

Drought Arithmetic for Cowboys

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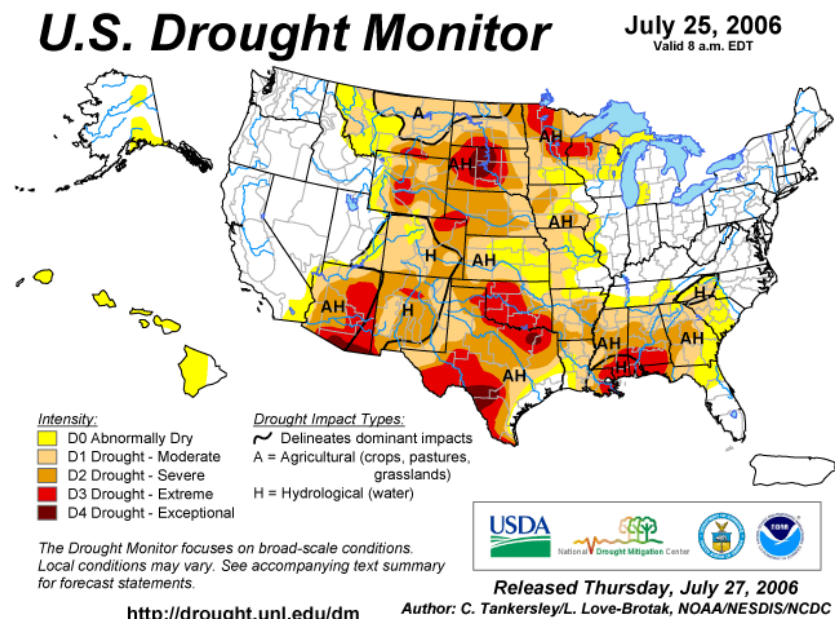
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Drought can be expected as part of normal production cycles. The overall cattle operation management plan should include drought preparation and coping plans. Extended periods of dry weather create management challenges for both cow-calf and stocker operations. Droughty conditions greatly impact pasture and hay land productivity as well. Nutritional concerns often become a focal point of cattle production systems during periods of drought-induced poor forage productivity and supplies.

State offices of the National Agricultural Statistics Service publish a weekly weather crop report. This report details pasture and hay conditions as Excellent, Good, Fair, Poor, or Very Poor with percentages of the state crop rated in each of these categories. This report provides an overall summary of statewide pasture and hay conditions, yet local conditions can vary dramatically across the state. While the local precipitation situation is of most concern to individual producers, statewide, regional, and even national precipitation, soil moisture, and crop conditions impact supply and demand for inputs and marketings from local beef operations. The U.S. Drought Monitor tracks current drought conditions and impacts on a national scale.

Widespread drought has a number of implications for the cattle market. Dry weather can affect feed markets as well. Scarce hay supplies and/or poor grazing conditions are red flags for winter feeding programs. Producers facing these circumstances should immediately be looking at and comparing the costs of alternative feedstuffs. A number of by-product feeds are available around the state. It is often the case that by-product feed prices will increase some along with hay prices due to drought effects on supply and demand of these commodity feeds, but in many instances these feedstuffs may still be a lower cost feeding alternative than traditional hay feeding systems. Availability of alternative feedstuffs can also become an issue, and timeliness of feed booking may be critical to secure supplies and reasonable prices.



Drought conditions are always difficult to deal with. Localized drought creates a variety of management challenges for beef cattle producers. More widespread drought even has the potential to affect national markets. In these situations, producers should, in evaluating all management and marketing decisions, focus on the long-run sustainability and survivability of the operation.

Planning for and Dealing with Drought

- ✓ Drought can be expected as part of normal production cycles
- ✓ Overall management plan should include drought preparation and coping plans
- ✓ Drought creates management challenges for both cow-calf and stocker operations
- ✓ Widespread drought can impact markets
- ✓ Focus on operational long-run sustainability and survival

Where to Start

Inventory Ranch Resources

One of the first things that cattle producers should do when faced with drought conditions is to assess herd, nutritional, and other resources. The usefulness of different management and marketing options varies based on ranch resources, management, and marketing systems. Assessments of cattle nutrient needs, pasture production, stored feed resources (hay, baleage, commodity feeds, etc.), labor resources, facilities (particularly covered feed or hay storage capabilities), and other operational inputs (fertilizer, seed, fuel, etc.) need to be closely quantified. Any shortfalls in nutrient supplies and cattle nutrient needs, for example, must be planned for in a very timely manner.

- ✓ **Evaluate pasture and hay quality and supply**
- ✓ **Determine cattle nutrient needs**
- ✓ **Estimate supplemental feed requirements**

Cattle Nutritional Programs

Nutrient Requirements of Beef Cattle

Cost-efficient drought survival depends heavily upon close matching of nutritional programs and cattle requirements. Overfeeding wastes resources and funds and underfeeding hurts production levels. Priority should be placed on determining nutrient needs of the cattle herd. The best time to improve cow body condition in preparation for calving and breeding is in the months right after weaning. Daily dry matter intake needs approach 2% of body weight for mature cows immediately after calves are weaned. As calving nears, dry matter intake needs will increase, and after calving daily dry matter intake levels should be closer to 2.5% of body weight. Growing cattle can require closer to 3% of body weight in daily dry matter intake. If hay quality/supply appear short and grazing plans cannot provide adequate levels of nutrients for the herd, then supplemental feed may become necessary. For practical purposes, beef cattle dietary requirements and feed formulations presented in this publication primarily consider total digestible nutrients (TDN) and crude protein (CP) levels on a dry matter basis. Mineral, fat, and effective fiber contents of forages and feeds are also important in balancing the overall diet.

