.1	.1
IRM mineral	.25	.25	.25	.25	.25
1200 pound pregnant, dry cow in mid-January; Corn stalks containing 48% TDN and 5.0% CP on dry basis					

Purchased Feeds

When alternative feeds are not available on the farm, purchasing feeds must be considered. Hay may not be available for purchase and even if it is, producers must consider if it is the best purchase. Generally speaking, as the nutrient content of a feed increases, the cost per unit of that nutrient decreases. In other words, it may be cheaper to purchase nutrients from grains, commodity feeds or silages than from hays. Although late corn has been hurt by the drought, much of the early corn will make a decent crop and could be considered for silage.

Nutrient analysis of corn silage, stalks, grass hay and soybean silage and hay are shown in Table 3. We have used these values and some baseline assumptions to help you compare the value of corn silage, if available, with hay. We assumed a silage yield of 18 tons and hay yield of 1.5 tons per acre. Table 4 shows the energy and protein needs of a spring calving cow on both a daily and total winter basis. These values show that we can produce enough energy and protein from an acre of corn silage to winter almost 6 cows while an acre of grass hay will only winter 1 cow.

Table 3. Nutrient Analysis of Common Feeds			
	Dry Matter Basis		
Feed	**DM%**	**TDN%**	**CP%**
Corn Silage	34	69.9	8.2
Grass Hay	91.9	56.6	10.7
Soybean Silage	61	56	16
Soybean Hay	91.6	60.9	16.3
Corn Stalks	51.7	54	7.6
Source: Dairy One Laboratory Database, Cornell University			

Table 4. Nutritional Needs of a 1200 Pound, Spring Calving Cow Wintered for 120 Days		
	TDN lbs	**CP lbs**
Daily	12.37	1.81
Total	1484	217

Table 5 estimates winter feeding cost per cow based on $125 per ton hay. Silage costs in table 5 were estimated by valuing corn for grain at $3.50 per bushel, subtracting grain harvest and hauling costs, and adding silage harvest and hauling costs from the Kentucky Custom Rate Survey and the estimated value of the nutrient removal. Table 6 estimates the maximum amount that can be paid for corn silage based on various hay prices. The first row shows comparable silage prices per ton, the second row subtracts the custom silage harvesting and hauling cost from the Kentucky Custom Rate Survey ($7.97 per ton), and the final row estimates value on per acre basis assuming a silage yield of 18 tons per acre. If good standing corn and custom chopping are available, buying standing corn for silage is a much more economical way to winter cows than buying hay at the prices shown.

Table 5. What Will It Cost?

	Value/Acre, $	Total Cost/Acre, $	Cost per Cow, $
Corn Silage (120 bu. of corn)	$420	$559.27	$95.07
Grass Hay (1.5 tons)	$187.50	$187.50	$178.31

Table 6. What Can I Pay for Corn Silage?

Hay Cost/Ton	$100	$120	$140	$160
Silage/Ton	$46.62	$55.94	$65.26	$74.59
Standing Corn, per ton silage	$38.65	$47.97	$57.29	$66.62
Standing Corn, per acre	$695.70	$863.46	$1,031.22	$1,199.16

If corn is not available for silage, and grains or commodity feeds are purchased, feeding management must be considered. Whereas round rolls of hay can be fed free choice with little management, grains or commodity feeds cannot be. Rations composed of a high portion of grains or commodity feeds must be limit fed to prevent health problems and for best economic return. A 3 year summary of experiments comparing limit fed corn based rations to free choice round rolls of hay is shown in Table 7.

During the grazing season, all cows were pastured together. At the beginning of winter feeding, cows were separated into two groups with one group allowed free choice access to round rolls of hay. The second group was fed a level of nutrient intake formulated to meet their nutrient needs as defined by the NRC with the nutrients coming from whole shelled corn, a pelleted protein, mineral and vitamin supplement and sufficient long hay to meet rumen health needs. Total dry matter intake was much lower for the limited grain fed cattle; however, conception rates and average calf weaning weights were higher for the limit fed cattle.

