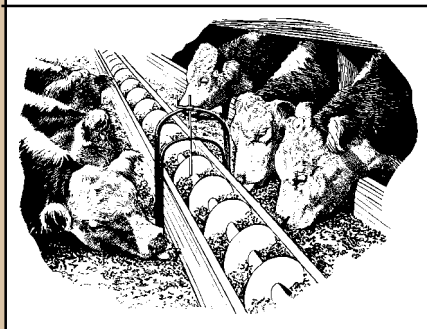
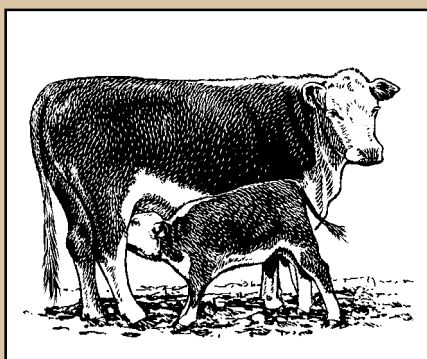


Production Practices of Arkansas Beef Cattle Producers

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ABSTRACT

This report contains information from a 1996 survey on production practices of Arkansas beef cattle producers. While several studies have been completed on the profitability of retained ownership of beef cattle, few empirical data are available on production practices of cow/calf and stocker operations in Arkansas. This report shows that there are some differences in production methods across operation types. Further, the report summarizes demographic characteristics of Arkansas cow/calf and stocker operations. The results of this study can be particularly helpful in providing the needed data for studying the potential economic impact of feeding weaned calves to heavier weights in Arkansas as a value-added production alternative to selling calves at weaning. It should also prove helpful in the formulation of budgets and simulation models.

Key words: retained ownership, cattle production, beef producer statistics

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CONTENTS

INTRODUCTION	5
SAMPLING PROCEDURE AND SURVEY DESIGN	6
COW/CALF OPERATION HERD SIZE	8
AGE OF BREEDING STOCK	9
MANAGEMENT OF CALVING SEASONS	9
Control Over Calving Seasons by Operation Type	10
Control Over Calving Seasons by Herd Size	12
COMMERCIAL VS. PUREBRED OPERATIONS	12
Feeding of Weaned Calves by Business Type	13
Operation Size by Business Type	13
EXPERIENCE WITH FEEDING WEANED CALVES	14
Experience with Custom Feeding of Weaned Calves	14
Experience with Pasture Rental for Feeding Weaned Calves	15
ALTERNATIVE USES FOR PASTURE	16
STOCKER AND BACKGROUNDER OPERATIONS	16
Stocker vs. Backgrounder	17
Average Days on Feed and Steer and Heifer Weights	17
Differences in Feeding Methods Across Operation Types	18
Number and Type of Cattle Fed	19
Three-year Feeding Trends	22
Cattle Ownership	22
Capacity and Capacity Utilization:	22
Record Keeping	23
BEEF PRODUCER STATISTICS–	
OTHER LIVESTOCK, LAND AND CATTLE SALES	24
Other Livestock	24
Acreage Used for Cattle Enterprise	24
Pasture Rental Fees	27
Cattle Sales Relative to Farm Sales	27
PRODUCER DEMOGRAPHICS	29
Operator Age	29
Education	29
SUMMARY AND CONCLUDING REMARKS	30
LITERATURE CITED	33
APPENDIX A: SURVEY INSTRUMENT	34

Production Practices of Arkansas Beef Cattle Producers¹

Michael P. Popp and Lucas D. Parsch

INTRODUCTION

A survey was conducted in 1996 in order to obtain information regarding livestock production and marketing practices of Arkansas cattle producers. This report highlights current production practices. Three types of operations were surveyed: 1) cow/calf operations that sell calves at weaning; 2) cow/calf operations that feed weaned calves to a heavier weight; and 3) stocker or backgrounding operations that prepare weaned calves for feedlot placement. These enterprises operate at different processing stages of the beef cattle marketing channel and exhibit different degrees of specialization in production. Cow/calf-only and stocker-only operations are more specialized than cow/calf operations that also feed weaned calves. This questionnaire was designed to address what operational similarities or differences exist across these different operations.

In particular, information on herd size and age of breeding stock, producers' control over calving seasons, their involvement in the purebred business, experience with feeding weaned calves and alternative uses for pasture are summarized. The paper also provides detail on the mix of business that stocker operations pursue. Finally, statistics on land use, the degree of specialization and producer demographics are reported.

There are a number of studies that compare returns to selling calves at weaning versus returns obtained from continuing to feed weaned calves to heavier weights either on farm or on a custom basis (Watt et al., 1987; Johnson et al., 1989; Gage, 1993 and 1994; Feuz and Wagner, 1996). Results of most

¹This paper is part of a set of reports funded by the University of Arkansas Agricultural Experiment Station, Research Initiation Program. The authors are thankful for the help of Michel Pardue, Diana Danforth and other support staff for helping with the data entry and questionnaire design.

of these studies conclude that feeding calves to heavier weights as a value-added marketing alternative to selling at weaning is profitable. Most of these studies also use various livestock production budgets and simulation models to do these analyses. Many assumptions are made that are often not based on empirical research. Therefore, the focus of this paper is to provide empirical data on operational statistics for further research on the economic viability of value-added marketing and production alternatives for Arkansas beef cow/calf operations.

This information is valuable because 1) it updates statistics on livestock production practices and producer demographics in Arkansas; 2) it can be used to show how producers' production methods change with different levels of specialization; and 3) it provides the background for further study.

SAMPLING PROCEDURE AND SURVEY DESIGN

A mail survey (Salant and Dillman, 1994) was chosen in order to allow respondents to consult records and to respond to a lengthy and difficult set of questions. The questionnaire (see Appendix A) was mailed to mid- to large-sized beef cattle operations in Arkansas because these operations would be large enough and sufficiently specialized to answer the questions of interest. In addition, these operations handle the majority of the cattle in Arkansas (see Table 1).

Table 1 describes the size distribution of beef cattle operations in Arkansas for 1996. The subsample of mid- to large-sized beef producers with more than 50 and less than 1,000 cattle contained 7,239 producers, or approximately 40% of the total number of beef cattle operations in Arkansas. Further, this

Table 1. Number of beef cattle operations by size group, 1996.

Size Group ¹	Number of Farms	% of All Beef Cattle Farms	Estimated No. of Cattle ²	% of Est. Total No. of Cattle
1 - 9	1,441	8.0	7,205	0.5
10 - 19	2,600	14.4	37,700	2.7
20 - 49	6,776	37.4	233,772	16.5
50 - 99	3,887	21.5	289,582	20.4
100 - 199	2,120	11.7	316,940	22.4
200 - 499	1,060	5.9	370,470	26.1
500 - 999	172	1.0	128,914	9.1
1000 - 1499	26	0.1	32,487	2.3
1500 - 9999	20	0.1	n/a ³	n/a ³
Total Farms	18,102	100.0	1,417,070	100.0

Notes: Percentages may not add due to rounding. (Source: James Ewing of Arkansas Agricultural Statistics Service who coordinated the mail survey and sampling procedure. Arkansas Agricultural Statistics Service, 1996)

¹ Cattle includes cows, heifers that have calved and animals over 500 lb.

² The estimated number of cattle per size group is the product of the number of farms and the mid-point or average number of cattle per farm per size group. For example, the estimated number of cattle in the '1-9' head size group is 1,441 farms * [(1+9)/2] average head of cattle / farm with 1 - 9 head = 7,205 head of cattle.

³ Not included as the average or mid-point because this category might be misleading.

PRODUCTION PRACTICES OF ARKANSAS BEEF CATTLE PRODUCERS

subsample of producers represents nearly 80% of beef cattle in Arkansas. The first mailing was sent out 6 May 1996 with 2,500 addresses across the entire state of Arkansas picked at random by Arkansas Agricultural Statistics Service. On 20 May, two weeks after the initial mailing, a follow-up survey was sent out. In all, 1,094 surveys were returned with 1,057 usable observations, a 42.3% mail return rate.

The survey was organized to ask specific questions of producers by their type of operation. The three types of operations were classified into the following categories:

- 1) Cow/calf - operations that sell calves at weaning except for replacement heifers. The sample contained 851 (80.5%) observations in this category;
- 2) Feeder - operations that are involved in either purchasing weaned calves and feeding to heavier weights or custom feeding them to get weaned calves ready for feedlot placement. These operations may graze animals (stockering) and/or feed them in a drylot environment (backgrounding). The sample contained 34 (3.2%) observations in this category;
- 3) Mixed - operations that have a cow/calf *and* a feeding component in their business. The sample involved 172 (16.3%) observations in this category.

The report can be divided into three general areas. First, results of queries that only operations with a cow/calf business component could answer are reported for cow/calf operations that sell weaned calves ('Cow/calf') and cow/calf operations that feed their calves ('Mixed'). The production-oriented questions were related to cow/calf operation herd size, culling and breeding age, management of calving seasons, the degree of involvement in purebred cattle, the experience with feeding weaned calves and finally alternative uses for pasture.

Second, there is a section reporting on operations that feed weaned calves. There are operations that feed their own calves ('Mixed') as well as those that custom feed or purchase weaned calves ('Feeder'). Here respondents were asked to identify their production method (grazing or drylot), length of feeding period, finish weights of steer and heifer calves, type and quantity of animals fed, operation capacity, extent of custom feeding and, finally, record keeping.

The final set of general questions, applicable to all operation types ('Cow/calf', 'Mixed' and 'Feeder'), was on what other types of livestock were fed on farm, a breakdown of owned and rented acreage used for the cattle operation, pasture rental fees, cattle sales as a percentage of farm sales and demographic questions on age and education.

COW/CALF OPERATION HERD SIZE

Producers were asked to indicate the size of their operation by selecting a size category for each of the following: 1) number of cows (bred or with calf); 2) replacement heifers (open and bred); and 3) herd sires (Appendix A, Question 1). The results are shown in Table 2. Over 70% of the operations sampled had between 50 and 149 cows in their operation. Slightly more than half of the operations had between 10 and 29 heifers. The most common number of herd sires was between three and four.

