

Estimate of the Economic Impact of Drought on Commercial Beef Cow/Calf Operations in Arkansas: A Comparison of August 2011 to July 2012 with a Typical Production Year

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Executive Summary

The 2012 drought has resulted in an estimated loss to Arkansas cow-calf producers of \$128 million or \$141 per bred cow (Table 1). The economic loss was a result of decreased forage production (\$74.97/ bred cow or \$48.74/hay acre) and reduced calf revenue (\$66.28/bred cow or \$19.93/pasture acre).

In addition to this economic loss, producers responding to an online survey indicated that 73% would be selling their calves earlier than in a typical year, 49% had sold more mature cows, 41% planned to sell more mature cows, 41% had sold replacement heifers and 30% were planning to sell more replacement heifers. Other production changes as a result of the drought included applying extra weed control to improve pastures (40%), selling all livestock (3%), feeding extra hay and supplement (76%), and bringing in off-farm water (18%). Table 3 summarizes changes in key production statistics from a drought year (2012) to a typical year (3-year average).

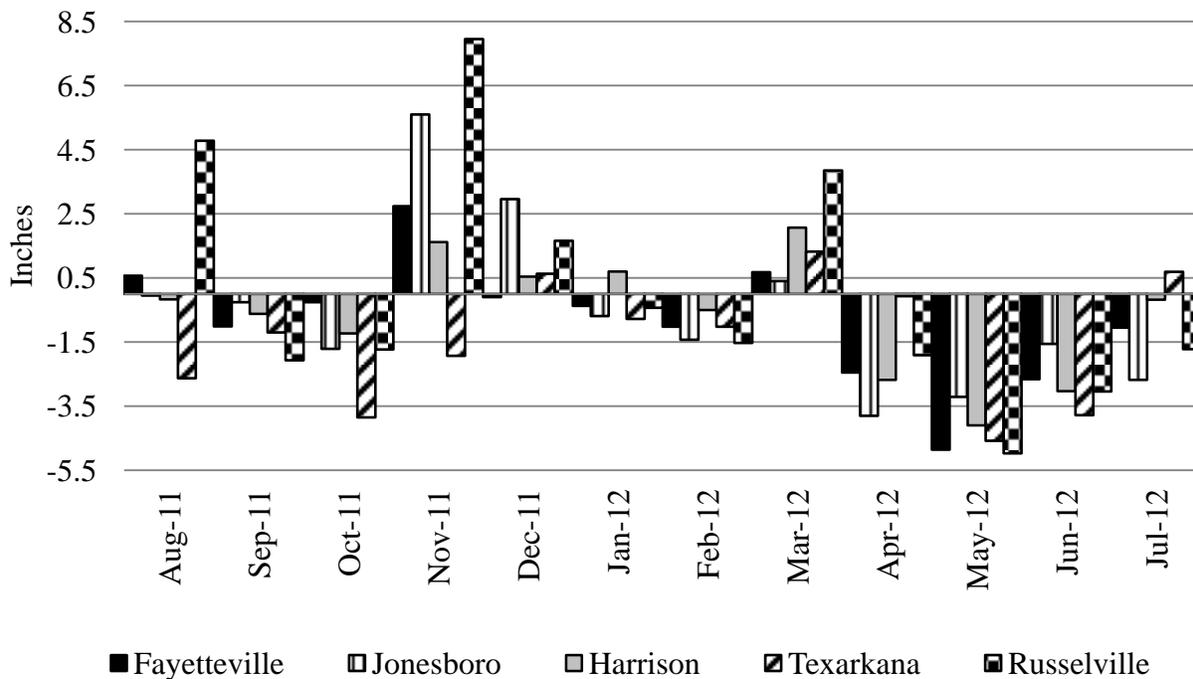
The online survey was distributed to cow-calf producers who are subscribers to a blog established by University of Arkansas System Division of Agriculture extension Animal Science faculty, as well as cattle producers who applied for assistance with the Department of Agriculture. A total of 545 responses from 58 counties were received.