Table 7. Limit fed Corn Rations vs Hay for Beef Cows, 3 Year Summary

Ration	Corn Based	Hay
Cow Weight Loss, lbs	- 53	- 72
Calf Birth Wt. lbs	102	96
Weaning Wt. lbs	634	613
Conception %	91	84
	Average Daily Feed, lbs	
Hay	2.1	30
Shelled Corn	11.3	--------

Supplement	2.5	--------

Table 8 examines the cost per day of feeding cows the corn based ration compared to free choice hay as shown in Table 7. Based on these feed price assumptions, the corn based ration was actually $49.40 less expensive for a 130 day winter feeding period than free choice hay feeding. This will not always be the case, but during expensive hay years, it is likely to be. Further, this corn price is based on the producer having to go to the local elevator or feed store and purchase corn. Producers may have corn grain in storage at home or they may be able to purchase from a neighbor. In these cases, the cost of corn should be considered the value paid by the elevator to the producer.

Just as important as feeding cost, cows on the corn based ration saw an increase in average weaning weight of 21 pounds and an increase in conception rates of 7%. The combination of higher weaning weights and improved conception increased total pounds of weaned calf per cow. Based on this study, average pounds of weaned calf per cow was 62 lbs higher for cows on the corn based ration. Even when considering long term calf prices and weight slides, an additional 62 pounds of weaned calf per cow is usually worth between $40 and $60 making the limit feeding ration even more attractive. Even if feed prices were such that the limit fed ration was more expensive, this type of animal performance can easily offset some additional feed expense. It is important to remember that minimizing cost is not always the best way to maximize profit.

Table 8. Economics of Corn vs. Hay to Cows

Feed	**Price, $**	**Unit**	**$ / Pound**
Shelled Corn	$175*	Ton	$.0875
Supplement	$300	Ton	$0.15
Hay	$125	Ton	$.0625
Feed Cost Comparison			
Ration		Corn Fed	Hay Fed
Daily Feeding Cost		$1.50	$1.88
Winter Feeding Cost (130 days)		$195	$244.40
*Price based on corn purchased at $4.90 / bu from feed dealer			

All producers will not wish to limit feed corn due to the potential of acidosis in cows from high volumes of corn. Commodity feeds can be utilized in place of corn when they are available and priced competitively. The nutrient content of some available commodities are compared with corn in Table 9. Most commodities will not require protein supplementation as they generally contain adequate crude protein levels. Special attention must be paid to mineral nutrition as most commodities and grains are higher in their phosphorus content than calcium. Soybean hulls would be the exception to this. Many of the commodities are also high in their sulfur content. Excessive sulfur will decrease the availability of copper and selenium for cattle. When commodities are fed, a high quality complete mineral should be available for cattle. Example rations for limit feeding commodities are shown in Tables 10 and 11.

Table 9. Nutrient Content of Selected Feeds on a Dry Matter Basis

Feed	**D. M. %**	**TDN %**	**NEm**	**NEg**	**C. P. %**	**Ca. %**	**P. %**
S. Corn	90	90	1.01	.70	9.8	0.03	0.32
C. Gluten Feed	90	80	0.88	0.59	23	0.07	0.95
Soybean Hulls	90	77	0.84	0.55	12	0.53	0.18
Wheat Midds	89	82	0.89	0.59	18	0.15	1.02

Hominy Feed	90	89	0.99	0.67	11	0.04	0.45
Rice Bran or Meal	90	70	0.74	0.46	14	0.10	1.73
Bakery Waste	90	90	1.0	0.68	12	0.18	0.28
Dried Distillers Grains	90	90	0.99	0.68	27	0.26	0.83
Wet Distillers Grains	30	90	1.0	0.75	32	0.025	0.65

Table 10. Commodity Rations for Limit Feeding Cows, Early Winter					
Feed/Ration	**1**	**2**	**3**	**4**	**5**
CGF		7.8	2	5.5	3
SBH	12	4.5	9	6	6.5
Grass Hay	3	3	3	3	10
Limestone		.2		.1	
Protein Block	X				
Based on a 1200 lb dry cow in mid-November; Ky-31 fescue with TDN = 48% and CP = 8%					

Table 11. Commodity Rations for Limit Feeding Cows, Late Winter					
Feed/Ration	**1**	**2**	**3**	**4**	**5**
CGF		6.7	5.5	2.3	
SBH	15	7.3	6	9	11
Grass Hay	3	3	3	3	10
DDGS			2	2.2	
Limestone		.1	.1	.1	
Protein Block					X
Based on a 1200 lb dry cow in mid-January; Ky-31 fescue with TDN = 48% and CP = 8%					