To calculate sample averages of the number of cows, bull and heifers per operation, the top size category was excluded since 1) that size category represents a small percentage of producers and 2) that size category has no easily identifiable mid-point or average size. The average number of cows, heifers and bulls per operation was then calculated by adding the product of the reported number of operations and the mid-point or average size of each size category and dividing that total by the number of observations used. For example, the average number of cows per operation is calculated as follows:

$$\frac{(0+24)/2 \cdot 20 + (25+49)/2 \cdot 91 + (50+99)/2 \cdot 476 + (100+149)/2 \cdot 244 + (150+199)/2 \cdot 110}{20+91+476+244+110} = 94.2 \text{ cows/operation}$$

Using this method, the average beef cattle operation had 94.2 cows, 18.6 heifers and 3.6 herd sires. In addition, other operational statistics such as breeding animals per herd sire and the average turnover of the breeding stock were calculated. The average operation used one herd sire for 26.2 cows or 31.3 cows and heifers. Since both open and bred heifers were counted in the replacement heifer category, the cows and heifers per herd sire may be slightly high. The data also suggest that it takes 18.6 heifers to maintain a total breeding stock of 112.8 head. In other words, cows are replaced after $112.8 / 18.6 =$

Table 2. Current herd inventory of cows, heifers and bulls of Arkansas cow/calf operations.

	# of head per operation							Response Rate (%) ¹
	<24	25-49	50-99	100-149	150-199	200+	Total	
Cows:								
# of respondents:	20	91	476	244	110	76	1017	
% of responses:	2.0	9.0	46.8	24.0	10.8	7.5	100.0	99.4
Heifers:	<5	5-9	10-19	20-29	30-49	50+	Total	
# of respondents:	88	89	254	189	113	74	807	
% of responses:	10.9	11.0	31.5	23.4	14.0	9.2	100.0	78.9
Bulls:	None	1	2	3-4	5-7	8+	Total	
# of respondents:	6	47	164	353	175	124	869	
% of responses:	0.7	5.4	18.9	40.6	20.1	14.3	100.0	84.9

Notes: Percentages may not add to 100 due to rounding.

¹ Based on 1,023 eligible 'Cow/calf' and 'Mixed' respondents.

PRODUCTION PRACTICES OF ARKANSAS BEEF CATTLE PRODUCERS

6.1 calving seasons. Using this average turnover of the breeding stock, the average culling age can be calculated by adding the age of a replacement heifer at first calving.

AGE OF BREEDING STOCK

Producers were asked to provide information on the age of their breeding stock (Appendix A, Questions 3 and 4). Table 3 shows that the average age of cows was 6.2 years. In addition, there was a broad range in the age of the oldest cows. The average age at first calving at 26.4 months (2.2 years), and the 6.1 calving seasons per cow calculated above suggest that the culling age of cows is 8.3 years. Further, the standard deviation suggests that in roughly two out of three cases, the calving age is between 22.9 and 29.9 months. This translates to a breeding age range of 14 to 21 months with a wider range likely given the variability in conception rates of heifers.

MANAGEMENT OF CALVING SEASONS

Producers were asked to match their management practice regarding calving season or multiple calving seasons with the following categories: 1) winter; 2) spring; 3) summer; 4) fall and 5) year-round calving (Appendix A, Question 5). While this question was intended to reveal seasonality in production, it also showed whether operations practiced control over breeding and calving periods. To interpret the results shown in Table 4, the following response categories were established:

- 1) One season (winter or spring or summer or fall) - for operations with a distinct starting and ending point for calving once a year. Some respondents had checked two adjoining seasons, e.g. spring and summer. For these cases, the response was adjusted to a single season as the earlier of the two seasons;
- 2) Two season (spring and fall or summer and winter) - for operations that had two distinct starting and ending points for calving twice a year;

Table 3. Age of cows, oldest cows and heifers at first calving for Arkansas cow/calf operations.

Statistics	Average Age of Cows	Age of Oldest Cow	Age of Heifer at First Calving
	-----Years-----		Months
Average	6.2	11.6	26.4
Standard Deviation ¹	1.6	3.2	3.5
Minimum	2	3	19
Maximum	15	24	36
Response rate (%) ²	95.9	92.9	94.0

¹The range of values delineated by the average value \pm one standard deviation encompasses a 68% confidence interval—i.e., in approximately two of three cases, observed values will be within the confidence interval.

²Based on 1,023 eligible 'Cow/calf' and 'Mixed' respondents.

Table 4. Management practice related to calving seasons for Arkansas cow/calf operations.

Statistic	Un-controlled	One Season				Two Season ¹	Total	Response Rate (%) ²
		Winter	Spring	Summer	Fall			
# of respondents:	405	102	162	2	57	289	1,017	
% of responses:	39.8	10.0	15.9	0.2	5.6	28.4	100.0	99.4

Notes: Percentages may not add to 100 due to rounding.

¹ 287 operations were spring and fall; two operations were summer and winter. Ten spring & summer were categorized as spring only, 49 winter & spring were categorized as winter only, 21 fall & winter were categorized as fall only, and one summer & fall was categorized as summer only.

² Based on 1,023 eligible 'Cow/calf' and 'Mixed' respondents.

- 3) Uncontrolled (year round) - for operations that cited three or more calving seasons with no clearly identifiable starting and ending points for calving in the year.

The overall statistics suggest that for nearly 40% of the cases, 'uncontrolled' calving was the norm. However, there were a large number of operations that were working with 'two-season' calving. Finally, the practice of 'two-season' calving appeared to be least common when compared to 'one-season' and 'uncontrolled' calving.

Some of the following reasons may exist for operators of different operations to use two distinct calving seasons rather than just one:

- 1) Marketing reasons - Calf prices exhibit seasonality; therefore, it may be advantageous to coordinate calving to generate calves when prices are highest;
- 2) Improved utilization of hired labor - Larger operations may be able to better utilize hired labor with two calving seasons and, therefore, exercise more control over calving season;
- 3) Improved utilization of pasture - The coordination of feeder cattle supplies for seasonal pasture grazing may be important;
- 4) Improved utilization of herd sires - Bulls may be used twice a year rather than once. In addition, cows or heifers that had breeding failures could be serviced again after half a year rather than being culled or idle for a full year.

Statistical tests were conducted in order to determine whether management practices regarding calving seasons differed across operation type ('Cow/calf' vs. 'Mixed') and operation size. These tests evaluated whether there were significant differences in the distribution of responses that operations had provided about the level of control they exercised over calving seasons.

Control Over Calving Seasons by Operation Type

Figure 1 and Table 5 indicate differences between 'Cow/calf' and 'Mixed' operations with respect to the control over calving seasons. 'Cow/calf' operations had largely uncontrolled calving seasons and the least amount of two-

PRODUCTION PRACTICES OF ARKANSAS BEEF CATTLE PRODUCERS

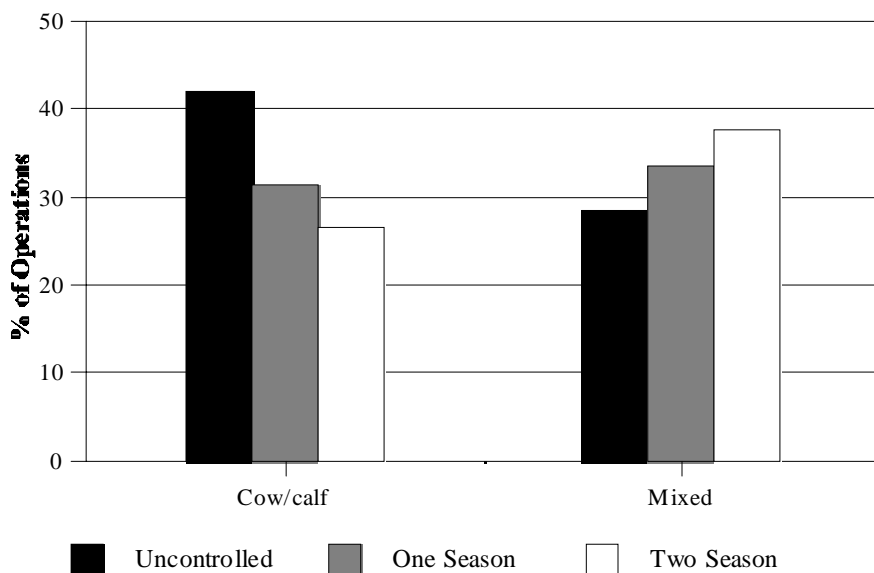


Fig. 1. Control over calving season (cow/calf vs. mixed operations).

Table 5. Distribution of uncontrolled, one-season and two-season calving by operation type.

Operation Type	Uncontrolled	One Season	Two Season	No. of Respondents	χ^2 -statistic (Probability)
	-----%-----				
Cow/calf	42.1	31.4	26.5	845	13.330
Mixed	28.5	33.7	37.8	172	(0.001)
All	39.8	31.8	28.4	1,017 ¹	n/a

¹ 1,017 implies six missing observations or a 99.4% response rate.

season calving. 'Mixed' operations exhibited exactly the opposite: more control over calving seasons and less uncontrolled calving.

Table 5 shows the percentage breakdown of responses for the two operation types, the number of respondents for each type of operation, the calculated χ^2 -square statistic and the probability of rejecting the null hypothesis.¹ The null hypothesis is that the distribution of answers across the different response categories was the same for 'Cow/calf' and 'Mixed' operations. A probability of

¹All statistical tests were run using Windows version 6.12 of SAS. To test for statistically significant differences in the distribution of answers across operation type, χ^2 tests were used (Huntsberger and Billingsley, 1987).

less than 0.05 indicates that the distribution of answers was different across operation type with 95% confidence. This means that 'Cow/calf' operations managed calving seasons differently than 'Mixed' operations. The bottom row of the table shows the percentages for each response category weighted by the number of respondents. It reports the practice of controlled, one-season and two-season calving for all of the 1,023 eligible 'Cow/calf' and 'Mixed' operations.