Longer term cow-calf producer economic losses attributed to the drought, such as pasture recovery, increased breeding failures, reduced herd body condition score, or BCS, and the impact on agricultural input industries, will take additional time to quantify.

Introduction

Summer 2012 has been one of the worst droughts in decades and has had a dramatic impact on agricultural producers who could not rely on irrigation in Arkansas. Precipitation from April to July was well below seasonal norms for most of the state (Figure 1). Additionally, precipitation events producing large quantities of rainfall have been short in duration, thus not allowing sufficient time for water to be absorbed into agricultural soils. Cow-calf producers in particular have been adversely affected due to diminished pasture productivity, reduced hay production, lower calf weaning weights resulting from earlier marketings, expected incidence of more reproductive failure due to reduced cow weights and body condition scores, or BCS, and increased input costs for water, pasture maintenance and supplemental feeds. To capture economic consequences that have already taken place from August of 2011 to July of 2012, an online survey was distributed to cow-calf producers who subscribe to part of University of Arkansas Cooperative Extension Service Animal Science department's blog, as well as cattle producers who applied for assistance with the Department of Agriculture. During the last half of August, this resulted in direct e-mail contact of 971 producers via the Animal Science Constant Contact list and 916 producers via the Department of Agriculture with an unknown amount of overlap in mailings. The survey was also announced at producer drought meetings conducted at Hot Springs (Aug. 15) and Harrison (Aug. 16), with a pre-test conducted at Quitman (Aug. 7). A total of 545 responses from 58 counties were received.

Figure 1. Deviation from normal precipitation levels for five locations in Arkansas



As stated above, long-term effects of the drought are yet to be fully realized. Impacts from increased breeding failures, replenishment of breeding stock and pasture/hay land recovery will take several years to completely assess. Immediate economic losses that can be quantified for commercial cow-calf producers are additional hay purchases, reduction in revenue from hay sales and decreased calf revenue. Additional costs incurred by producers that were not numerically quantifiable from survey results include supplemental feed, water, and culled cows (drop in BCS /weight). These costs may represent a significant expense to cow-calf producers. As such, the analysis below should be deemed a conservative estimate of the direct economic impact of the drought on cow-calf producers' income.

Survey / Methodology

The survey was designed to measure deviations in forage and cow-calf production between the last twelve months (Aug. 2011 to July 12) and a typical year (3-year average of August 2008 to July 2011). Respondents were asked to report on their type of cow-calf operation – commercial, purebred or both, as well as their control over calving season (spring, fall, year-round or other). Only responses from commercial producers were used here as purebred producers reflect a much smaller percentage of production and operate at different price levels and incentives than commercial producers. Questions regarding calving season were important to determine how much seasonal detail with respect to sale prices, forage needs and forage availability would be needed. The remaining questions centered on:

- Hay (amounts fed, prices paid/received, acres harvested, fertilizer use),
- Feed supplements other than hay (type and cost),
- Animal statistics (sale weights for steer and heifer calves, selling age for calves, number of and weight of cows bred, number of calves weaned annually and number of herd sires used)
- Pasture (acreage, use of cross fencing, frequency of resting periods for individual pastures, forage species composition, fertilizer use)
- Planned and actual responses to the drought up to end of July 2012 and for the remainder of 2012

The average response time to the survey was 34 minutes, which was longer than intended. While the overall response rate to most questions was quite good, some questions that were more difficult to answer had fewer responses. We thus curtailed this report to reflect those questions where the response rate was greater than 75% to reflect observations that are representative.

Given these limitations, estimation of drought impacts from this survey were focused on producer revenue and cost changes associated with increased hay purchases, lost hay sales, and decreased calf sale weights and associated revenues.

Hay Purchases:

Respondents reported an average purchase price for hay delivered to their operation for a typical and drought year. The reported average price for standard 1,000-pound round bales was \$37.05 and \$58.56 for a typical and drought year, respectively. Combining the change in price with the change in quantity fed between typical and drought years allowed estimation of added hay feeding costs on a \$/bred cow and \$/hay acre basis.