For more efficient use of nutritional resources, cattle can be divided into feeding groups based on nutrient needs published by the National Research Council (Tables 1 to 6). As a general rule, lactating cows have higher nutrient requirements than dry cows, and first-calf heifers have higher nutrient percentage requirements in their diets than mature cows. Young growing cattle tend to require higher percentages of dietary nutrients but lower total dietary pounds of nutrients per day. Heifers can be separated by weight after weaning into feeding groups for more efficient feeding. The better quality forages and feeds should go to the feeding groups with higher nutrient needs. Another approach is to allocate higher quality grazing paddocks to the feeding groups with higher nutrient demands.

Efficient Herd Nutritional Programs

- ✓ **Divide cattle into feeding groups based on nutrient needs**
- ✓ **Allocate forage/ feed supplies to each group to closely match animal requirements**

Growing Steer and Heifer Nutrient Requirements

Table 1. Growing Steer and Heifer Nutrient Requirements, 1,100 lbs. at Finishing

Body wt. (lbs.)	ADG (lbs.)	Dry matter intake (lbs/day)	Diet Nutrient Density		Daily Nutrients / Animal	
			TDN (% dry matter)	CP (% dry matter)	TDN (lbs.)	CP (lbs.)
300	0.5	7.9	54	9.2	4.3	0.73
	1.0	8.4	59	11.4	5.0	0.95
	1.5	8.6	64	13.6	5.5	1.17
	2.0	8.6	69	16.2	5.9	1.39

	2.5	8.5	75	18.9	6.4	1.61
	3.0	8.2	83	22.2	6.8	1.83
400	0.5	9.8	54	8.7	5.3	0.85
	1.0	10.4	59	10.4	6.1	1.08
	1.5	10.7	64	12.1	6.8	1.30
	2.0	10.7	69	14.1	7.4	1.51
	2.5	10.6	75	16.3	8.0	1.72
	3.0	10.2	83	19.0	8.5	1.94
500	0.5	11.6	54	8.4	6.3	0.97
	1.0	12.2	59	9.8	7.2	1.19
	1.5	12.6	64	11.2	8.1	1.41
	2.0	12.7	69	12.8	8.8	1.63
	2.5	12.5	75	14.7	9.4	1.84
	3.0	12.1	83	16.9	10.0	2.05
600	0.5	13.2	54	8.2	7.1	1.08
	1.0	14.0	59	9.4	8.3	1.31
	1.5	14.4	64	10.6	9.2	1.53
	2.0	14.6	69	11.9	10.1	1.74
	2.5	14.4	75	13.6	10.8	1.95
	3.0	13.8	83	15.7	11.5	2.17
700	0.5	14.9	54	8.0	8.0	1.19
	1.0	15.8	59	9.0	9.3	1.42
	1.5	16.2	64	10.1	10.4	1.64
	2.0	16.3	69	11.4	11.2	1.85
	2.5	16.1	75	12.8	12.1	2.06
	3.0	15.5	83	14.6	12.9	2.27

Table 2. Growing Steer and Heifer Nutrient Requirements, 1,200 lbs. at Finishing

Body wt. (lbs.)	ADG (lbs.)	Dry matter intake (lbs/day)	Diet Nutrient Density		Daily Nutrients / Animal	
			TDN (% dry matter)	CP (% dry matter)	TDN (lbs.)	CP (lbs.)
300	0.5	7.8	54	9.4	4.2	0.73
	1.0	8.3	58	11.5	4.8	0.95
	1.5	8.6	63	13.7	5.4	1.17
	2.0	8.6	68	16.2	5.8	1.40
	2.5	8.6	73	18.7	6.3	1.61
	3.0	8.3	80	22.0	6.6	1.83
400	0.5	9.7	54	8.8	5.2	0.85
	1.0	10.3	58	10.4	6.0	1.07
	1.5	10.6	63	12.2	6.7	1.30
	2.0	10.7	68	14.1	7.3	1.51
	2.5	10.7	73	16.1	7.8	1.72
	3.0	10.4	80	18.7	8.3	1.94
500	0.5	11.5	54	8.4	6.2	0.97
	1.0	12.2	58	9.8	7.1	1.19
	1.5	12.6	63	11.2	7.9	1.41

	2.0	12.6	68	12.9	8.6	1.63
	2.5	12.6	73	14.6	9.2	1.84
	3.0	12.2	80	16.8	9.8	2.05
600	0.5	13.2	54	8.2	7.1	1.08
	1.0	14.0	58	9.3	8.1	1.31
	1.5	14.4	63	10.6	9.1	1.52
	2.0	14.4	68	12.1	9.8	1.74
	2.5	14.4	73	13.5	10.5	1.95
	3.0	14.0	80	15.4	11.2	2.16
700	0.5	14.8	54	8.0	8.0	1.18
	1.0	15.7	58	9.0	9.1	1.42
	1.5	16.2	63	10.1	10.2	1.64
	2.0	16.3	68	11.3	11.1	1.85
	2.5	16.2	73	12.7	11.8	2.05
	3.0	15.8	80	14.4	12.6	2.27