Control Over Calving Seasons by Herd Size

Similar statistics are provided for the distribution of answers regarding control over calving seasons by operation size for 'Cow/calf' and 'Mixed' operations. This information is presented in Table 6. The trend there was not as decisive. In the first column, uncontrolled calving increased slightly from the smallest category to the next larger category. Uncontrolled calving then declined to 30.3% once the cow herd size reached 200 or more animals. In the second column, the single calving season was used most in the smallest size category when compared to the other size categories. The trend in two controlled calving seasons in the third column was more evident—least popular among small producers but preferred among the larger operations. This suggests that there may be economies of size associated with two calving seasons and that a critical size is necessary before two controlled calving seasons are feasible. Although the trends across the different levels of control are not distinctive, the χ^2 -statistic nevertheless shows that the distribution of answers differed by herd size.

COMMERCIAL VS. PUREBRED OPERATIONS

'Cow/calf' and 'Mixed' operations were asked to select a business category that most closely represented their cow/calf operation from the following (Appendix A, Question 2):

- 1) Commercial - operations that raise and produce commercial beef cattle only for slaughter.

Table 6. Distribution of uncontrolled, one-season and two-season calving by operation size.

Herd Size	Uncontrolled	One Season	Two Season	No. of Respondents	χ^2 -statistic (Probability)
no. cows/operation	-----%-----				
< 50	42.2	38.5	19.3	109	13.057
50 - 99	43.3	28.4	28.4	476	(0.042)
100 - 199	36.4	33.9	29.7	354	
200 +	30.3	34.2	35.5	76	
All	39.8	31.8	28.4	1,015 ¹	n/a

Notes: Percentages may not add to 100 due to rounding.

¹ 1,015 implies eight missing observations or a 99.2% response rate.

PRODUCTION PRACTICES OF ARKANSAS BEEF CATTLE PRODUCERS

- 2) Purebreeder - operations that raise and sell purebred cattle only as breeding stock.
- 3) Combined - operations that produce beef cattle for slaughter and also raise and sell purebred breeding stock.

The sample showed that only 27 operations identified themselves as purebreeders (see Table 7). The majority of operations were commercial operations.

Feeding of Weaned Calves by Business Type

To test whether raising and selling purebred cattle as breeding stock would affect whether feeding of weaned calves would take place, the 'Purebreeder' and 'Combined' categories from Table 7 were combined into the 'Some Purebreeding' category in Table 8. The distribution of responses across the business categories 'Commercial' and 'Some Purebreeding' revealed that a higher percentage of 'Some Purebreeding' operations fed weaned calves or were 'Mixed' operations. The χ^2 -statistic and 10.6% probability suggests that this difference was only marginal, however. In other words, approximately 90% of the time a larger percentage of 'Some Purebreeding' operations fed weaned calves. One explanation for this may be that 'Some Purebreeding' operations, with a purebreeding component in their business may be more interested in the feeding performance of their animals and, therefore, engage more in the feeding activity.

Operation Size by Business Type

To test the relationship between business category and operation size, the 'Purebreeder' and 'Both' categories from Table 7 were grouped together in the 'Some Purebreeding' category. Table 9 shows statistics similar to Table 8 and indicates that more respondents in the 'Some Purebreeding' operations category, operations with a purebred component, were also in the larger size

Table 7. Distribution of commercial, purebreeder and combined operations in Arkansas.

Statistic	Commercial	Purebreeder	Combined	All	Response Rate (%) ¹
# of respondents	831	27	149	1,007	
% of responses	82.5	2.7	14.8	100.0	98.4

¹Based on 1,023 eligible 'Cow/calf' and 'Mixed' respondents.

Table 8. Distribution of cow/calf and mixed operations by business type.

Business Type	Cow/calf	Mixed	No. of respondents	χ^2 -statistic (Probability)
	-----%-----			
Commercial	84.0	16.0	831	2.606
Some Purebreeding	79.0	21.0	176	(0.106)
All	83.1	16.9	1,007 ¹	

¹ 1,007 responses implies 16 missing observations or a response rate of 98.4%.

Table 9. Distribution of operation size by business type.

Business Category	Herd Size(# of cows per operation)						No. of Respondents	χ^2 -statistic (Probability)
	<24	25-49	50-99	100-149	150-199	200+		
	-----%-----							
Commercial	2.0	8.1	49.4	23.6	10.2	6.6	830	15.360
Some Purebreeding	1.7	11.4	35.4	25.7	13.7	12.0	175	(0.009)
All	2.0	8.7	47.0	24.0	10.9	7.6	1,005 ¹	

Notes: Percentages may not add to 100 due to rounding.

¹ 1,005 responses implies 18 missing observations or a 98.2% response rate.

categories. The percentage of operations in the largest size category of the 'Some Purebreeding' operations was nearly twice that of the figure in the 'Commercial' category. The 50-99 cow herd size category contained half of the commercial operations but only a third of the 'Some Purebreeding' operations with a purebred business. The χ^2 -square statistic shows that the difference in the size distributions was statistically significant or that 'Commercial' operations were generally smaller than the 'Some Purebreeding' operations.

EXPERIENCE WITH FEEDING WEANED CALVES

This section solicited information about the level of experience 'Cow/calf' and 'Mixed' producers had with feeding weaned calves. Producers were asked to match five different levels of experience, ranging from 'Never' to 'Always', to the following four production questions: 1) do you feed and care for your own calves? 2) do you feed your own plus purchased calves? 3) do you have a stocker/backgrounder feed for you? and 4) do you rent pasture to feed your calves? (Appendix A, Question 6).

The first two questions attempted to verify the respondents' classification as a 'Cow/calf' vs. 'Mixed' operation by asking how often respondents fed their own calves or owned and purchased calves. Unfortunately, the question was designed in such a way that respondents may have been confused about the definition of calves in this context. The intended meaning was weaned calves, but the respondents answered the questions to pertain to calves in general. Data from the first two questions, therefore, could not be analyzed in a meaningful manner. The last two questions on custom feeding and pasture rental are not affected and are interpreted next.

Experience with Custom Feeding of Weaned Calves

When calves are weaned, producers often face the decision of whether they should continue to feed their calves or sell them. One of the options producers do not often consider is the custom feeding of weaned calves. The question 'Do you have a stocker/backgrounder feed for you?' addressed this issue. Further, there may be some differences between operations that feed weaned calves and those that do not. Table 10 reports on the results to this question.

PRODUCTION PRACTICES OF ARKANSAS BEEF CATTLE PRODUCERS

Table 10. Distribution of experience with custom feeding by operation type.

Operation Type	Never	Not Yet	No Longer	Some-times	Always	No. of respondents	χ^2 -statistic (Probability)
	-----%						
Cow/calf	85.7	6.9	2.7	3.3	1.4	700	50.229
Mixed	67.5	9.7	2.6	10.4	9.7	154	(0.001)
All	82.4	7.4	2.7	4.6	2.9	854 ¹	

Notes: Percentages may not add due to rounding.

¹ 854 responses implies 169 missing observations or a 83.5% response rate.

The differences in the distribution of experience with custom feeding were statistically significant across operation type. The χ^2 -statistic suggests that there was a very low probability, less than 0.1%, that the difference in experience with custom feeding was not different across operation types. Compared to the 'Mixed' respondents, nearly 20% more of the 'Cow/calf' respondents had never had experience with having their weaned calves custom fed by a stocker or backgrounding operation. Most 'Cow/calf' operations were not interested in custom feeding. Some had tried it, and others might. Very few operations had calves custom fed sometimes or always. By contrast, 'Mixed' operations were more inclined to have experience with custom feeding or were at least interested in it. The low percentages in the 'no longer' category suggest that respondents tended to continue custom feeding once they had tried it. It may be that operations that had calves custom fed at one point subsequently decided to feed weaned calves on their own. In other words, their experiences with selling at different calf weights at different times of the year were positive and led them to continue to feed weaned calves.

Experience with Pasture Rental for Feeding Weaned Calves

Table 11 shows that the practice of pasture rental was different across operation type. The data suggest that it was quite common for a 'Mixed' operation to sometimes rent land for pasture. By contrast, 'Cow/calf' operators were less inclined to rent pasture land. Since 'Mixed' operations were larger in terms of cow herd size, they may also need more land. Rental may be a more affordable and flexible option than outright land ownership.

Table 12 shows data on the experience with pasture rental according to size category. Differences were again statistically significant as shown by the low probability associated with the χ^2 -statistic.

Some of the largest differences across herd sizes were for operators who had never rented pasture to feed weaned calves. In addition, a trend may be observed in the last two columns. Compared to the smallest size operations, approximately 10% more of the largest operations rented pasture either sometimes or always (i.e., renting pasture for feeding weaned calves was more common among larger operations).

Table 11. Distribution of experience with pasture rental by operation type.

Operation Type	Never	Not Yet	No Longer	Some-times	Always	No. of respondents	χ^2 -statistic (Probability)
	-----%						
Cow/calf	59.6	5.4	4.7	21.4	8.8	738	19.603
Mixed	42.8	9.4	4.4	34.6	8.8	159	(0.001)
All	56.6	6.1	4.7	23.8	8.8	897 ¹	

Notes: Percentages may not add due to rounding.

¹ 897 responses implies 126 missing observations or a 87.7% response rate.

Table 12. Distribution of experience with pasture rental by operation size.

Herd Size	Never	Not Yet	No Longer	Some-times	Always	No. of respondents	χ^2 -statistic (Probability)
	-----%						
# cows/operation							
<50	50.5	6.1	9.1	22.2	12.1	99	19.937
50-99	60.2	7.2	5.0	19.4	8.2	417	(0.068)
100-199	55.5	4.9	3.3	28.3	8.1	308	
200+	49.3	5.6	2.8	32.4	9.9	71	
All	56.7	6.2	4.7	23.8	8.7	895 ¹	

Notes: Percentages may not add due to rounding.

¹ 895 responses implies 128 missing observations or a 87.5% response rate.