Hay Sales:

Loss of revenue from reduced hay sales was estimated by producer responses to quantify hay sold and selling price. The selling price of a 1,000-pound bale of hay ready for pick up at the side of the field was reported as \$27.52 and \$31.52 for a typical and drought year, respectively. Again, combining price changes with quantity changes allowed calculation of changes in hay sales revenue between a drought and typical year on a \$/bred cow and \$/hay acre basis.

Calf Sales:

Reduction in calf revenue was quantified by estimating the reduction in sale weight and reduction in calf numbers for the drought year compared to a typical year. Respondents provided steer and heifer selling weights under drought and typical conditions as well as changes in the number of calves weaned. We used a 10-year average, inflation-adjusted price for 100-pound weight categories for both heifer and steer calves. This price was chosen rather than the actual prices for the time spans involved to remove the impact of beef cycles and feed price effects on cattle prices. Since 50% of the commercial operations had calves year round, the overall annual average price was used by gender and weight category. A 50/50 breakdown between steer and heifer calves was assumed on each operation. Changes in calf sales were calculated both on a \$/bred cow and \$/pasture acre basis.

Total Change:

A net loss per bred cow was estimated by combining the forage-related losses per bred cow and calf sales reductions per bred cow for each operation. Rather than taking the simple average of these per bred cow numbers across operations, we calculated a weighted average by first totaling the losses reported by all respondents and then dividing by the total number of bred cows (22,277) on all operations as reported by the respondents. Using this average removes size of operation effects.

Table 1. Estimated economic loss for cow-calf producers as a result of the 2012 drought

	Average Loss (\$ per Bred Cow)	Total Estimated Loss for All Cow-Calf Producers in Arkansas (Millions)
Increased Expense		
Hay Purchased	\$64.91	\$59.0
Decreased Revenue		
Hay Sales	\$10.06	\$9.1
Calf Sales	\$66.28	\$60.3
Total Estimated Loss	\$141.25	\$128.4

Results

Table 2 shows the location, by crop reporting district, or CRD, of the 406 commercial cow-calf producer respondents as well as the 2012 USDA estimated numbers of beef cows for each CRD. As anticipated, the majority of the respondents were located in CRD 1 to 5 and 7 in the north, west, and central portion of the state (Figure 2) as those are the regions with the most cows. The estimated economic loss per bred cow was \$141/hd resulting in an estimated loss of \$128 million for cow-calf producers in Arkansas, assuming similar losses occurred across the entire state as those reported by the respondents (Table 1).

Table 2. Number of drought survey responses by crop reporting district (CRD)

CRD	# of Survey Responses	2012 Estimated Number of Beef Cows	Estimated Economic Loss from Reduced Forage and Beef Production in Millions of \$
1	62	208,500	29.5
2	48	84,200	11.9
3	31	57,300	8.1
4	32	90,700	12.8
5	32	61,800	8.8
6	4	20,100	2.8
7	27	59,300	8.4
8	5	21,500	3.0
9	4	11,000	1.6
Not Disclosed	161	294,600	41.7
State Total	406	909,000	128.4

