PRODUCTION PRACTICES AND MANAGEMENT INTENSITY OF OKLAHOMA COW-CALF PRODUCERS ACROSS INCOME AND HERD SIZE

By

MALLORY KAY VESTAL

Bachelor of Science

West Texas A&M University

Canyon, Texas

2005

Submitted to the Faculty of the
Graduate College of the
Oklahoma State University
In Partial Fulfillment of
The requirements for
The Degree of
MASTER OF SCIENCE
JULY, 2007

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Thesis Approved:

Clement Ward, Ph. D.
Thesis Adviser

Damona Doye, Ph. D.

David Lalman, Ph. D.

A. Gordon Emslie, Ph. D.
Dean of the Graduate College

ACKNOWLEDGEMENT

The completion of this thesis would not have been possible without the help of several individuals. First, I would like to extend my most sincere appreciation to my adviser, Dr. Clem Ward. Without his guidance, patience, direction and assistance, this thesis would not have been possible. I would also like to thank my committee members, Dr. Damona Doye and Dr. David Lalman, who have provided wonderful direction and insight into this project. To the Agricultural Economics Department and the Master Cattleman Program, thank you for providing me with both data resources and funding; Donna Rhea and Gracie Teague, thank you for all of your assistance with my computer and formatting needs. I would also like to extend appreciation to Justin Ward for his assistance throughout the completion of this project.

To the Oklahoma State Women's Equestrian program, I am thankful for the financial assistance which enabled me to pursue this degree, along with the countless memories, laughs and adventures along the way. I would also like to extend my thanks to Drs. John Pipkin and Anne Macy of West Texas A&M University for their encouragement in my pursuit of an advanced degree. To my friends at West Texas and Oklahoma State, thank you for all the good times and wonderful memories. To Cade Brawley, thank you for always encouraging me to soldier on even when I thought it was surely impossible.

To my dear friend, Rebekah Bachman, words are not enough to express my appreciation for all you have done to make me the person I am. Your support, wisdom, and guidance has helped me to make countless decisions. Your friendship has made me better, and I am so thankful that the Lord has blessed my life with you. To Steve, you have opened a new door for my life, and I am not only grateful but extremely indebted to you.

Lastly, I would like to thank my parents, Ted and Kathy Vestal, for their never ending patience and encouragement. They have instilled countless skills which have allowed me the drive, persistence, and motivation to succeed in all that I do. To my mother, thank you for always caring and loving me even when I was hardly loveable. To my father, who has given me an enthusiasm and love of knowledge, thank you for answering what seemed like a million questions on cattle and life, as well as inspiring a passion for satisfaction in a job done right. Although it is a very small token of appreciation, it is to them I dedicate this thesis.

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CHAPTER I

INTRODUCTION

Background

The 2002 Census of Agriculture noted that 40 percent of U.S. farms had sales of cattle and calves, making it the single most prevalent enterprise on farms nationwide (USDA/NASS). Approximately 80 percent of the farms with beef cows had fewer than 50 cows. The National Animal Health Monitoring System (NAHMS) Beef '97 report established a variety of benchmarks for the nation's cow-calf industry in areas such as information and management practices, breeding and calving management, production management and disease control, health and health management (USDA/APHIS). The NAHMS report notes that the beef herd was the primary source of income on 14 percent of all operations included in its study, but no analysis of data by herd size or relative importance of income from the cow-calf enterprise was done.

Overview

This thesis is comprised of an analysis of cow-calf producers' practices by separating producers into two "Groups" based on herd size and income dependency from the beef operation. Producers' practices were then evaluated to determine if a

significant difference exists between the two groups. A detailed explanation of the data, survey and associated extension program (Master Cattleman) is included in Chapter IV.

Additionally, the primary data set was analyzed to determine what, if any, effect demographic and farm entity characteristics had on the propensity of producers to use specific management practices.

The results and implications of both the analysis by producer groups as well as the analysis across all producers yielded often expected and notable results. The analysis by producer group documents clearly the current situation and status of Oklahoma's cattlemen. To validate future research regarding cow-calf production practices, a sound benchmark is a necessity. In reference to the demographic factors which influence producers' choice of production practices, results also provide knowledge about the factors influencing cattlemen today. Previous research conducted by the USDA Economic Research Service, asks the question, "Does Off-Farm Work Hinder 'Smart' Farming?". Here, the question is broadened to not only include off-farm work, but also such defining characteristics as age, education, and herd size.

Objectives

The long term objective of this study is to increase the production efficiency of beef cattle enterprises.