Two-Year-Old First-Calf Heifer Nutrient Requirements

Table 3. Two-Year-Old Lactating First-Calf Heifer Nutrient Requirements

Mature body wt. (lbs.)	Months after calving	Dry matter intake (lbs/day)	Diet Nutrient Density		Daily Nutrients / Animal	
			TDN (% dry matter)	CP (% dry matter)	TDN (lbs.)	CP (lbs.)
1000	1	20.4	61.0	10.6	12.4	2.16
	2	21.2	62.1	11.1	13.2	2.36
	3	21.8	59.8	10.4	13.0	2.26
	4	21.2	58.5	9.7	12.4	2.06
	5	20.7	57.1	9.0	11.8	1.87
	6	20.3	56.0	8.4	11.4	1.71
1200	1	22.9	60.4	10.2	13.8	2.34
	2	23.8	61.4	10.7	14.6	2.55
	3	24.5	59.2	10.0	14.5	2.44
	4	24.0	58.0	9.4	13.9	2.25
	5	23.4	56.8	8.8	13.3	2.05
	6	23.0	55.8	8.3	12.8	1.90
1400	1	25.3	60.0	10.0	15.2	2.52
	2	26.2	60.9	10.4	16.0	2.72
	3	27.1	58.7	9.7	15.9	2.62
	4	26.6	57.6	9.1	15.3	2.43
	5	26.1	56.5	8.5	14.7	2.23
	6	25.7	55.7	8.1	14.3	2.08

Table 4. Two-Year-Old Dry (Non-Lactating) First-Calf Heifer Nutrient Requirements

Mature body wt. (lbs.)	Months after calving	Dry matter intake (lbs/day)	Diet Nutrient Density		Daily Nutrients / Animal	
			TDN (% dry matter)	CP (% dry matter)	TDN (lbs.)	CP (lbs.)
1000	7	18.8	48.6	6.9	9.1	1.29
	8	18.9	49.4	7.0	9.3	1.33

	9	19.1	50.7	7.3	9.7	1.39
	10	19.4	52.7	7.7	10.2	1.50
	11	19.9	55.5	8.3	11.0	1.66
	12	20.6	59.1	9.3	12.2	1.92
1200	7	21.5	48.9	6.9	10.5	1.48
	8	21.7	49.7	7.1	10.8	1.53
	9	22.0	51.0	7.3	11.2	1.61
	10	22.3	53.1	7.8	11.8	1.73
	11	22.8	55.9	8.5	12.7	1.93
	12	23.7	59.7	9.4	14.1	2.23
1400	7	24.2	49.1	6.9	11.9	1.67
	8	24.4	49.9	7.0	12.2	1.72
	9	24.7	51.3	7.3	12.7	1.81
	10	25.1	53.4	7.8	13.4	1.96
	11	25.7	56.4	8.5	14.5	2.19
	12	26.7	60.2	9.5	16.1	2.54

Mature Cow Nutrient Requirements

Table 5. Mature Lactating Cow Nutrient Requirements (20 lbs./day peak milk production)

Body wt. (lbs.)	Months after calving	Dry matter intake (lbs/day)	Diet Nutrient Density		Daily Nutrients / Animal	
			TDN (% dry matter)	CP (% dry matter)	TDN (lbs.)	CP (lbs.)
1000	1	24.0	59.6	10.5	14.3	2.53
	2	25.0	60.9	11.2	15.2	2.79
	3	25.4	58.6	10.4	14.9	2.64
	4	24.4	57.0	9.7	13.9	2.36
	5	23.5	55.4	8.9	13.0	2.08
	6	22.7	54.0	8.2	12.3	1.85
1200	1	26.8	58.7	10.1	15.7	2.71
	2	27.8	59.9	10.7	16.7	2.97
	3	28.4	57.6	9.9	16.4	2.82
	4	27.4	56.2	9.3	15.4	2.54
	5	26.5	54.7	8.5	14.5	2.26
	6	25.7	53.4	7.9	13.7	2.04
1400	1	29.5	58.0	9.8	17.1	2.88
	2	30.5	59.1	10.3	18.0	3.14
	3	31.3	56.8	9.6	17.8	2.99
	4	30.3	55.5	8.9	16.8	2.70
	5	29.4	54.1	8.3	15.9	2.44
	6	28.6	53.0	7.7	15.2	2.21

Table 6. Mature Dry (Non-Lactating) Cow Nutrient Requirements

Body wt. (lbs.)	Months after calving	Dry matter intake (lbs/day)	Diet Nutrient Density		Daily Nutrients / Animal	
			TDN (% dry matter)	CP (% dry matter)	TDN (lbs.)	CP (lbs.)
1000	7	19.5	46.8	6.5	9.1	1.26

	8	19.8	47.2	6.6	9.3	1.30
	9	20.3	47.9	6.7	9.7	1.35
	10	21.1	48.9	6.9	10.3	1.45
	11	21.0	52.1	7.7	10.9	1.61
	12	21.4	55.9	8.7	12.0	1.86
1200	7	22.4	46.9	6.5	10.5	1.45
	8	22.8	47.3	6.5	10.8	1.49
	9	23.3	47.9	6.7	11.2	1.56
	10	24.3	49.0	6.9	11.9	1.67
	11	24.1	52.3	7.7	12.6	1.86
	12	24.6	56.2	8.8	13.8	2.16
1400	7	25.2	46.9	6.5	11.8	1.63
	8	25.6	47.3	6.5	12.1	1.67
	9	26.2	48.0	6.7	12.6	1.75
	10	27.3	49.1	6.9	13.4	1.89
	11	27.0	52.6	7.8	14.2	2.11
	12	27.6	56.6	8.9	15.6	2.45

Cows and heifers in thin body condition at calving time:

- ✓ **Rebreed slower**
- ✓ **Produce less colostrum**
- ✓ **May not have sufficient nutrient reserves for maximum milk production**
- ✓ **Are less likely to wean a live calf**

Bull Nutrition

Proper post-weaning development of beef bulls is important for future effectiveness as herd sires. Bulls should be separated and managed according to age groups (weanling bull calves, yearling bulls, highly-fitted or gain-tested bulls, 2-year old bulls, mature bulls). Separating younger and older bulls can be particularly important in preventing injuries. Dividing bulls into management groups also allows the different nutritional needs of the different groups to be better met. Yearling bulls still have lots of growth and development ahead of them and should be managed differently than older bulls.