Limit Hay Feeding

The principle of increasing digestibility or feed utilization by restricting intake applies to forage as well as high energy rations. This is illustrated in Tables 12 and 13. Data in Table 12 shows the results of restricting access to hay for cows nursing calves. Cows were allowed unlimited access or were allowed access to hay for only 4 or 8 hours daily. Cows with limited access to hay lost more weight and body condition compared to cows with unlimited access. Calf daily gain was not affected however. Cows provided access to hay for only 4 or 8 hours daily had a hay savings of 38% and 11% respectively. In the second experiment, Table 13, bred cows in the last trimester of gestation were given access to hay for 3, 5 or 7 hours daily. As hours of access increased, body weight and condition increased. Even the cows given only 3 hours of daily access had a positive weight gain while eating 23 % less hay than cows provided with 7 hours of access daily. Restricting feed intake increases digestibility because passage

rate through the digestive system slows down and more can be digested. For the principle to work well on hay based rations, the hay should be of good quality and a hay feeding area must be available that cattle can be driven out of after the desired amount of time.

When trying to manage feed costs in drought times, this strategy is likely worth consideration. Clearly, a reduction in the amount of hay fed will stretch a short hay supply further and decrease the need for additional purchased feeds. For producers who are purchasing hay, it can represent a direct cost reduction. If hay is purchased at $125 per ton, a 13.6 lb. per day reduction in disappearance (as seen in Table 12) could save the producer $0.85 per cow for every day that hay is limit fed to lactating cows. In the case of dry cows, as depicted in Table 13, a 4.6 pound decrease in hay disappearance could save the producer $0.29 per day. Although extremely useful during drought, limit hay feeding would also be beneficial during non-dry years to reduce winter feeding costs. Again, if we assume a 130 day winter feeding period, this could result in savings of $110.50 and $37.38 for lactating and dry cows respectively.

Table 12. Restricting Hay Intake for Cows Nursing Calves			
Hours of Access	4	8	24
Body Wt. Change lb	- 125	- 61	- 44
Final BCS	5.4	5.5	6.1
BCS Change	-.63	-.25	.15
Calf ADG, lbs	2.17	2.15	2.21
Milk, lbs	9.9	9.9	10.1
Hay Dis. Lbs	22.4	32	36
% < 24 hours	38	11.1	--------
PAS 21: 182 – 189			

Table 13. Restricting Hay Intake for Cows in Last Trimester of Gestation			
Hours of Access	3	5	7
Body Wt. Change lb	+ 52	+ 70	+ 106
Final BCS	5.3	5.3	5.6
Hay Disap. Lbs	15.4	17.6	20
% < 7 hours	23	12	--------
PAS 21: 182 – 189			

Feeding Management for Weaned Calves

Producers should also give consideration to early weaning of calves. This allows the cows to be turned dry which will greatly reduce her nutrient requirements and thus, the amount of feed needed. Some research in early weaning has been successfully conducted with calves as young as 49 days of age although calves that are 60 to 90 days of age are likely to wean more easily. When properly fed, gain and pounds of calf to sell with early weaned calves will be equal to or greater than calves weaned at conventional times or ages. Feed conversion will be highly efficient in these young, light weight calves, generally between 4 and 5 pounds of feed required per pound of gain.

Special management of early weaned calves will be necessary. Hot weather, youth, lighter weight and the probability of dusty conditions make early weaned calves good candidates for health problems. If at all possible, calves should be vaccinated for factors involved in the BRD complex as well as clostridia, treated for internal and external parasites and turned back on the cow for two weeks. After the two week time period, separate calves from the cows, booster the vaccines previously given and the internal parasite control if needed. Feed bunks and water troughs must be low enough to the ground so that the

youngest calf can reach them for feed and water. Several good commercial rations for light weight calves are available or a home made one can be used. Example early weaning rations are shown in Table 14.