Specific objectives are:

1) Determine if management practices of cow-calf producers differ across income and herd sizes and
2) Determine what or how producer's demographics affect the probability of using specific management or production practices.

CHAPTER II

CONCEPTUAL FRAMEWORK

A key assumption in production economics is that the goal of the firm is to maximize profit, or in some cases minimize costs of production, subject to both technical and economic constraints (Beattie and Taylor 1985). Thus there are two primary production objectives: enhance revenue and reduce costs. A key component in the profit maximization equation is total costs. By minimizing cost of production, beef producers are better able to increase total profit received. Research has shown numerous production practices can increase returns either by increasing revenue or by reducing costs (Ramsey et al. 2005).

From a producer's standpoint, the added benefit of specific production practices must be compared to the added cost of implementation. An example is the use of growth promoting implants in calves. Although there are input expenses such as labor, time, and actual cost of implants, the producer should compare these to the increased returns which are derived through increased weight gain and thus higher pay weights of marketed calves.

When defining innovative farm technologies, it is important to note the associated management time is of considerable importance. Some practices may require intensive management while others may provide added value in terms of reducing management time (Fernandez-Cornejo et al. 2007). Utility maximization is

an important factor in production economics. Analytically speaking, a producer will allocate limited resources in order to maximize utility. The maximization of an individual's utility does not necessarily indicate that the most innovative or recommended production practice will be implemented.

Adoption of production practices is affected by numerous constraints in a beef producer's production enterprise. Time/human capital, off-farm income, or education can affect implementation of ideal production practices (Just and Zilberman 1983). Appropriate allocation of limited inputs, for instance, labor and capital, differs not only by farm entity, but also according to the constraints of each individual producer. The time a producer has available to invest in the cow-calf operation can easily affect the adoption of numerous practices. For example, maintaining individual herd records requires a significant time commitment on the part of the producer. An individual producer might prefer to spend limited management time on such practices as preconditioning calves or pregnancy testing cows.

Off-farm income also affects the implementation of management practices. If a producer receives a large portion of household income from an off-farm source, naturally the importance of sustaining off-farm income is of greater importance to the producer than, for example, the nutritional quality of hay being fed to cows in the winter months. The opposite is also true. A producer who obtains the majority of income from cattle production is more likely to adopt and implement ideal production practices or innovative technologies that increase income generated.

It is hypothesized that income dependency on beef production along with herd size affects production practices. This research assesses producers' current practices

over a broad range of management areas, and identifies areas in which notable dissimilarities exist.

CHAPTER III

LITERATURE REVIEW

In the United States, beef production is a large part of agriculture. In 1997, the Census of Agriculture noted that of the over one million U.S. farms with cattle, the sales generated accounted for approximately 21 percent of the total market value of agricultural products. This percentage causes cattle production to be ranked first among all commodities produced (Short 2001). As a result of the role that beef production has on numerous households and the economy as whole, extensive programs have been developed to further educate beef producers.

Beef production is an extremely important agricultural commodity produced in the United States, and the industry has responded to the need for increasing education. Middleton and Gibb examined beef cattle improvement programs in 1991, and cited that current educational programs were largely available through various breed programs. Funding for such educational programs is generated through registration income. The history of these programs was reviewed to establish a bench-mark to measure the progress made within the industry through time, and to address current concerns. Along with the increase in technology and complexity, has come a shortage in the number of educators that truly comprehend the industry and associated technologies (Middleton and Gibb 1991). Although Middleton and Gibb outlined their primary concerns for qualified educators, the industry has risen to the challenge with targeted extension education

programs in numerous states and universities. Alabama, Georgia, Kentucky, Louisiana, Oklahoma and Tennessee all states have initiated a targeted beef educational program with the goal of advancing producers' production and management practices (Vestal et al. 2006).

The study of technology adoption has been wide and extensive. Two main areas of technology adoption have been outlined. The first area is associated with building economic decision models that are linked to factors such as farm size, risk attitudes, and liquidity. The second area is related to empirical studies which identify the factors related with adoption decisions (Dorfman 1996). In a 1983 study, Just and Zilberman showed the relationship between economies of firm size and adoption. They stated a possible quadratic effect, as larger firms were more prone to adoption earlier than smaller farms (Just and Zilberman1983). The role of firm size and its relationship to adoption has been a topic of specific interest to researchers. In 2001, economies of scale were related to low-cost vs high-cost production firms. Low-cost operations had significantly larger cowherds than high-cost operations. Cow-calf production was the primary production on low-cost firms, and was more likely to be a secondary activity in high-cost firms (Short 2001).