As bulls mature, their nutritional requirements change. Younger bulls require less quantity but higher quality diets. For example, daily nutrient requirements for a 700 lbs. bull gaining two lbs. per day are approximately 16 lbs. of dry matter intake with 11.4% crude protein and 65% total digestible nutrients (TDN) on a dry matter basis, while a 1,500 lbs. bull gaining two lbs. per day needs approximately 34.5 lbs. of dry matter intake with 6.1% crude protein and 63% TDN on a dry matter basis. While daily dry matter intake generally increases with increasing body weight, a bull's crude protein requirement declines as a percentage of dry matter intake with advancing age and body size. Younger bulls require higher protein percentages for the rapid lean muscle growth that is occurring during early development.

Increased physical activity of bulls during the breeding season can result in body condition loss. Adequate bull body condition is important for effective breeding performance. Since it can often be difficult to supplement bulls separately from the remainder of the breeding herd, bulls should be fed to go into the breeding season in at least good body condition without being excessively fat. A body condition score of 6, where 1=extremely thin and 9=obese, is a good goal for bulls at the start of breeding.

Yearling bulls can lose significant amounts of weight during their first breeding season. They must gain this weight back and continue to grow before the next breeding season to remain effective herd sires. It is important to observe growing bulls closely for changes in body condition. Adjustments to bull feeding programs can then be made in a timely manner. A good target is for a 2-year old bull to weigh approximately 75% of his expected mature weight. For example, if a bull's expected mature weight is 2,000 lbs., then he should weigh approximately 1,500 lbs. ($2000 \times .75 = 1,500$) at two years of age.

Bull Nutrition Basics

- ✓ Younger bulls need less quantity but higher quality diets
- ✓ Bulls should begin breeding season in a body condition score 6
- ✓ Breeding season activity can reduce body condition
- ✓ Target 75% of expected mature weight for two-year old bulls

Feed Intake during Weather Extremes

Extreme temperatures and weather can impact feed intake. As temperatures rise above the animal's thermal neutral zone upper critical temperature (the point at which heat stress begins), dry matter intake falls. Likewise, as temperatures drop below the animal's thermal neutral zone lower critical temperature (the point at which cold stress begins), dry matter intake increases. Temperature-based stress on cattle impacts their energetic efficiency. The effects of temperature on feed intake depend upon the animal's thermal susceptibility, acclimation to the conditions, and diet. Temperature effects on feed intake are heightened by mud, precipitation, humidity, and wind. The duration of these adverse conditions may also be important. Adaptability of cattle to the environment can be important as it relates to feed intake and cattle productivity.

Alternative Feeds for Beef Cattle

Stored forages and feeds should be located, evaluated for nutrient value and price, and purchased or forward contracted. Many hay suppliers fill orders to a regular customer base first before marketing to new customers, especially when hay supplies are tight relative to hay demand. Word of mouth is a common way of locating hay supplies. State agriculture department market bulletins and Internet-based hay directories are also potentially useful sources of information on hay suppliers.

By-product commodities are a viable feed alternative to commercially mixed supplements. Take time to evaluate both commodity feeds and commercial supplements to determine what ingredients price in as the most cost-effective to achieve target production levels. It is useful to reevaluate diets over time as feed prices and availability change to make sure that the cost of the current nutritional program is reasonable in comparison with other feeding options. Two useful resources available on the Internet for regularly updated commodity price information are:

Oklahoma State University Feed Commodity Bulletin

- ✓ www.ansi.okstate.edu/exten/feedbull/

Missouri By-Product Feed Page

- ✓ agebb.missouri.edu/dairy/byprod/

Commodity Feed Price Trends

By-product commodity prices for many common ingredients in beef cattle diets often follow seasonal price trends (Figure 1). Dried distillers grains usually reach seasonal lows around early autumn. Whole cottonseed prices, on the other hand, tend to start falling after June and usually reach annual lows in October and November. Cottonseed hull prices tend to climb in November and December over September and October prices and then drop again in January and February. The best prices on soybean hulls are typically in early summer, with soybean hull prices often rising after August before starting to decline again after January. Prices of wheat midds are generally lowest in May and reach their peaks in December. Price trends in the current year can always buck the traditional seasonal trend, however, so it is important to stay up to date on current commodity prices. Pool resources with neighbors when possible. Purchasing feed in bulk can often reduce cost per unit.