Table 14. Early Weaning Rations – 300 lb calf, 2.0 lbs ADG				
Feed / Ration	**1**	**2**	**3**	**4**
Corn	2	2.3		
Corn Gluten Feed			1.5	3.3
Soy Hulls			5	3.3
Alfalfa Hay	5.5			
Grass Hay		5		
SBM – 44%	2	2.2	1.7	
SBM – 49%				1.0
DDG			1.3	1.65
Limestone		.15	.1	.15
Dical Phosphate	.1			

The most economical ration to feed would clearly depend on current feed prices. Table 15 below lists assumed feed prices at the time of this writing. Based on those prices and the assumption of 2 lbs. per day average daily gain, cost per lb of gain during the early weaning period is estimated at the bottom of Table 15. Cost of gain differences were small, but based on those assumptions, rations 2, 3, and 4 appear to be the most economical. However, producers are strongly encouraged to explore all feeding options in their area.

During drought times, the price of light calves tends to decrease more than usual due to large numbers of producers weaning calves and selling them early. With cost of gain between $0.41 and $0.52 per lb, early weaning likely would be a profitable way to grow calves to sale weight and avoid selling at lower prices. And, just as importantly, it allows the producer to dry his cows and greatly reduce their nutrient needs. This means less dependence on scare pasture and feed resources.

Table 15. Early Weaning Cost of Gain, Using Above Rations and Stated Feed Prices (assuming 2 lbs per day ADG)					
Feed	**Corn**	**Corn Gluten**	**Soybean Hulls**	**Alfalfa Hay**	**Grass Hay**
Cost Per Ton (est)	$175 / ton	$150 / ton	$160 / ton	$200 / ton	$125 / ton
Feed	**SBM 44%**	**SBM 48%**	**DDG**	**Lime**	**Dical**
Cost Per Ton (est)	$285 / ton	$293 / ton	$175 / ton	$3.05 / bag	$10.25 / bag
Ration		**1**	**2**	**3**	**4**
Cost per lb gain		$0.52	$0.42	$0.44	$0.41

Some producers have left calves on the cows or provided a creep feed for calves so that weaning weights are more normal than might be expected in a drought. Producers should give serious consideration to putting calves through a 45 day CPH program before selling. Because of the drought, demand for healthy and normal weight calves is likely to increase from cattle feeders. Example rations for preconditioning calves are shown in Table 16.

Table 16. Rations for Preconditioning Calves, lbs per head daily					
Feed/Ration	**1**	**2**	**3**	**4**	**5**
Grass Hay	3.3	4.4	6		
Alfalfa Hay				5.5	5.0
Soy Hulls	4.4	6.5		6.4	1.1
Corn Gluten Feed	3.3				1.1
Shelled Corn			5.7		3.0
Soybean Meal	2.0	.7	2.0	1.8	
DDGS		1.6			2.2
IRM Stocker Mineral	.25	.25	.25	.25	.25
500 lb calves gaining 2.5 lbs daily for 45 days. Grass hay assumed to be 50% TDN and 9.0% CP on DM basis. Alfalfa hay assumed to be 62% TDN and 19.9% CP on DM basis.					

We can examine cost of gain for these pre-conditioning rations in the same way that we looked at the early weaning rations. Estimated cost per pound of gain, assuming 2.5 lbs of gain per day, are shown at the bottom of Table 17. Costs per pound of gain between $0.45 and $0.56 are generally attractive to producers since the value of those additional pounds usually exceeds that. Also, pre-conditioned cattle often receive price premiums in the market due to expected health performance if they are sold in large enough groups. A major strength of the CPH-45 program is that calves are commingled and sorted into larger groups allowing the producer to benefit from additional weight gain, larger lot size, and a uniform health program.

Table 17. Pre-conditioning Cost of Gain, Using Above Rations and Stated Feed Prices (assuming 2.5 lbs per day ADG)					
Feed	**Corn**	**Corn Gluten**	**Soybean Hulls**	**Alfalfa Hay**	**Grass Hay**
Cost Per Ton (est)	$175 / ton	$150 / ton	$160 / ton	$200 / ton	$125 / ton
Feed	**SBM 44%**	**SBM 48%**	**DDG**	**Lime**	**Dical**
Cost Per Ton (est)	$285 / ton	$293 / ton	$175 / ton	$3.05 / bag	$10.25 / bag
Ration	**1**	**2**	**3**	**4**	**5**
Cost per lb gain	$0.47	$0.45	$0.50	$0.56	$0.48