In terms of long-term sustainability, the efficiency of farms is an important factor. Farming like numerous businesses exhibits a high rate of turnover, as well as a high rate of new entrants. The demographics of primary producers have been a factor in determining the longevity of the operation. In a recent study by the Economic Research Service of the U.S. Department of Agriculture (ERS-USDA), farms with middle-aged operators are more likely to survive (MacDonald 2006).

Other factors affecting technology adoption include the financial situation of producers. Income generated from an agriculture based production firm was a variable used in determining the adoption of range management practices in Louisiana. The study showed that household income generated from agricultural production had a positive relationship on the probability of adopting specific range management practices. (Kim, Gillespie, and Paudel 2004). This research is one of only a few previous studies that have been conducted concerning the cow-calf industry and technology adoption.

With economies of size a large factor in many farms today, the analysis of the role farm size plays in beef production becomes exceedingly relevant to economics of beef production. As previously stated, most farms are small, family based organizations. With this structure and operation size, an individual firm lacks the ability to appropriate the time or investment involved in research and development of technology and innovation, therefore the adoption process is the only means of advancement. Diederon, van Meijl, and Wolters (2003) examined the factors which influence a farmer to adopt an innovation. By incorporating an Ordered Probit approach, they developed a relationship between innovation adoption and labor resources, market position, access to information and past adoption behavior. The fact that numerous farms used in this research have limited access to research and development has shown that few firms have a large incentive to develop the necessary capabilities to incorporate new innovations into their production firm. Results showed that innovative activities are positively correlated to firm size, market position, and information available (Diederen, van Meij and Wolters 2003).

In a 1996 study by Dorfman, education was shown to be important in adoption rates. His Multinomial Probit model was applied to farmers who were faced with multiple technologies which can be adopted in various combinations. The conclusion determined that farmers with higher education levels were more likely to adopt the improved irrigation bundle, but less likely to adopt only improved irrigation. With regard to integrated pest management, producers with higher education levels are more likely to realize and appreciate the potential benefits of IPM.

The most conclusive results are with the off-farm labor supply. A greater number of hours worked off-farm by the operator lowers the probability of adopting improved irrigation methods (Dorfman 1996). Popp, Faminow, and Parsch (1999) note a key point regarding education. The likelihood of adoption would increase with higher education levels, but better education is also likely to change off-farm labor opportunities.

Numerous studies have been conducted on factors that heavily influence beef cow-herd costs, production and profits, however even with both an increase in research and technology, the profitability of cow-calf operations varies greatly. In a study by Ramsey, et al. (2005), the primary objective was to determine the economic factors within a ranch manager's control that are important in determining economic performance. Standard Performance Analysis (SPA) data from New Mexico, Oklahoma, and Texas were used to interpret those factors that influence economic performance. SPA data were organized into two primary categories. The first included cash operating costs, liabilities, as well as market value of assets, changes in inventories and other expenses. The second category included cow and calf inventories, feed and grazing acres, feed used, and pregnancy efficiency. Several key economic factors are examined, including

cow herd size, land investment, machinery and equipment investment, livestock investment, feed fed, calving percentage, death loss, and breeding season. Each of these factors has previously been shown to not only affect production, but also efficiency of production. In their study, production and financial management were both large contributors to explaining total costs, along with economies of size increase at a decreasing rate. Results clearly indicated the importance of efficient management in regards to cow herd costs per unit, production and profitability. Management is key to effective investments and this combined with good decision skills leads to an improvement in long-term profitability and sustainability (Ramsey et al. 2005).

The primary goal of extension educators is to continually provide consistent and clear information to farm producers (Hall et al. 2003). With technology continually developing, a question arises, as to the best method of information delivery (Hall et al. 2003). Extension educators constantly are made aware of the impact that technological innovation have on individuals, family, and farm producers. Technology has caused major shifts to occur in the methods in which farmers receive and channel information. Information transfer through the use of personal computers is enhancing agricultural marketing strategies and improving possibilities for increased farm profitability. While more American farmers are incorporating technology and computer usage into their farm-related business, the farmers surveyed in this study are recognized farm leaders in their commodity production area (Hall et al. 2003). To increase the probability of adoption, educational programs have been formatted and designed to be extremely friendly to even the most technologically averse (Doye 2004).