ALTERNATIVE USES FOR PASTURE

Table 13 shows the percentage of operations that could use their pasture for haying, rental, a tree farm, other livestock, crops and various other uses by operation type (Appendix A, Question 7). Among the alternative uses for pasture, haying the pasture instead of grazing was most common. The major difference among 'Cow/calf' and 'Mixed' operations was that the 'Mixed' operations showed more alternative uses for their pasture land. This was especially true for the crops category. This is likely a function of the use of winter wheat pasture or other improved pastures on crop land by 'Mixed' operations that feed weaned calves.

STOCKER AND BACKGROUNDER OPERATIONS

This set of questions relates to operational characteristics of operations that fed weaned calves; therefore, only 'Mixed' and 'Feeder' operation types were queried. As noted previously, there were 172 'Mixed' operations that had both a cow/calf operation and fed weaned calves and 34 'Feeder' operations that were solely in the business of feeding weaned calves. The first set of questions elicited whether the operation was of the following type:

- 1) 'Stocker' - an operation in which calves are placed on pasture and grazed until marketed (Appendix A, Question 9);

PRODUCTION PRACTICES OF ARKANSAS BEEF CATTLE PRODUCERS

Table 13. Alternative uses for pasture by operation type.

Alternative Use of Pasture land	% of operations that have this option available			χ^2 -statistic (Probability) ¹
	Cow/calf	Mixed	All	
Hay	91.5	90.6	91.3	0.135 (0.713)
Rent out	10.7	11.8	10.9	0.173 (0.677)
Tree farm	10.0	14.7	10.8	3.312 (0.069)
Other livestock	6.9	12.9	7.9	7.145 (0.008)
Crops	3.6	10.6	4.7	15.487 (0.001)
Various	2.9	5.9	3.4	4.018 (0.045)
No other use	9.3	7.7	9.0	0.446 (0.504)

Notes: There were 834 and 170 'Cow/calf' and 'Mixed' respondents with 98.0% and 98.8% response rates, respectively.

¹These statistics provide tests on the hypotheses that 'Cow/calf' and 'Mixed' operations had different alternative uses of pastures. The null hypothesis in each case was that the distribution of 'Yes' and 'No' answers was the same across operation type. A probability level less than 0.05 indicates that differences existed with 95% confidence.

2) 'Backgrounder' - an operation in which calves are fed hay and concentrates in a drylot (Appendix A, Question 10); or

3) 'Combined' - an operation that used both of the above feeding methods.

Other points of interest were to see how long cattle were in the feeding program, at what weights they were sold and what type of cattle were placed, i.e., steer calves, heifer calves or bull calves. The final set of questions asked about custom feeding or the distribution of cattle ownership, the extent of capacity utilization and the kinds of records that were kept.

Stocker vs. Backgrounder

Table 14 shows a breakdown of 'Stocker', 'Backgrounder' and 'Combined' operations. Overall, a grazing program was most common. It appears that 'Mixed' operations were more inclined to background calves or use both methods as compared to 'Feeder' operations. 'Feeder' operations relied more heavily on grazing cattle than putting them on feed in the drylot. The reasons for this may be that 'Mixed' operations have existing cattle facilities, in which case it may be relatively less costly to add a feeding pen for weaned calves than to build new facilities.

Average Days on Feed and Steer and Heifer Weights

Table 15 shows differences on the days on feed and weight statistics between 'Stocker' and 'Backgrounder' feeding methods (Appendix, Questions 9 and 10). To compare the results on days on feed and finish weights across feeding method, t-statistics and associated probabilities on the difference in average responses were calculated.¹ The sign on the t-statistic shows whether

¹These tests were performed using the UNIVARIATE procedure in SAS. Based on the results of an F-test on equal or unequal variances across the samples, differences in means across samples were tested with the appropriate t-statistic (Huntsberger and Billingsley, 1987).

Table 14. Usage of different feeding methods by operation type.

Operation Type	Feeding Methods (% of operations that used this method)			No. of Respondents	χ^2 -statistic (Probability)
	Stocker	Backgrounder	Combined		
Mixed	70.9	13.9	15.2	165	4.488
Feeder	87.9	3.0	9.1	33	(0.106)
All	73.7	12.1	14.1	198 ¹	

¹ 198 responses implies a 96.1% response rate or eight missing observations. These eight respondents did not indicate whether they were stocker or backgrounder operations.

Table 15. Number of days on feed and finish weights across feeding method¹.

Statistic		Feeding Method		t-statistic (Probability)
		Stocker	Backgrounder	
Days on Feed (days per head)	Average	167	93	-9.2386
	Standard Deviation	68	40	(0.0001)
	Minimum	30	10	
	Maximum	365	180	
	# of observations	167	46	
Steer Weight (lb/head)	Average	723	750	9.107
	Standard Deviation	105	193	(0.3667)
	Minimum	500	450	
	Maximum	1250	1250	
	# of observations	153	45	
Heifer Weight (lb/head)	Average	667	687	0.7313
	Standard Deviation	94	166	(0.4683)
	Minimum	450	450	
	Maximum	1050	1100	
	# of observations	137	40	

¹ Both 'Mixed' and 'Feeder' operations could respond to this question.

the difference in means is positive or negative. A probability below 0.05 indicates that the averages reported were different across the two feeding regimes with 95% confidence. The difference in the reported days on feed between the two feeding methods was statistically significant whereas the differences in average finish weights across feeding methods were not.

Differences in Feeding Methods Across Operation Types

For operations that used the 'Stocker' feeding method, Table 16 shows differences in the average days on feed and steer and heifer weights across operation type ('Mixed' vs. 'Feeder'). To analyze differences in production statistics, averages were compared using a t-test. A probability of less than 0.05 indicates that the averages were significantly different. 'Feeder' operations tended to graze cattle longer and feed to heavier steer and heifer finish weights than 'Mixed' operations.

PRODUCTION PRACTICES OF ARKANSAS BEEF CATTLE PRODUCERS

For 'Backgrounder' operations, differences in the number of days on feed, and steer and heifer weights across operation type ('Mixed' vs. 'Feeder') were not statistically significant, primarily because the number of 'Feeder' observations was very small (< 5 observations). Nonetheless, Table 17 shows the averages reported.

Number and Type of Cattle Fed

'Feeder' and 'Mixed' operations were asked to provide information on the number of head of bull, steer and heifer calves they had fed over the previous three years, 1994 to 1996 (Appendix A, Question 11). The data were not analyzed for each year but instead were averaged over the three-year period. In order to do that, the following assumptions were made:

- 1) if a producer did not answer any of this question, the information was not included;
- 2) if the respondent listed some numbers in the beef or dairy category for any of the years from 1994 to 1996, a blank field was assumed to represent a zero.

Table 16. Differences in production statistics for stocker feeding method by operation type.

Description	Operation Type	Grazing Statistic	No. of Respondents	t-statistic (Probability)
Days on feed (days/head)	Mixed	156	125	4.272
	Feeder	211	31	(0.000)
Steer weight (lb/head)	Mixed	713	130	2.151
	Feeder	778	23	(0.041)
Heifer weight (lb/head)	Mixed	661	119	2.167
	Feeder	711	18	(0.032)

Table 17. Production statistics for backgrounder or drylot feeding regimes by operation type.

Description	Operation Type	Grazing Statistic	No. of Respondents	t-statistic (Probability)
Days on feed (days/head)	Mixed	96	42	-1.802
	Feeder	60	4	(0.079)
Steer weight (lb/head)	Mixed	756	42	-0.696
	Feeder	675	3	(0.490)
Heifer weight (lb/head)	Mixed	687	38	0.109
	Feeder	700	2	(0.914)

Table 18 is broken down by cattle sex (bull calves, steer calves and heifer calves), cattle type (beef and dairy) and operation type ('Feeder', 'Mixed' and 'All'). In addition, two sets of statistics—'Sample' and 'Adjusted'—are reported. 'Sample' statistics are based on all observations in the respective subcategories, including those observations with a zero response. 'Adjusted' statistics, by contrast, reflect only those observations in the subcategories with a non-zero response. Thus, the 'Adjusted' statistics report feeding activity of operations that actually fed cattle in a specified subcategory. To illustrate, Table 18 in the 'Total Beef' row reports that there were 29 'Feeder' respondents that fed 'BEEF' calves. Of those operations only five actually fed 'BEEF - Bull calves'. The 1994 to 1996 average for all 29 operations was 82 head of 'BEEF - Bull calves' and was the 'Sample' statistic. The average for only those five operations that actually fed cattle of this type was much higher at nearly 500 head, however, and represents the 'Adjusted' statistic.

In the beef category, bull calves were fed by the fewest number of respondents. Roughly one-fifth of the responding operations fed this type of cattle. While 'Feeder' operations fed a much larger number of bull calves on average than 'Mixed' operations, the difference was statistically significant only marginally whether sample averages or adjusted averages were used. This may be a function of the small number of operations involved in this type of feeding. The maximum number of 1,167 bull calves fed by one of the respondents indicates that there are some large operations in this category.

Steer calves were fed by two-thirds of the 'Feeder' operations and by nine-tenths of the 'Mixed' operations. The difference in the average number of steers fed across operation types was statistically significant. This indicates that 'Feeder' operations tended to feed in larger numbers.

Heifer calves were fed by only half of the 'Feeder' operations and by over 90% of the 'Mixed' operations. The difference in the average number of heifers fed across operation type was also statistically significant. 'Mixed' operations likely fed their own replacement heifers as they can monitor performance on these animals.

The largest and smallest operations were both in the 'Mixed' category for steers and heifers, suggesting a broader range in the size of operations. However, bigger variation in terms of size, as indicated by the standard deviation values, was evident in the 'Feeder' category.

Overall, the average numbers in Table 18 suggest that 'Feeder' operations were more specialized in terms of average size as well as in terms of concentrating on feeding bulls, steers or heifers. 'Feeder' operations fed 400 head on average, whereas 'Mixed' operations fed only 116 head. The difference in the averages of total beef calves fed was also statistically significant.