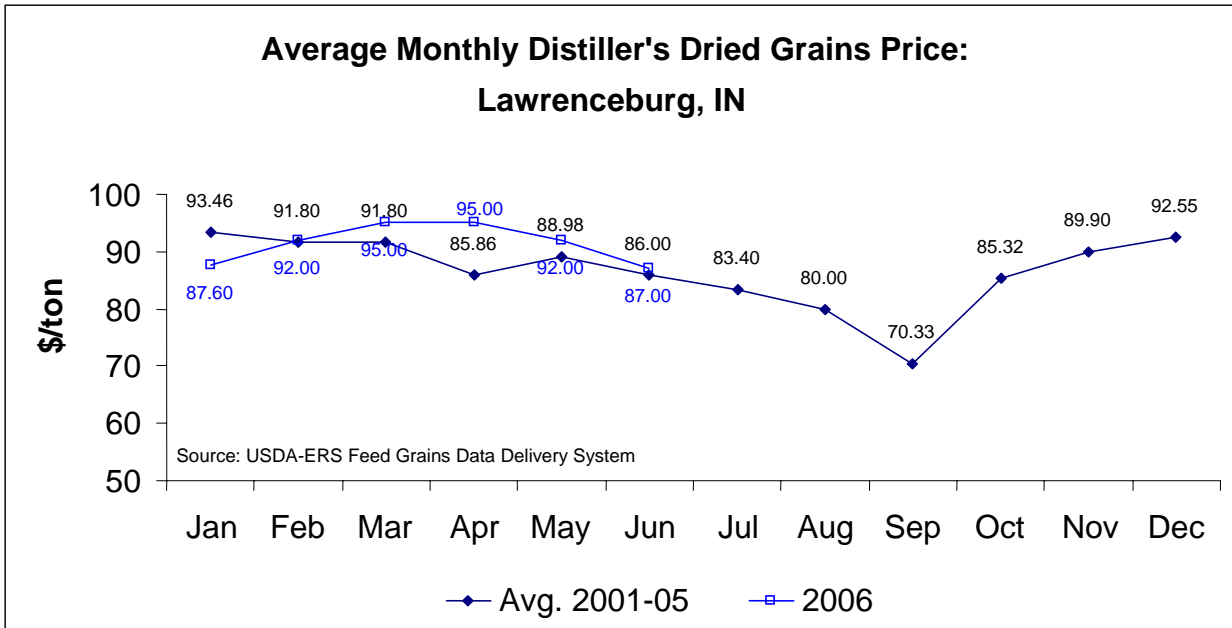
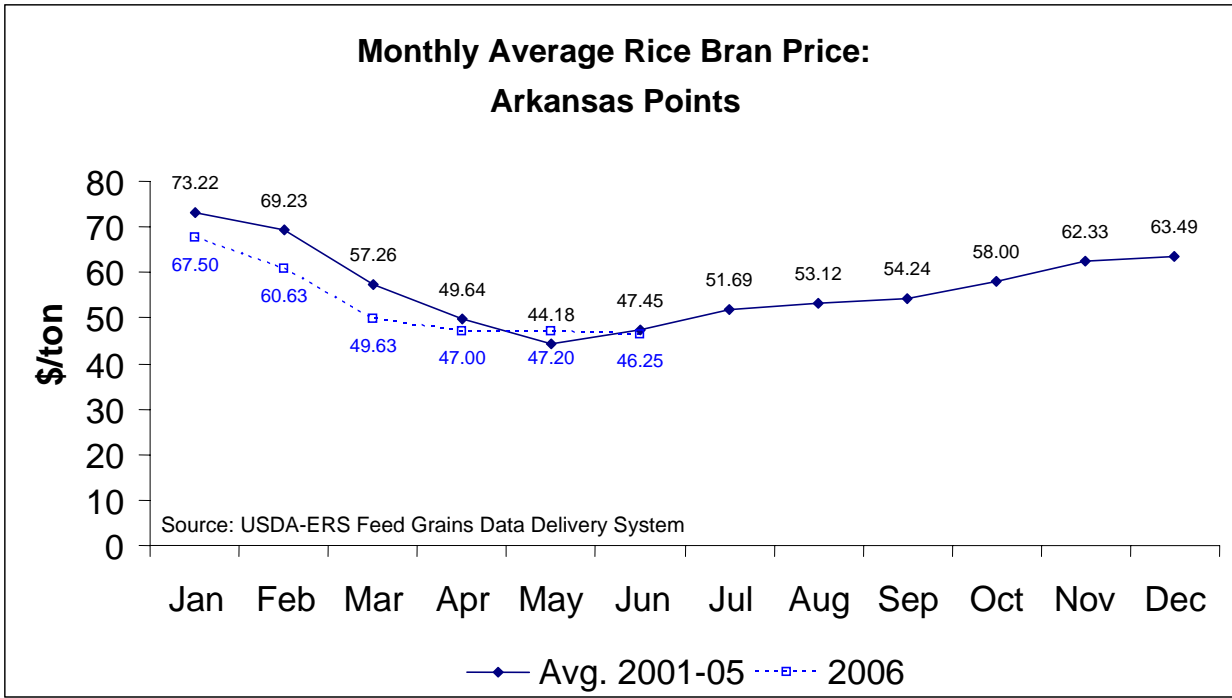


Figure 1. Commodity Feed Price Trend Examples

Nutritional Values of Selected Feedstuffs

Just because certain by-products are cheap in terms of dollars does not mean that they are necessarily a good value. The nutritional makeup of feeds and what they will contribute to beef cattle performance determine their true value (Table 7). Some feeds can be fed free-choice in self-feeders, while others required daily hand feeding. Because each feed has its own unique feeding advantages and limitations, it is worth the time to visit with someone who is competent in formulating beef cattle diets to avoid any potential nutritional problems or disorders in the herd.