While research has been conducted on both the factors affecting technology adoption, and the factors influencing cow-calf profitability, very little research has been directly conducted regarding the relationship between cow-calf operations and technology adoption. In 1999, the factors affecting the adoption of value-added production on cow calf farms were analyzed. The goal of the research was to better define and determine those factors that affect the adoption of value-added production on cow-calf farms. The decision to feed or sell calves at weaning was examined for Arkansas cow-calf producers. The authors hypothesized that farm size, human capital, perception of risk and returns, and enterprise diversification would explain this decision. The authors also set out to rank these factors and their influence on the decision to feed weaned calves to higher weights rather than sell them at weaning. Explanatory variables commonly used in technology adoption include farm size, human capital, age, and education. Previously, farm size was found to be positively related to technology adoption as larger production units are more likely to adopt a new technology. Human capital follows in a similar pattern as a positive relationship between education level and adoption rates is common. Results clearly showed that farm size was a significant variable. On average, a 100 acre increase in land would ultimately lead to a 1% increase in the likelihood that the production unit would background calves. Human capital was a variable that needed further research as the survey did not include more precise variables to capture operator experience, off-farm employment opportunities, and the current labor situation on the production unit. The perception of profitability was extremely influential as the impact led an operator to adopt the value-added enterprise if it is thought to bear a higher return. This increase in returns also bears an increase in risk. If a producer feels as

though the risk associated with feeding small calves to heavier weights is greater than the price premium, the producer is more likely to sell the calves rather than incorporate backgrounding. In general, if the producer felt as though the added investment was profitable and had minimal price risk associated with it, then they invested in backgrounding. A major conclusion was that extension efforts should be focused on price risk management, feeding technology, and methods to convert existing facilities to accommodate feeding (Popp, Faminow, and Parsch 1999).

A similar study was conducted in 2004 by Kim, Gillespie, and Paudel. The effect of economic factors on the adoption of best management practices in beef cattle production was examined. The goal of the research was to provide insight into the factors that affect adoption of best management practices. The focus was on the environmental effects of cattle production. The major concern is that the adoption rates are extremely low, and even though ample effort has been made to educate producers, minimal implementation has occurred. The primary method of data analysis used was Probit analysis. Data were gathered through a state wide survey in Louisiana. The relationship between farm size and adoption has been previously related to fixed costs, risk preference, human capital, credit constraint, labor requirements, tenure arrangements and number of animals in the herd. Most studies have found that age has negative impacts on the probability of technology adoption and that the producer's financial situation could play an important role in his or her technology adoption decision. Results confirmed the hypothesis that the greater the dependency on crop or livestock production, the greater the need and desire for economic efficiency. The income variable was positive and

significant in technology adoption, meaning as income increased the likelihood of adoption also increased (Kim, Gillespie, and Paudel 2004).

The implications such research has in further developing beef educational programs are significant. The relationship and quantification of the lag in implementation is only one of numerous benefits generated from such research. To determine how the cow-calf industry is making progress, it is important to know what the current situation is. By providing a benchmark of current management practices, both producers and educators can more easily track their progress and development over time. Specific management practices regarding preconditioning, breeding season, and forage intake are all practices that have been proven to be cost-effective and profitable practices.

Implementation of these practices has been unpredictable and inconsistent. Examining the effect of firm size and income generated by the firm on adoption can further assist educators in understanding the lag in implementation. With a combination of ideal management decisions in such areas as nutrition, animal health, marketing, business planning, reproduction and genetics, producers could potentially see greater returns over time.

CHAPTER IV

PROCEDURES AND DATA SOURCES

Sixteen lead authors from six academic disciplines wrote a new Oklahoma Beef Cattle Manual in 2005 consisting of forty chapters (Doye and Lalman 2005). The manual was distributed through local Extension offices, producer meetings, and by e-mail request from an Oklahoma State University (OSU) website (http://agecon.okstate.edu/cattleman/). Producers who received a copy of the manual were asked to complete a survey documenting beef production and management practices.

The survey instrument asks a variety of questions on a broad array of production and management areas of the cowherd enterprise. Management practices included in the survey were categorized into eight areas: nutrition and management, forages and introduced pasture, quality assurance and animal health, marketing and risk management, business planning and management, reproduction, genetics, and demographics. A frequency distribution was developed to view the number of observations in two categories: herd size and percentage dependence on the beef enterprise for household income. From this distribution, two groups were formed. The first group (referred to as Group 1) consisted of smaller producers (herd sizes of 1-99 breeding females) whose percentage of household income from the beef enterprise in 2003 was between 1 and 40%. The second group (referred to as Group 2) consisted of larger producers (herd sizes

of 100 or more breeding females) whose percentage of household income from the beef enterpise in 2003 was greater than 40%. Producers in these two groups totaled 414 and accounted for 56.8% of all producers used for this project. Group 1 consisted of 324 producers; and Group 2, 90 producers (Table IV-1).