The only dairy cattle fed were dairy steers, and less than 5% of the respondents indicated any kind of involvement with feeding dairy cattle. Since only

Table 18. 1994-96 average levels of feeding activity for beef and dairy bull, steer and heifer calves by operation type.

Beef	Operation Type	Average		Standard Deviation		Range		No. ⁴ of respondents	% of Operations and Response Rate ⁵		t-statistics	
		Sample ¹	Adjusted ²	Sample ¹	Adjusted ²	Min. ³	Max.		Rate ⁵		Sample ¹	Adjusted ²
Bull Calves	Feeder	82	491	275	546	28	1,167	5	17.2		1.5471	1.9242
	Mixed	4	21	11	17	1	60	31	19.4		(0.1327)	(0.1266)
Steer Calves	All	16	86	112	248	1	1,167	36	19.0			
	Feeder	195	292	328	366	9	1,667	20	69.0		2.1952	2.7275
Heifer Calves	Mixed	60	65	176	182	3	2,200	147	91.9		(0.0355)	(0.0129)
	All	81	93	212	224	3	2,200	167	88.4			
Total Beef	Feeder	110	220	191	223	27	833	15	51.7		1.5857	2.7871
	Mixed	52	57	128	132	4	1,533	148	92.5		(0.1221)	(0.0138)
Dairy ⁶	All	61	72	140	149	4	1,533	163	86.2			
	Feeder	400	400	587	587	40	3,167	29	85.3		2.5068	2.5633
Steer Calves	Mixed	116	116	226	226	8	2,233	160	93.0		(0.0177)	(0.0157)
	All	160	160	324	324	8	3,167	189	91.7			

Notes:

¹Statistic includes observations with a response of zero. The average is representative of all responding operations sampled.

²Statistic reflects only those observations with a non-zero response, i.e., operations that reported feeding cattle of this type.

³The minimum of all operations sampled is zero in all cases. For a more meaningful minimum number of cattle fed, the minimum of non-zero responses is shown instead.

⁴The number of operations that fed cattle of this type—the number of non-zero responses. In the Total Beef row, this is the number of non-zero responses.

⁵The percentage of responding operations that fed cattle of this type are based on 29, 160 and 189 observations for 'Feeder', 'Mixed' and 'All' operations, respectively.

⁶The only feeding activity reported was for steer calves in the dairy category. Only eight 'Mixed' operations responded to this query. Statistics comparing 'Mixed' and 'Feeder' operations are therefore not available.

one 'Feeder' operation reported any feeding activity in this area, differences between 'Feeder' and 'Mixed' operations could not be tested.

Three-year Feeding Trends

The cattle number data were tested for trends over the period from 1994 to 1996. A paired t-test was conducted on the difference between 1994 and 1996 cattle numbers for each of the cattle types and for the 'Feeder', 'Mixed' and 'All' operations. The only statistically significant change over the period was an increase in the number of beef steers fed by 'Mixed' operations. The increase amounted to 16.5 head from 1994 to 1996. Statistically, this change is significant at the 0.01 level with a t-statistic of 2.8237. A likely explanation is that 'Mixed' operations fed steer calves to heavier weights in 1996 because of the cyclically low 1996 prices for weaned calves.

Cattle Ownership

Cattle ownership in a feeding program is of interest as price risk can be shifted from the feeding operation to the cattle owner. Respondents were asked how many of the cattle that were fed were owned by the operator and how many head were custom fed for other cow/calf operations, feedlots and other investors (Appendix A, Question 12). To analyze the data, percentages of the total cattle on feed were calculated for each of the four ownership categories. Table 19 shows the percentage breakdown across these categories for 'Mixed', 'Feeder' and 'All' operations. Differences across operation types were tested with a t-test in each ownership category. A probability value less than 0.05 indicates that statistically significant differences exist across operation type. For both the 'Mixed' operations and the 'Feeder' operations, over 90% of cattle were reported as owned by the operation. 'Feeder' operations did not feed for cow/calf operations.

Capacity and Capacity Utilization:

This section relates to grazing and drylot capacity and to what extent operations were utilizing that capacity (Appendix A, Question 13). Producers were asked to report both their one-time capacity and their capacity for the

Table 19. Feeder cattle ownership distribution by operation type.

Ownership Distribution	Mixed	Feeder	All	t-statistic (Probability)
	-----%-----			
Owned or financed	94.2	91.7	93.8	-0.5659 (0.5722)
Custom fed for feedlot	3.1	6.7	3.7	0.8606 (0.3954)
Custom fed for cow/calf	1.6	0.0	1.3	n/a
Custom fed for other	1.1	1.6	1.2	0.2488 (0.8038)

There were 147 and 29 'Mixed' and 'Feeder' respondents, respectively. This translates to 85.4 % and 85.3 % response rates for 'Mixed' and 'Feeder' operations, respectively.

PRODUCTION PRACTICES OF ARKANSAS BEEF CATTLE PRODUCERS

year of 1996 in numbers of head fed. The turnover ratio, the average number of lots of cattle that moved through the facilities or the pasture for 1996, was calculated by dividing the 1996 capacity by the one-time capacity. Table 20 shows the one-time capacity, the 1996 capacity and the calculated turnover ratio for 'Mixed', 'Feeder' and 'All' operations. The capacities shown in Table 20 corroborate the numbers quoted earlier in Table 18. Capacities for the 'Feeder' operations tended to be twice as large as those of the 'Mixed' operations. The range of capacities was also larger for the 'Feeder' operations. The only statistically significant difference across operation types occurred in the one-time capacity. 'Feeder' operations could handle more cattle at one point in time than 'Mixed' operations.

The turnover statistics suggest that 'Feeder' operations had a higher cattle turnover in their operations than the 'Mixed' operations. This was not statistically significant, however. In addition, turnover statistics less than one show that producers did not fully utilize their capacities to feed calves in 1996. The range in the statistics suggests that there were some operations that fed more than one lot of cattle per year.

Record Keeping

The answers of 'Mixed' and 'Feeder' operators to the types of feeding records that were kept are shown in Table 21. These statistics are of interest as animal feed performance data was hypothesized to be an important benefit of feeding weaned calves. A χ^2 -test was used to test for statistically significant differences across operation type. A probability less than 0.05 indicates a statistically significant difference.

Overall, the first row of the table indicates that 35.5% of operations kept records of some sort. Cost of gain records were kept most frequently, followed

Table 20. One-time capacity, 1996 capacity and turnover statistics by operation type.

Description	Operation Type	Average	Standard Deviation	Range		t-statistic (Probability)	Response rate
				Min.	Max.		
One-Time Capacity (# of head/operation)	Mixed	199	219	30	2,000	2.4547	93.0
	Feeder	<u>406</u>	<u>459</u>	<u>100</u>	<u>2,500</u>	(0.0196)	91.1
	All	233	282	30	2,500		92.3
1996 Capacity (# of head/operation)	Mixed	193	255	20	2,000	1.4696	87.8
	Feeder	<u>411</u>	<u>844</u>	<u>90</u>	<u>5,000</u>	(0.1511)	97.1
	All	233	430	20	5,000		89.3
Turnover (lots of cattle fed/year)	Mixed	0.96	0.31	0.20	2.00	0.3311	-
	Feeder	<u>1.03</u>	<u>1.08</u>	<u>0.20</u>	<u>6.67</u>	(0.7428)	-
	All	0.97	0.53	0.20	6.67		-

¹ The response rate was calculated on the basis of 34 'Feeder' operations, 172 'Mixed' operations and 206 in the 'All' category.

Table 21. Extent of record keeping by operation type.

Record Keeping	% of operations that kept records of this type			χ^2 -statistic (Probability)
	Mixed	Feeder	All	
Do you keep records?	34.9	38.2	35.5	0.137 (0.712)
Cost of gain	19.8	35.3	22.5	3.899 (0.048)
Average daily gain	16.7	29.4	18.9	2.980 (0.084)
Other records	8.0	8.8	8.2	0.024 (0.877)

There were 162 and 34 'Mixed' and 'Feeder' respondents, respectively. This amounts to a 95.1% response rate.

by records on average daily gain and other records. There were no strong, statistically significant differences between 'Feeder' and 'Mixed' operations except for the cost of gain records. Approximately one-third of 'Feeder' operations kept records of this type whereas only one-fifth of 'Mixed' operations did the same. It may be that 'Feeder' operations produced less of their own feed but instead purchased feed and were therefore better able to keep track of these costs.

BEEF PRODUCER STATISTICS— OTHER LIVESTOCK, LAND AND CATTLE SALES

This section contains information on questions that were asked of all producers, regardless of operation type. Producers were asked what types of other livestock they raised on their farm, how much acreage they used for their cattle enterprise, how much they paid for pasture rental and how important cattle sales were when compared to overall farm sales.

Other Livestock

Producers were asked whether they commercially raised livestock other than cattle and what types of livestock they raised (Appendix A, Question 21). As represented in the first row of Table 22, nearly one-third of all operations did raise other livestock. A χ^2 -test was performed to test for statistically significant differences across operation type. A probability less than 0.05 indicates a statistically significant difference. The results show that the most common type of other livestock raised was poultry, followed by horses, swine and dairy for all of the operation types. It appears that 'Feeder' operations were least diversified, although the statistical results were only marginal. In addition, only 38 operations, or 3.6% of the respondents, raised two or more other types of livestock commercially.

Acreage Used for Cattle Enterprise

Since cow-calf and stocker enterprises use pasture, the respondents were asked how much of the land used for cattle was owned and how much was rented (Appendix A, Question 22).

PRODUCTION PRACTICES OF ARKANSAS BEEF CATTLE PRODUCERS

Table 22. Other livestock raised commercially by operation type.

Other Livestock	% of operations that raised this type of livestock				χ^2 -statistic (Probability)
	Cow/calf	Mixed	Feeder	All	
Do you raise other livestock?	32.0	38.3	21.9	32.7	4.155 (0.125)
Poultry	24.0	25.3	15.6	23.9	1.383 (0.501)
Horses	6.8	8.0	3.1	6.9	1.056 (0.590)
Swine	3.4	4.9	0.0	3.6	n/a ¹
Dairy	0.5	0.6	0.0	0.5	n/a
Other	1.9	4.9	6.3	2.6	n/a

Notes: There were 784, 162 and 32 'Cow/calf', 'Mixed' and 'Feeder' respondents, respectively. This reflects a 92.5% response rate.