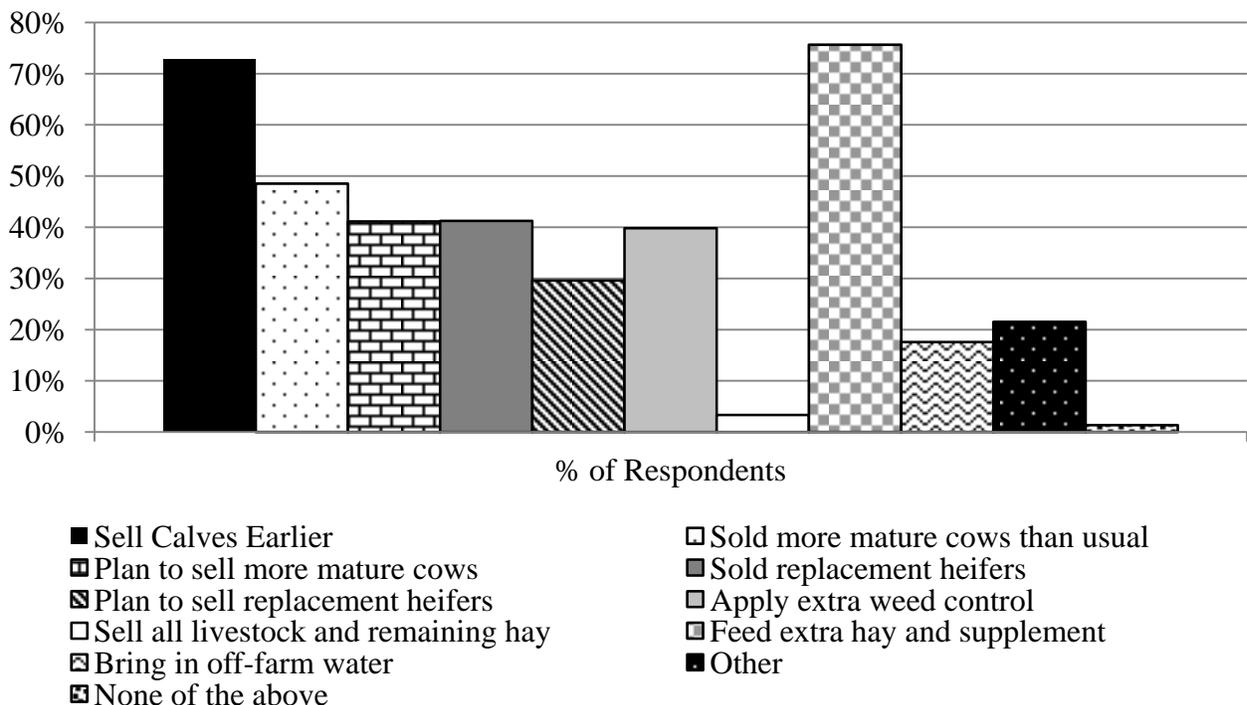
Figure 2. Crop reporting districts (CRD) in Arkansas



Producer Reaction to the Drought

Figure 3 shows producer reaction to the drought. More than 73% of producers indicated they would be selling their calves 2.4 months earlier than in a typical year. Producers also indicated that herd reduction had occurred or was part of their future plans. The number of bred cows per herd decreased on average 8.7 head per operation (average herd size was 77 bred cows in a typical year for the respondents to this survey). Compared to a typical year, producers indicated that 49% had sold more mature cows, 41% planned to sell more mature cows, 41% had sold replacement heifers and 30% were planning to sell more replacement heifers. Other production