Table 7. Nutrient Content of Selected Beef Cattle Feeds on a Dry Matter Basis¹

Feed	Dry Matter %	Total Digestible Nutrients %	Crude Protein %	Crude Fiber %	Crude Fat %	Calcium %	Phosphorus %
Energy Feeds							
Whole Shelled Corn	90	90	9	2	4	0.03	0.32
Hominy Feed	90	91	11	7	8	0.06	0.58
Soybean Hulls	90	80	12	39	2	0.60	0.17
Wheat Midds	89	77	18	9	5	0.15	1.00
Rice Bran	90	70	16	12	15	0.10	1.73
Cane Molasses	74	72	6	1	0	0.01	0.10
Citrus Pulp	90	80	6.5	13	4	1.90	0.13
Protein Feeds							
Corn Gluten Feed	90	83	24	10	4	0.07	0.95
Whole Cottonseed	93	90	24	22	18	0.20	0.73
Cottonseed Meal	92	76	41	13	3	0.18	1.21
Soybean Meal	90	84	48	7	2	0.34	0.70
Peanut Meal	88	77	53	2	2	0.32	0.66
Dried Distillers Grains	92	86	27	12	10	0.26	0.83
Brewers Grains	24	69	26	15	11	0.30	0.57
Roughages							
Cottonseed Hulls	91	42	4	48	2	0.10	0.07
Cotton Gin Trash	92	46	8	38		0.60	0.20
Peanut Hay	91	48	11	33		1.20	0.15
Peanut Hulls	91	22	9	63		0.20	0.07
Corn Stalks	85	50	6.6	34	2	0.50	0.10
Soybean Stubble	88	40	5	44		1.00	0.06
Wheat Straw	92	40	4	42	2	0.17	0.04

¹The nutrient values presented are intended as a general guide to nutrient qualities of feedstuffs. Significant variation in nutrient values exists among different feed sources.

Economic Replacement Value of Feedstuffs

The relative value of feeds can be compared in terms of dollar value for TDN and CP content as compared to whole shelled corn and soybean meal base feeds. Table 8 shows prices at which selected by-product feeds would be relatively equivalent to corn and soybean meal at the given prices. Being able to purchase by-product feeds for less than these relative values would be good deals compared to feeding corn and soybean meal base diets at the given prices. This does not account for roughage levels needed in the diet or other feeding considerations but can be useful in quick overall comparisons of feed prices and nutrient replacement values.

Table 8. Relative Value of By-Product Feeds with Selected Corn and Soybean Meal Prices¹

Feed	Corn Price, \$/ton					
	70	80	90	100	110	120
Whole cottonseed	\$105.22	\$113.25	\$121.28	\$129.31	\$137.34	\$145.37
	\$121.56	\$129.59	\$137.62	\$145.65	\$153.68	\$161.71
Cottonseed hulls	\$37.71	\$42.91	\$48.12	\$53.32	\$58.53	\$63.74
	\$38.13	\$43.34	\$48.54	\$53.75	\$58.95	\$64.16
Soybean hulls	\$71.29	\$79.36	\$87.42	\$95.48	\$103.55	\$111.61
	\$76.24	\$84.30	\$92.37	\$100.43	\$108.49	\$116.56
Corn gluten feed	\$95.39	\$101.33	\$107.27	\$113.21	\$119.15	\$125.09
	\$113.33	\$119.27	\$125.21	\$131.15	\$137.09	\$143.03
Hominy feed	\$76.76	\$86.78	\$96.81	\$106.83	\$116.85	\$126.88
	\$78.96	\$88.98	\$99.01	\$109.03	\$119.05	\$129.08
Dried distillers grains	\$110.79	\$116.80	\$122.80	\$128.80	\$134.80	\$140.80
	\$133.72	\$139.72	\$145.72	\$151.73	\$157.73	\$163.73
Wheat midds	\$87.17	\$94.15	\$101.14	\$108.12	\$115.11	\$122.09
	\$99.93	\$106.91	\$113.90	\$120.88	\$127.87	\$134.85

Rice bran	\$70.42 \$79.06	\$76.78 \$85.42	\$83.14 \$91.78	\$89.49 \$98.13	\$95.85 \$104.49	\$102.21 \$110.85
Cane molasses	\$47.54 \$44.68	\$55.55 \$52.70	\$63.57 \$60.71	\$71.58 \$68.73	\$79.60 \$76.74	\$87.62 \$84.76

¹Top values are estimated based on soybean meal costing \$150/ton. Bottom values are estimated based on soybean meal costing \$200/ton.

Feed Storage and Handling Considerations

Farm feed storage (Table 9), mixing, handling, and feeding capabilities also determine the feasibility of using different ingredients and diets for the herd. Specific feeds can have characteristics that require special handling considerations, as in the case of the flowability limitations associated with fuzzy whole cottonseed. A cornstarch coating process for whole cottonseed shows promise for alleviating this handling problem though. Sacking feeds is useful for feeding and storage in many cases but typically costs extra.

Table 9. Feed Storage Requirements for Selected Beef Cattle Feedstuffs

Feedstuff	Feed Storage Requirement		
	lbs./bushel	lbs./ft. ³	ft. ³ /ton
Whole corn	56	45	42
Corn silage		35	57
Soybean hulls	18	14	142
Soybean meal	53	42	48
Corn gluten feed	41	33	61
Hominy feed	35	28	72
Whole cottonseed	25	20	100
Cottonseed hulls	19	15	134
Cottonseed meal	48	38	53
Cotton gin trash		7	286
Wheat midds	25	20	100
Wet brewers grains	82	65	30
Dried brewers grains	19	15	134
Dried distillers grains	19	15	134
Rice bran	25	20	100

Hay Replacer Diets

Hay replacer diets are formulated with high levels of roughage to make up for forage shortfalls. Growing cattle require different dietary nutrient levels than mature cattle. The diets listed in Table 10 are intended for mature cattle.