¹ χ^2 -statistics are not reported as the number of responses in some of the response categories was too small.

Table 23. Land ownership by operation type.

Operation Type	Land Ownership		t-statistic (Probability)
	Owned	Rented	
Cow/calf	263	221	54 / 46 2.5352 (0.0117)
Mixed	289	254	53 / 47 0.9498 (0.3452)
Feeder	192	189	50 / 50 0.0268 (0.9795)
All	267	227	54 / 46 2.6827 (0.0076)

There were 346 responses in the 'Cow/calf' category, 79 responses in the 'Mixed' category and seven responses in the 'Feeder' category. This amounts to an overall 40.9% response rate.

Table 23 shows differences in land ownership for each of the operation types. A paired t-test was conducted to see if there were significant differences in owned versus rented land use. The overall low response rate was attributed to a copying blemish and poor construction of the survey question.¹ The land ownership structure revealed in the reported owned acreage as a percentage of total land usage versus rented acreage as a percentage of total land usage ranged from 54/46, 53/47 and 50/50 for 'Cow/calf', 'Mixed' and 'Feeder' operations, respectively. Only for the 'Cow/calf' operations was the land ownership split different from 50/50. Relative to owned land acreage, 'Feeder' operations showed the most use of rented land in their cattle enterprises, and 'Cow/calf' operations showed the least use of rented land.

Table 24 shows similar information but reports on statistics that compare operation size in terms of land use across operation types. The breakdown on neither owned nor rented land showed significant differences across operation types (see t-statistics on right hand side of Table 24). 'Feeder' operations did appear to own less land than either of the 'Cow/calf' or 'Mixed' operations, but that result was not statistically significant.

¹Because of the question design and a copying blemish in the underline after 'Acres: _____ rented _____ own' in the survey question 22, many respondents provided either three numbers or a single number. This presented a problem for analysis. A conservative approach was taken by discarding observations where the split between rented and owned land was unclear. This is reflected in the low response rate indicated in the notes to Tables 23 and 24.

Table 24. Owned and rented acreage used for cattle in 1996 by operation type.

Description	Operation Type	Average	Standard Deviation	Range		t-statistics (Probability)
				Min.	Max.	
Owned (acres per operation)	Cow/calf	263	245	0	2,500	Cow/calf vs Mixed: -0.9873 (0.3253)
	Mixed	289	207	10	1,000	Mixed vs. Feeder: 1.2125 (0.2287)
	Feeder	192	154	10	400	Cow/calf vs. Feeder 0.7638 (0.4455)
	All	267	237	0	2,500	
Rented (acres per operation)	Cow/calf	221	219	0	1,800	Cow/calf vs. Mixed: -1.1852 (0.2366)
	Mixed	254	245	0	1,760	Mixed vs. Feeder: 0.6873 (0.4938)
	Feeder	189	155	65	485	Cow/calf vs. Feeder: 0.3845 (0.7008)
	All	227	223	0	1,800	

There were 346 responses in the 'Cow/calf' category, 79 responses in the 'Mixed' category and seven responses in the 'Feeder' category. This amounts to an overall 40.9% response rate.

Table 25. Total acreage used for cattle in 1996 by operation type.

Description	Operation Type	Average	Standard Deviation	Range		t-statistics (Probability)
				Min.	Max.	
Total Acreage (acres per operation)	Cow/calf	431	318	16	2,700	Cow/calf vs mixed: -2.5243 (0.0125)
	Mixed	547	565	85	5,700	Mixed vs. Feeder: 2.3735 (0.0198)
	Feeder	390	272	64	1,250	Cow/calf vs. Feeder 0.7077 (0.4793)
	All	449	370	16	2,500	

There were 793 responses in the 'Cow/calf' category, 160 responses in the 'Mixed' category and 31 responses in the 'Feeder' category. This amounts to an average 93.1% response rate. Since no comparison between rented and owned acreage was necessary for these comparisons, observations where a single number was provided in either of the owner or rented categories were added. This raised the response rate considerably.

PRODUCTION PRACTICES OF ARKANSAS BEEF CATTLE PRODUCERS

Table 25 reports on the total acreage (owned and rented). The reader is cautioned that this land use figure does not reflect the quality of land that these operations were using for their cattle. T-tests on the difference in average land use between the operation types showed that 'Mixed' operations used the most acreage on average. No statistically significant results were found between the 'Cow/calf' and 'Feeder' enterprises.

Pasture Rental Fees

Pasture rental fees were broken into a payment for pasture on a per-acre and per-head basis (Appendix A, Question 23). Since the question did not stipulate a time period or for what type of cattle the pasture was rented (i.e., bred cows, cow/calf pairs, stocker calves, etc.) only the cost-per-acre figures were analyzed. In addition, no attempt was made to classify the rental cost on the basis of the quality of the land. Even with these restrictive assumptions, the reported answers are presented in Table 26. The numbers represent an average cost per acre presumably for average-quality pasture for one year or grazing season. There were three operations that reported a zero rental charge because they had rental arrangements that involved another form of payment. For example, pasture use was granted on the basis of maintaining fences and the quality of the pasture through weed and brush control.

The high maximum value of \$100.00/acre suggests rental of high-quality pasture such as winter wheat pasture or pasture systems that include handling facilities. The reported figures were somewhat lower than pasture rental fees for improved pastures reported by the Arkansas Cooperative Extension Service (Hankins and Stuart, 1993).

Cattle Sales Relative to Farm Sales

The intention of this question was to find out how important revenues from the cattle enterprise were compared to total farm revenues (Appendix A, Question 24). This measure was selected as it may be easier to compare sales than profits or gross margin across the different enterprises of a farm. Table 27 shows the average, standard deviation and ranges reported by the different operation types. T-tests reported in the right half of the table revealed that there were no statistically significant differences across operation types for this response. The higher average and minimum percentages reported by the 'Feeder' operations do suggest that these operations were more specialized in cattle, however. Overall, the median observation was 92.5%, suggesting that half of the operations surveyed derived between 92.5% and 100% of their total farm sales from cattle. There were three respondents with less than 5% of sales derived from cattle; these were likely operations that had cattle as a sideline business or may have interpreted the question as a profit margin question.

Table 26. 1996 pasture rental fees by operational type.

Description	Operation Type	Average	Standard Deviation	Range		t-statistics (Probability)
				Min.	Max.	
Rental Fee (\$/acre /grazing season)	Cow/calf	14.46	10.50	0.00	100.00	Cow/calf vs mixed: -0.0477 (0.9620)
	Mixed	14.51	7.65	0.00	35.00	Mixed vs. Feeder: 0.0924 (0.9288)
	Feeder	14.13	11.42	3.00	40.00	Cow/calf vs. Feeder 0.0878 (0.9301)
	All	14.46	9.98	0.00	100.00	

There were 296 responses in the 'Cow/calf' category, 77 responses in the 'Mixed' category and eight responses in the 'Feeder' category. This amounts to an average 36.0% response rate.

Table 27. Cattle sales as a percentage of total farm sales by operation type.

Description	Operation Type	Average	Standard Deviation	Range		t-statistics (Probability)
				Min.	Max.	
Cattle sales as percentage of farm sales (in %)	Cow/calf	72.89	34.04	1	100	Cow/calf vs mixed: 0.1566 (0.8757)
	Mixed	72.46	30.56	10	100	Mixed vs. Feeder: -0.7251 (0.4693)
	Feeder	76.97	31.95	20	100	Cow/calf vs. Feeder -0.6333 (0.5267)
	All	72.95	33.36	1	100	

There were 711 responses in the 'Cow/calf' category, 160 responses in the 'Mixed' category, and 29 responses in the 'Feeder' category. This amounts to an average 85.1% response rate.

PRODUCER DEMOGRAPHICS

This section reports on producer demographics in terms of the operator's age and the kinds of educational institutions that had been attended (Appendix A, Questions 25 and 26). To analyze differences between operations that fed weaned calves and those that did not, the 'Mixed' and 'Feeder' categories were aggregated into a 'Mixed & Feeder' category for operations that fed weaned calves. Results were compared between 'Cow/calf' and 'Mixed & Feeder' responses.

Operator Age

The cover letter of the survey asked the manager of the cattle enterprise to fill out the questionnaire. Table 28 shows the tabulated responses to the age question. The age distribution for 'Cow/calf' operators was significantly different from the age distribution of the 'Mixed & Feeder' operators. There were more older and fewer younger operators in the 'Cow/calf' business.

Education

Producers were asked to indicate what level of educational institutions they had attended. Among the choices were high school, community college, university and special training courses. Table 29 shows the breakdown for each of the different categories of educational institutions that had been attended by the operator. Almost every operator had attended high school. Over one-third of the respondents had also gone on to a university. Less than 10% of the respondents continued their education at a community college. Statistical tests on the

Table 28. Operator age by operation type.

Operation Type	% of respondents in age group				No of respondents	χ^2 - statistic (probability)
	< 41 ¹	41 - 50	51 - 60	61 +		
Cow/Calf:	7.9	20.7	31.1	40.3	833	12.215
Mixed & Feeder:	13.5	26.0	30.5	30.0	200	(0.007)
Total:	9.0	21.7	31.0	38.3	1033 ²	

¹ Responses for the less than 41 year old category were aggregated from the <21, 21 - 30 and 31 - 40 years of age categories. There was one operator in each of the 'Cow/calf' and 'Mixed & Feeder' categories under the age of 21. There were 10 and two operators between 21 and 30 years of age and 55 and 24 operators between the ages of 31 and 40 for the 'Cow/calf' and 'Mixed & Feeder' operations, respectively.

² 1033 responses implies 24 missing observations or a 98% response rate.

Table 29. Operator education by operation type.