Figure 3. Survey Results - Producer response to the summer 2012 drought

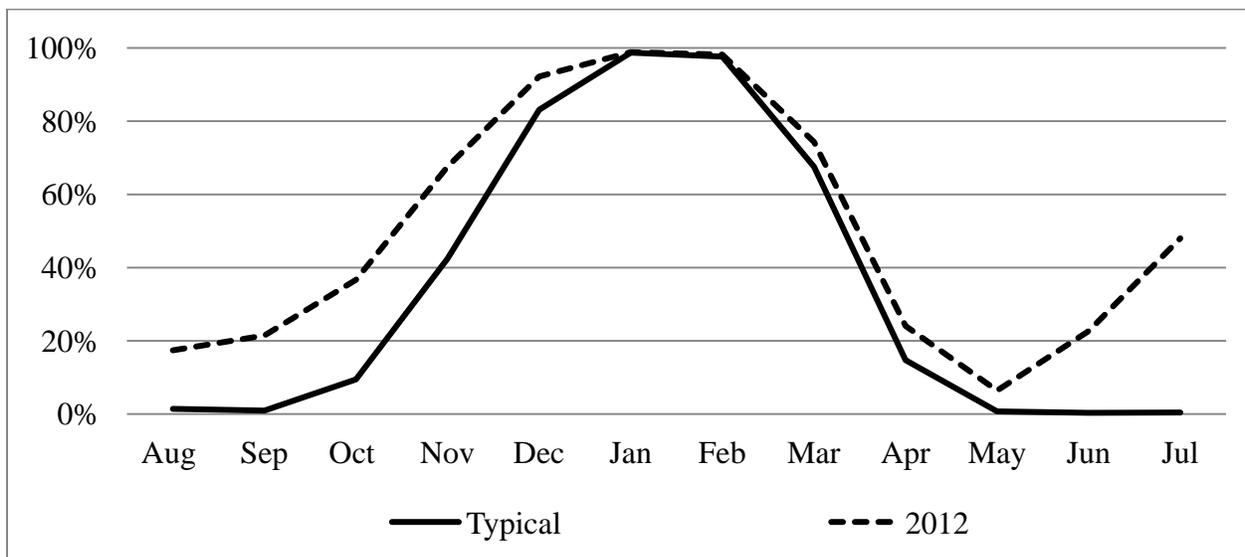


changes as a result of the drought included applying extra weed control to improve pasture growth (40%), selling all livestock (3%), feeding extra hay and supplement (76%), and bringing in off-farm water (18%).

Forage

Forage production across the state has been adversely affected by the drought, resulting in decreased hay availability and increased prices. Figure 4 illustrates the percentage of producers feeding hay for each month of a typical and drought year. The economic loss as a result of decreased forage production was estimated to be \$48.74/hay acre or \$74.97/ bred cow. This estimate does not include supplemental feed costs since the response rate on this question was quite low. Supplemental feeds utilized by producers included range pellets, range cubes, protein tubs, corn, gin trash, corn gluten, grain byproducts, rice bran, DDG, wheat silage, poultry litter, and corn /soybean meal. Usable responses to this question however did indicate that feeding of supplements occurred for an average of 52 more days in the drought year representing a 42% increase over a typical year.

Figure 4. Percentage of cow-calf operations feeding hay by month



Animal performance

Half of the respondents indicated that they practice year-round calving on their operation. Spring and fall calving season were used by 18% and 7%, while a dual calving season (spring and fall) was utilized by 25% of producers. Table 3 shows the change in average herd characteristics for survey respondents between the drought and typical years.

As a result of the drought, producers indicated they would be weaning calves earlier than in a typical year due to a lack of forage. Earlier weaning has resulted in reduced weights, and consequently, reduced returns to producers. Estimated economic impact of reduced weights and

number of weaned calves was \$66.28/bred cow or \$19.93/pasture acre. The average number of calves weaned per operation decreased from 60 in a typical year to 53 in the drought year. This coincided with an average reduction of bred cows from 77 to 68 per herd.

Table 3. Change in selling age, steer and heifer weaning weights, cow weights, number of calves weaned, number of bred cows, hay purchase price, and days on supplemental feed between a typical and drought year for cow-calf producers in Arkansas

	Drought	Typical	% Change
Calf Selling Age (Months)	7.1	8.3	-13.8
Steer Weaning Weight (lbs)	511	591	-13.6
Heifer Weaning Weight (lbs)	473	544	-13.0
Cow Weight (lbs)	1,072	1,157	-7.3
Calves Weaned	52	60	-12.5
Bred Cows	68	77	-11.8
Hay Purchase Price (\$/1,000 lb Bale)	58.56	37.05	58.1
Days on Supplemental Feed	179	127	41.6

Discussion

The drought has resulted in an estimated loss of \$141/hd for commercial cow-calf producers. As mentioned above, this does not include a change in supplement feed or long term drought impacts. These longer term impacts include costs associated with pasture recovery, increased breeding failures due to reduced herd BCS and cow weight, rebuilding herd size and the impacts on agricultural input industries due to a reduced herd size. These impacts will require additional time to fully assess.

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