Table 10. Hay Replacer Diet Alternatives for Mature Cattle

Ingredient	Lbs./ton				
	Diet 1	Diet 2	Diet 3	Diet 4	Diet 5
Corn		730		325	
Cottonseed hulls	887	950	546	1300	700
Cottonseed meal		295	152	150	100
Soybean hulls			1283		
Corn gluten feed	1089				
Oats					1180
Cane molasses				175	

Limestone	13	14	6		
Dicalcium phosphate			2	10	
Urea				20	
Trace mineral salt	9	9	9	20	20
Vitamin ADE premix	4 million IU Vitamin A	4 million IU Vitamin A	4 million IU Vitamin A	4 million IU Vitamin A	4 million IU Vitamin A

Alternative Feeds for Beef Cattle

- ✓ Consider commodity feed price trends and availability
- ✓ Compare nutritional values of feedstuffs and economic replacement values
- ✓ Understand feed storage and handling challenges
- ✓ Consult with a nutritionist on diet formulations and feeding limitations
- ✓ Use ionophores and growth promoting implants as appropriate

Forages

Supplementation Programs for Forage

Forage is an important component of beef cattle nutritional programs. With shorter hay supplies as a result of drought conditions, it is critical that hay is used properly. Available hay should be evaluated for quality and then matched with an adequate supplementation program to meet body condition and growth targets (Table 11).

Table 11. Daily Cottonseed Meal (CSM) and Shelled Corn Supplementation Schedule with Various Quality Forages

Forage Analysis Results			Replacement Heifers ¹		Dry Cows ²		Lactating Cows ³	
Forage Quality	Crude Protein %	Total Digestible Nutrients %	Lbs. CSM	Lbs. Corn	Lbs. CSM	Lbs. Corn	Lbs. CSM	Lbs. Corn
Excellent	>11.2	>56	0	2.5	0	0	0	0
Good	9.5-11.1	>56	0	2.5	0	0	1.0	0
		53-56	0	2.75	0	0.5	1.0	1.0
Fair	8.2-9.5	50-53	0	3.25	0	1.0	1.0	2.5
		54-56	0.5	2.25	0	0.5	2.0	0
		51-54	0.5	2.5	0	1.0	2.0	1.5
Poor	7.3-8.2	<50	0.5	3.0	0	2.0	2.0	2.5
		53-55	1.0	2.5	0	0.5	2.5	0.5
		51-53	1.0	2.75	0	1.0	2.5	1.0
Very Poor	<7.3	<50	1.0	3.25	0	2.0	2.5	2.0
		<48	1.5-2.0	2.0-5.0	1.0	2.0	3.0	3.0

¹Heifers weighing 550 lbs. targeted to gain 1.25 lbs./day at this rate of supplementation

²Dry cows weighing 900-1100 lbs. during last three months of pregnancy

³Superior milking cows weighing 900-1100 lbs. during first three months of lactation

For mature, lactating cows, other supplementation options for good quality hay might include: 1) protein blocks, 2) liquid protein, 3) 2.5 lbs. of low-fiber range cubes, or 4) 2.5 lbs. of whole cottonseed. Additional supplementation options for fair quality hay might include: 1) protein blocks designed for 3 to 4 lbs. daily consumption, 2) 4.5 lbs. of low-fiber range cubes, or 3) 4.5 lbs. of whole cottonseed. Alternative supplementation options for poor quality hay might include: 1) 6.5 lbs. of low-fiber range cubes, or 2) 6 lbs. of whole cottonseed. Cows on very poor quality hay could be supplemented with 7.5 lbs. of low-fiber range cubes. Forage quality standards are listed in Table 12.

Table 12. Forage Quality Standards for Beef Cattle Diets

Forage Type	Standard	Total	Crude	Moisture	pH
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		Digestible Nutrients¹	Protein¹		
Silage²	Excellent	65% or above	8% or above	70% or below	4.2 or below
	Good	60 to 64%	7 to 8%	71 to 74%	4.3 to 4.7
	Fair	55 to 59%	6 to 7%	75% and above	4.8 to 5.1
	Poor	Below 55%	Below 6%	75% and above	5.2 or above
Grass Hay³	Excellent	58% or above	12% or above		
	Good	55 to 57%	10 to 11%		
	Fair	52 to 54%	8 to 9%		
	Poor	Below 52%	Below 8%		
Legume Hay³	Excellent	64% or above	18% or above		
	Good	60 to 63%	16 to 17%		
	Fair	57 to 59%	14 to 15%		
	Poor	Below 57%	Below 14%		

¹Dry matter basis.

²Determine silage quality by total digestible nutrients rating. If silage does not meet either crude protein or moisture requirement for quality, lower one standard.

³Determine hay quality by total digestible nutrients rating. If hay does not meet crude protein requirement or is less than 83% dry matter, lower one standard.