Institution Attended	% of operator attendance at following institutions			χ^2 - statistic (Probability)
	Cow/calf	Mixed & Feeder	All	
High School	99.1	99.0	99.1	0.040 (0.841)
University	35.1	42.4	36.5	3.730 (0.053)
Special Training	15.6	14.7	15.4	0.116 (0.734)
Community College	7.8	5.6	7.3	1.129 (0.288)

There were 813 and 198 'Cow/calf' and 'Mixed & Feeder' operators. This amounts to a response rate of 95.6%.

attendance at a particular educational institution revealed few differences across operation types except for the university category. Fewer of the 'Cow/calf' respondents attended a university than respondents that operated 'Mixed & Feeder' operations. Aside from high school, the most prominent institution attended was university followed by special training courses and community college.

SUMMARY AND CONCLUDING REMARKS

This report summarizes information regarding production practices of beef cattle producers in Arkansas. The sample of respondents included 851 cow/calf operations that sell calves at weaning ('Cow/calf'), 172 cow/calf operations that also feed weaned calves ('Mixed') and 34 operations that are solely in the business of feeding weaned calves ('Feeder'). A brief summary of the key findings on each of the production issues follows in point form:

Cow/calf operation herd size and age of breeding stock:

- The average operation had 94 cows and 19 heifers. There were no statistically significant differences in herd size between 'Cow/calf' and 'Mixed' operations, indicating that operation cow herd size may not have an impact on whether or not an operation feeds weaned calves.
- Herd sires serviced 26 cows and five heifers. Cows were replaced after six calving seasons.
- The reported average age of mother cows was 6.2 years. The average operation reported the age of the oldest cow at 11.6 years. The data also suggest an average age of heifers at first calving of 26.4 months and a cow culling age of 8.3 years.

Management of calving seasons:

- 'Cow/calf' operations had largely an uncontrolled calving season and the least amount of two-season calving. The exact opposite trend was observed for 'Mixed' operations.
- The practice of uncontrolled calving seasons declines with increasing operation size. The use of a single calving season is most common in the smallest size category (< 50 cows). Calving over two seasons is most popular among larger operations. The data suggest that there are some economies of size in controlling the calving season.

Purebred business characteristics:

- 2.7% of the respondents were strictly in the purebred business, and another 14.8% of operations had a purebred component in their cow/calf operation.
- Operations that had a purebred component in their business tended to be larger and also were more likely to feed weaned calves.

PRODUCTION PRACTICES OF ARKANSAS BEEF CATTLE PRODUCERS

Experience with having calves custom fed and renting pasture to feed weaned calves:

- 'Mixed' operations showed more experience with having their weaned calves custom fed by a stocker or backgrounding operation than 'Cow/calf' operations. It may be that these operations first gathered experience with feeding weaned calves by having them custom fed and subsequently decided to feed weaned calves on their own.
- Larger operations were more likely to rent pasture than smaller operations. Pasture rental is also more common among 'Mixed' operations than 'Cow/calf' operations. As an alternative to outright land ownership, renting pasture land for feeding of weaned calves may be more flexible.

Alternative uses for pasture land:

- The most common alternative use for pasture land was for haying. 'Mixed' operations indicated more alternative uses for their pasture land. This was attributed to the use of improved pasture land for grazing stocker calves.

Stocker and backgrounder operations:

- Stocker or grazing programs are much more common than backgrounder or drylot programs. 'Mixed' operations reported less use of the grazing method.
- Grazing programs were reported to last an average of 167 days, while the average for drylot feeding programs is 93 days. Finish weights on steers and heifers were not significantly different statistically across feeding regimes.
- Differences in days on feed and finish weights for steers and heifers across operation type existed for grazing programs. 'Mixed' operations tended to feed for shorter periods and to lighter steer and heifer weights than 'Feeder' operations.
- In terms of the average volume of business from 1994 to 1996, 'Feeder' operations had nearly four times the number of cattle per year of 'Mixed' operations. In addition, 'Feeder' operations were more specialized in the type of cattle they fed whether it be bull, steer or heifer calves.
- Statistics on capacity utilization show that, overall, operations feed one lot of cattle per year on average. Observations on this statistic ranged from the use of 20% of annual capacity in 1996 to a turnover of 6.67 lots for 1996.
- There was very little dairy cattle feeding activity.
- There was very little change in number of cattle fed from 1994 to 1996. One exception is an average increase of 16.5 head of beef steer calves fed per 'Mixed' operation. This may be attributable to the low 1996 calf prices.
- Over 90% of calves that are fed are owned by the operation. The second most common ownership type mentioned was custom feeding calves for

feedlots. There were no statistically significant differences across operation types.

- Approximately one-third of operations kept records on their feeding activity. Cost of gain data was recorded by more operations than data on average daily gain.

Beef producer statistics on other livestock, land and cattle sales:

- Over two-thirds of the operations sampled did not raise any other livestock commercially. Of the remaining one-third, poultry, horses, pork and dairy were the most to least common other types of livestock raised, respectively.
- 'Cow/calf' operations reported the lowest rented acreage as a percentage of total land acres used for the cattle enterprise. The split of owned versus rented land as a percentage of total land use was reported as 54/46, 53/47 and 50/50 for 'Cow/calf', 'Mixed' and 'Feeder' operations, respectively. Only for 'Cow/calf' operations was the owned versus rented acreage split significantly different statistically from a 50/50 split.
- On average, respondents used approximately 450 acres of land for their cattle enterprise. No statistically significant differences existed on whether the land was rented or owned. 'Mixed' operations tend to use more land than 'Cow/calf' and 'Feeder' operations.
- On average farmers reported a rental cost of \$14.46/acre/year for average-quality pasture. There were no differences in rental fees across operation type.
- Cattle sales made up nearly three quarters of total farm sales on average. The median observation was 92.5%, suggesting that over half of the respondents had cattle as a primary farm business. There were no statistically significant differences across operation types.

Producer demographics:

- Operator age and education were significantly different statistically whether an operation fed weaned calves or had only a cow/calf operation. More respondents were in the older age categories for the 'Cow/calf' enterprises than for those operations that fed weaned calves. A lower percentage of 'Cow/calf' operators had attended a university when compared to the percentage of producers that fed weaned calves.

Overall, the results of this study suggest that 'Mixed' operations may be able to capture more returns from their cow/calf enterprise through diversification. Using rented pastures for feeding stocker calves and sometimes having calves custom fed are some alternatives that set this operation type apart from 'Cow/calf' and 'Feeder' operations. Operators in this category tend to be younger and more educated as well. Specialized 'Feeder' operations operate on a larger scale and may be more effective at monitoring their cost of production. Custom feeding for 'Cow/calf' operations may be an opportunity for 'Feeder' opera-

PRODUCTION PRACTICES OF ARKANSAS BEEF CATTLE PRODUCERS

tions. Cow/calf producers may also want to consider forming cooperatives that manage stocker programs to capture profits from feeding their calf crop to heavier weights.

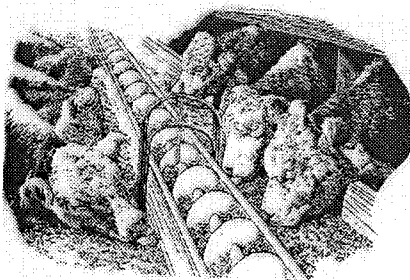
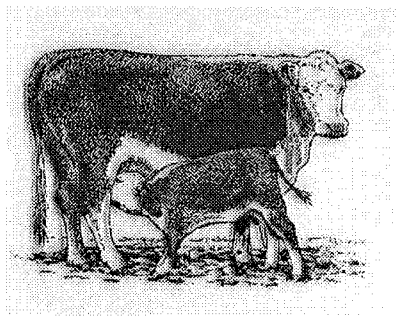
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APPENDIX A: SURVEY INSTRUMENT

ARKANSAS BEEF MARKETING SURVEY

For beef cow/calf, stocker and backgrounding operations



What type of operation do you have? (*Check only one*)

- ☐ ₁ Cow/calf only.....
(Cow/calf operations sell calves at weaning
except for replacement heifers)
- ☐ ₂ Stocker/Backgrounder only.....
(Stocker or backgrounding operations are
involved in purchasing weaned calves or
custom feeding them for feedlot placement)
- ☐ ₃ Cow/calf & Stocker/Backgrounder.....

Instructions:

Complete Sections A & C

Complete Sections B & C

Answer all Sections A, B & C

PRODUCTION PRACTICES OF ARKANSAS BEEF CATTLE PRODUCERS

SECTION A. COW/CALF OPERATION QUESTIONS

1. What is your current herd inventory in terms of cows (bred or with calf), replacement heifers (open & bred) and herd sires? *(Check one for each of the categories)*

Cows: ₁☐ 24 or less ₂☐ 25 - 49 ₃☐ 50- 99 ₄☐ 100 - 149 ₅☐ 150 - 199 ₆☐ 200+

Heifers: ₁☐ 5 or less ₂☐ 5 - 9 ₃☐ 10 - 19 ₄☐ 20 - 29 ₅☐ 30 - 49 ₆☐ 50+

Bulls: ₁☐ None ₂☐ 1 ₃☐ 2 ₄☐ 3 - 4 ₅☐ 5 - 7 ₆☐ 8+

2. Which of the following best describes your current operation? *(Check only one)*

₁☐ Commercial only ₂☐ Purebreeder only ₃☐ Commercial and purebreeder

3. How old are your mother cows? _____ Average age in years _____ Oldest

4. How old are your replacement heifers when they calve for the first time? _____ Average age in months

5. When is/are your calving season(s)? *(Check all that apply)*

☐ Year-round ☐ Winter ☐ Spring ☐ Summer ☐ Fall

6. What is your experience with feeding or grazing *weaned* calves?

<i>Check the most appropriate answer for each row</i>	Never	Not yet	No longer	Sometimes	Always
Do you feed and care for your own calves	₁ <input type="checkbox"/>	₂ <input type="checkbox"/>	₃ <input type="checkbox"/>	₄ <input type="checkbox"/>	₅ <input type="checkbox"/>
Do you feed your own plus purchased calves	₁ <input type="checkbox"/>	₂ <input type="checkbox"/>	₃ <input type="checkbox"/>	₄ <input type="checkbox"/>	₅ <input type="checkbox"/>
Do you have a stocker/backgrounder feed for you	₁ <input type="checkbox"/>	₂ <input type="checkbox"/>	₃ <input type="checkbox"/>	₄ <input type="checkbox"/>	₅ <input type="checkbox"/>
Do you rent pasture to feed your calves	₁ <input type="checkbox"/>	₂ <input type="checkbox"/>	₃ <input type="checkbox"/>	₄ <input type="checkbox"/>	₅ <input type="checkbox"/>

7. Other than using your pasture for grazing cattle, in what ways might you use your pasture land?
(Check all that apply)

☐ Hay ☐ Rent out ☐ Other livestock ☐ No other use
☐ Crops ☐ Tree farm ☐ Other _____

(over)

8. Regardless of your experience with *feeding/grazing weaned calves*, what is your *opinion* on the following?

<i>The problem with feeding calves on my farm is that, (Check only one for each statement)</i>	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Prices of feeder cattle change too much (too risky)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I don't have the facilities to feed weaned calves	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Borrowing money to finance the feeding is too costly	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Feeding is not profitable	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

<i>The problem with having calves fed with a custom feeder is that, (Check only one for each statement)</i>	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
No custom feeders are nearby	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I don't trust custom feeders	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
It is too hard to establish trust with custom feeders	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I have not considered this option	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

<i>The benefit of feeding calves (own or custom) is that, (Check only one for each statement)</i>	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
I know how well animals perform	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I can adjust my breeding program better, because I know how well animals perform	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
On average it is more profitable than selling weaned calves	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

!!! Skip to Section C if you do not feed weaned calves !!!

SECTION B. STOCKER/BACKGROUNDING OPERATIONS QUESTIONS

9. **Stocker** programs place weaned calves on pasture and graze them until marketed as feeders.

Do you run a stocker operation? ☐ Yes ☐ No ... *Skip to question 10*

How many days do you typically graze each lot of calves before selling? _____ Days

At what **average** weight do you generally sell? _____ Steers _____ Heifers

10. **Backgrounding** weaned calves implies placing the cattle in dry lots and feeding hay and concentrates until the animals are marketed. Do you background calves? ☐ Yes ☐ No ... *Skip to question 11*

How many days do you usually have each lot of calves in the feedlot? _____ Days

At what **average** weight do you generally sell? _____ Steers _____ Heifers

11. Over the last three years, including this year, what has been the typical mix of your stocker or backgrounding business? Please indicate the **number of head** per category. These numbers do not have to be exact, but please provide your best estimate (*Please indicate an average, not a range*).

Beef	1994	1995	1996	Dairy	1994	1995	1996
Bull calves	_____	_____	_____	Bull Calves	_____	_____	_____
Steer calves	_____	_____	_____	Steer Calves	_____	_____	_____
Heifer calves	_____	_____	_____	Heifer Calves	_____	_____	_____

- | | Average |
|---------------------------------------|------------|
| Owned yourself (outright or financed) | _____ head |
| Custom fed for cow-calf operations | _____ head |
| Custom fed for feedlots | _____ head |
| Custom fed for other investors | _____ head |
| Total | _____ head |

- | a) at one point in time? | Head | b) during 1996? | Head |
|--------------------------|------|-----------------|------|
| 1 | | 1 | |
| 2 | | 2 | |
| 3 | | 3 | |
| 4 | | 4 | |
| 5 | | 5 | |
| 6 | | 6 | |
| 7 | | 7 | |
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| 98 | | 98 | |
| 99 | | 99 | |
| 100 | | 100 | |

- What kind of records do you keep? (Check all that apply)

- ☐
- Pen or lot averages on average daily gain (ADG)
- ☐
- Cost of gain
- ☐
- Other

- What services do you provide for your customers? (Check all that apply)

- ☐ Contract pricing ☐ Brokerage service using futures & options
- ☐ Video Sales ☐ Other

16. To forecast or predict sale prices for the end of a feeding period I look at .. (Check all that apply):

- | | |
|---|---|
| <input type="checkbox"/> Feeder cattle futures price | <input type="checkbox"/> Market trends |
| <input type="checkbox"/> Prices paid at auction barns | <input type="checkbox"/> Contracted price |
| <input type="checkbox"/> Livestock reports | <input type="checkbox"/> Other |

17. Whenever I make the decision on whether to sell or keep feeding ... (Check one for each category)

	Always	Sometimes	Rarely
I compare calculated feed costs with sale prices of animals to make that decision.....	₁ <input type="checkbox"/>	₂ <input type="checkbox"/>	₀ <input type="checkbox"/>
I sell when I see relatively high prices and hold back when prices are low.....	₁ <input type="checkbox"/>	₂ <input type="checkbox"/>	₀ <input type="checkbox"/>
I sell, regardless of price, when the cattle are a certain age or weight	₁ <input type="checkbox"/>	₂ <input type="checkbox"/>	₀ <input type="checkbox"/>
I continue to feed if I have enough pasture, otherwise I sell	₁ <input type="checkbox"/>	₂ <input type="checkbox"/>	₀ <input type="checkbox"/>

18. The following questions ask you about the marketing methods you used to sell/buy cattle for the year 1995.

Please indicate which marketing methods you used. Also, please provide the total number of head per category and how often, during 1995, you sold / bought in the categories that apply to you.

	Yes	No	How many head?	How many times?
I sold/bought at a sale barn or auction market	₁ <input type="checkbox"/>	₀ <input type="checkbox"/>		
I sold directly to a stocker or backgrounder	₁ <input type="checkbox"/>	₀ <input type="checkbox"/>		
I sold directly to a feedlot	₁ <input type="checkbox"/>	₀ <input type="checkbox"/>		
I sold/bought through video auction	₁ <input type="checkbox"/>	₀ <input type="checkbox"/>		
I used cattle futures and options	₁ <input type="checkbox"/>	₀ <input type="checkbox"/>		
I sold/bought cattle on contract	₁ <input type="checkbox"/>	₀ <input type="checkbox"/>		
I sold cattle together with another producer(s)	₁ <input type="checkbox"/>	₀ <input type="checkbox"/>		
Other	₁ <input type="checkbox"/>	₀ <input type="checkbox"/>		

19. Please indicate how often you compare cattle prices to help make marketing decisions.

For information you use, check the most appropriate answer for how often you consult...

	Yes	No	Around time of sale only	Daily	Weekly	Monthly	Yearly
Your own sale records	₁ <input type="checkbox"/>	₀ <input type="checkbox"/>	₂ <input type="checkbox"/>	₃ <input type="checkbox"/>	₄ <input type="checkbox"/>	₅ <input type="checkbox"/>	₆ <input type="checkbox"/>
Sale prices at different auctions & markets	₁ <input type="checkbox"/>	₀ <input type="checkbox"/>	₂ <input type="checkbox"/>	₃ <input type="checkbox"/>	₄ <input type="checkbox"/>	₅ <input type="checkbox"/>	₆ <input type="checkbox"/>
Prices across different weight categories (calves, feeders, live, carcass, retail)	₁ <input type="checkbox"/>	₀ <input type="checkbox"/>	₂ <input type="checkbox"/>	₃ <input type="checkbox"/>	₄ <input type="checkbox"/>	₅ <input type="checkbox"/>	₆ <input type="checkbox"/>
Prices for different cattle types (steers, heifers, cows, replacements)	₁ <input type="checkbox"/>	₀ <input type="checkbox"/>	₂ <input type="checkbox"/>	₃ <input type="checkbox"/>	₄ <input type="checkbox"/>	₅ <input type="checkbox"/>	₆ <input type="checkbox"/>
Prices for different cattle breeds	₁ <input type="checkbox"/>	₀ <input type="checkbox"/>	₂ <input type="checkbox"/>	₃ <input type="checkbox"/>	₄ <input type="checkbox"/>	₅ <input type="checkbox"/>	₆ <input type="checkbox"/>
Information in trade magazines and other market news reports, TV, radio, etc.	₁ <input type="checkbox"/>	₀ <input type="checkbox"/>	₂ <input type="checkbox"/>	₃ <input type="checkbox"/>	₄ <input type="checkbox"/>	₅ <input type="checkbox"/>	₆ <input type="checkbox"/>

PRODUCTION PRACTICES OF ARKANSAS BEEF CATTLE PRODUCERS

Pooling cattle for sale means combining your cattle to be sold with cattle of other producers rather than just selling your cattle as an individual producer. This way cattle can be sorted according to similar characteristics and sold in larger, more uniform lots.

20. Even if you don't pool cattle, please indicate your opinion about the following statements on pooling.

<i>Please indicate your opinion on pooling cattle, (Check only one for each statement)</i>	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Larger, more uniform lots of cattle sell at a higher price	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pooling saves on transportation cost	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Video auction markets make pooling easier	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I don't like to sell my cattle at the average pen price	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I have not thought about pooling cattle	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I don't like it because I can't sell when I want to	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

21. What other livestock do you currently raise commercially? *(Check all that apply)*

- ☐ Poultry
 ☐ Dairy
 ☐ None
☐ Horses
 ☐ Swine
 ☐ Other _____

22. For this year, how many acres are you using just for your cattle? Acres: _____ rented _____ own

23. How much do you generally pay to rent pasture? _____ per acre _____ per head

24. What is your current average percentage of farm sales derived from cattle? _____%

25. What is your age? *(Check only one)*

- ☐ 1 20 or younger
 ☐ 2 21 - 30
 ☐ 3 31 - 40
 ☐ 4 41 - 50
 ☐ 5 51 - 60
 ☐ 6 61 or older

26. What is your educational background? *(Check all the institutions you have attended)*

- ☐ High-school
 ☐ Special Training Courses
☐ Community College
 ☐ University

27. Comments: _____

Thank you for your time in filling out this questionnaire. Your answers are completely confidential. Please return the questionnaire in the enclosed postage paid envelope. Thanks again.