Forage-Related Options

- ✓ **Consider stockpiling perennial forages to delay hay feeding**
- ✓ **Use combinations of annual cool-season forages**
- ✓ **Do not overlook alternative forage crops such as brassicas**
- ✓ **Forage test to accurately match hay supplies to supplementation programs (Tables 11 and 12)**
- ✓ **Use rotational, limit, and strip grazing practice to stretch forage**
- ✓ **Minimize hay storage and feeding losses**

Nitrate Poisoning Concerns

- ✓ **Nitrogen fertilization during drought increases risk**
- ✓ **Nitrate tests are available for forage samples (Test before feeding!)**
- ✓ **Sorghum-sudangrass, pearl millet, corn, and bermudagrass are susceptible**
- ✓ **Haying or ensiling does not eliminate nitrate problems**
- ✓ **Watch for signs of nitrate poisoning in cattle and treat immediately**

Poisonous Plant Essentials

- ✓ **Scout pastures and hayfields for poisonous plants**
- ✓ **Cattle are more likely to consume poisonous plants when forage is limited**
- ✓ **Quickly recognize and treat signs of poisoning in livestock**

Common Poisonous Plants

- ✓ **Perilla mint (purple mint)**
- ✓ **Nightshades**
- ✓ **Bracken fern**
- ✓ **Lantana**
- ✓ **Mountain laurel**
- ✓ **Pokeweed**
- ✓ **Pigweed**
- ✓ **Buckeye (horse chestnut)**
- ✓ **Wild cherry (black cherry)**
- ✓ **Oak buds and acorns**

Cattle Management

Advantages of Early Weaning

- ✓ Allows for more efficient feed utilization during drought
- ✓ More cows can be carried on a limited feed supply
- ✓ Excellent feed conversion of early weaned calves can result in cheaper gains
- ✓ Reduces herd energy requirements
- ✓ Helps cows to cycle earlier and improves rebreeding rates

Disadvantages of Early Weaning

- ✓ Calf management and nutrition must be excellent
- ✓ Labor, facilities, and feed must be available for feeding small calves
- ✓ Seedstock cattle must wean within defined age windows for breeds to accept data

Early Weaning Calf Feeding

- ✓ Start calves with a high-energy, high-protein diet designed for early weaning
- ✓ Hand feed starter diet for 10 to 14 days until to 4 to 5 lbs. per head per day
- ✓ Gradually increase to self-feeder as total intake increases
- ✓ Manage scours and coccidiosis if a problem
- ✓ Use a single diet for best performance through normal weaning age

Creep Feeding Considerations

- ✓ Will improve calf weaning weights
- ✓ Will not greatly reduce pressure on pastures or lactating dams
- ✓ Good option when calf nutritional needs are not being met (poor forage quality)
- ✓ Early weaning may be a better alternative when forage supply is limiting

Cattle Culling Highlights

- ✓ Pregnancy check early to find open cattle
- ✓ Establish a preferred culling order
- ✓ Decide on how deep to cull
- ✓ Cull in a timely manner to conserve forage and feed supplies
- ✓ Consider custom grazing and retained ownership options

Herd Health Recommendations

- ✓ Hot dry weather can increase the incidence and severity of common diseases
- ✓ Parasite control programs must address both internal and external parasites
- ✓ "Calf Comfort" is a critical component for successful weaning
- ✓ BQA guidelines are even more important for cattle stressed by drought
- ✓ Nutritional stress will have a negative effect on immune function
- ✓ Work with a veterinarian to make needed program adjustments

Useful Websites List

Weather Information Sources

MSUcares Weather Resources
<http://msucares.com/weather/>

Hay and Feed Source Information

Alabama Hay Directory
http://www.agi.alabama.gov/market_news

Arkansas Hay Producers Database
<http://hayproducers.uaex.edu/>

Commodity Feed Sources for Arkansas Producers
http://www.aragriculture.org/livestock/beef/nutrition/commodity_feed_sources.htm

Kentucky Department of Agriculture Hay Sales Directory
<http://www.kyagr.com/buyky/corral/haysales.htm>

Mississippi Hay Directory
<http://msucares.com/livestock/beef/mshay.html>

Mississippi Market Bulletin
<http://www.msmarketbulletin.org/>

Missouri By-Product Feed Price Listings
<http://agebb.missouri.edu/dairy/byprod/bplist.asp>

Missouri Hay Market Listings
<http://agebb.missouri.edu/haylst/>

National Internet Hay Exchange
<http://hayexchange.com/>

Oklahoma Hay Directories
In State: <http://www.oda.state.ok.us/forms/mktdev/haydir.pdf>
Out of State: <http://www.oda.state.ok.us/forms/mktdev/haydiroos.pdf>

Tennessee Hay Directory
<http://www.tnfb.com/hay.htm>

Texas Department of Agriculture Hay and Grazing Hotline
http://www.agr.state.tx.us/producer_info/hay_grazing/com_hayhotline.htm

USDA Memphis Weekly Feed Report
http://www.ams.usda.gov/mnreports/lr_gr210.txt

USDA Southeast Weekly Hay Report
http://www.ams.usda.gov/mnreports/MG_GR310.txt

Helpful Drought-Related Links

Alabama Drought Emergency Relief Effort Website
<http://www.aces.edu/drought/>

Dealing with Drought: A Resource for Cattle Producers (Angus Journal)
<http://www.angusjournal.com/drought/>

Mississippi Beef Cattle Drought Information Resources
<http://msucares.com/livestock/beef/drought.html>

National Drought Mitigation Center
<http://www.drought.unl.edu/>

NOAA Drought Information Center
<http://www.drought.noaa.gov/>

U. S. Drought Monitor
<http://www.drought.unl.edu/dm/>

Literature Cited

Parish, J., R. Watson, M. Collins, J. Anderson, T. Engelken, and P. McCoy. Mississippi Beef Cattle Producer Guide for Coping with Drought Conditions. 2006. Mississippi State University Extension Service and Mississippi State University College of Veterinary Medicine. Mississippi State, MS.