Table IV-1 Frequency of Producers by Herd Size and Income

	64 [1] Household net income from beef cattle operation				
58a[1].Breeding females in herd (head)	1%-20%	21%-40%	41%-60%	61%-80%	81%-100%
1-49	189	40	13	5	6
50-99	49	46	22	9	3
100-249	27	29	30	19	10
250-499	3	3	4	7	9
500-999	0	1	2	2	3
1000+	0	1	0	0	4

Group 1=Light shaded area
Group 2=Dark shaded area
[1] - 58a and 64 correspond to survey questions

Initially, t-tests of mean responses (where appropriate) and chi-square tests of frequency distributions comprise the statistical analysis. Some questions had two response categories, some questions asked for responses on a 1-7, Likert scale, and some questions could have multiple responses. Means were not meaningful in all cases. In other instances, response alternatives were grouped so as to approach an ordering for which a mean and chi-square test would be more meaningful.

An example of the Master Cattleman Cow Calf Initial Assessment is included in Chapter VIII, Appendix B. Total surveys number 729, and summary frequency tables across all surveys are included in Chapter VIII, Appendix A.

CHAPTER V

PRACTICES ACROSS PRODUCER GROUPS

Nutrition and Management

Questions regarding the nutritional maintenance and management of the cow herd included mineral supplementation, castration, growth promoting implants, and dehorning. Over half of the management areas examined in this section yielded a statistically significant difference between the two groups.

Commercial Mineral - When asked about mineral supplementation for cattle grazing spring and summer pasture (Table V-1), over 75% of both groups responded they nearly always provide a commercial mineral. Of Group 1 producers, 77% provide a commercial mineral, whereas 87.5% of Group 2 producers nearly always do. Among Group 1, 23% either sometimes or rarely if ever provide commercial mineral, yet of Group 2 only 12.5% sometimes or rarely use this practice. Producers were also asked about their use of white salt, both white salt and commercial mineral, or not using a supplement. Results for both groups are listed in Table V-1; however no significant difference was found between the two groups.

Table V-1 Question 1-Nutrition and Management Section[1]

1. For cattle grazing spring and summer pasture, do you provide:

	1	2	3	4	5	6	7
a. A commercial mineral[2*]							
Producer Group 1	155	33	15	18	9	3	11
	(63.52)	(13.52)	(6.15)	(7.38)	(3.69)	(1.23)	(4.51)
Producer Group 2	58	5	3	1	0	0	5
	(80.56)	(6.94)	(4.17)	(1.39)	(0.00)	(0.00)	(6.94)
b. White Salt[2]							
Producer Group 1	83	17	13	21	9	18	51
	(39.15)	(8.02)	(6.13)	(9.91)	(4.25)	(8.49)	(24.06)
Producer Group 2	17	2	3	4	1	7	13
	(36.17)	(4.26)	(6.38)	(8.51)	(2.13)	(14.89)	(27.66)
c. Both white salt & a commercial mineral[2]							
Producer Group 1	125	29	22	18	6	14	54
	(46.64)	(10.82)	(8.21)	(6.72)	(2.24)	(5.22)	(20.15)
Producer Group 2	29	5	3	4	5	3	14
	(46.03)	(7.94)	(4.76)	(6.35)	(7.94)	(4.76)	(22.22)
d. No salt or mineral supplement[2]							
Producer Group 1	4	2	6	5	2	14	147
	(2.22)	(1.11)	(3.33)	(2.78)	(1.11)	(7.78)	(81.67)
Producer Group 2	1	0	0	1	1	2	30
	(2.86)	(0.00)	(0.00)	(2.86)	(2.86)	(5.71)	(85.71)

[1]top number=frequency, and bottom number=percentage distribution.

[2] measured on a likert scale, 1-7, where 1=nearly always, 7=rarely if ever.

*Significant mean difference in chi-square at 0.1 significance level.

**Significant mean difference in chi-square at 0.05 significance level.

***Significant mean difference in chi-square at 0.01 significance level.

Mineral Supplementation - When producers are determining the amount and type of winter supplementation necessary, a wide range of informational sources are available (Table V-2). A significant difference was noted between the two groups in regards to implementing forage tests and estimated animal requirements when determining supplementation. Forty percent of Group 2 nearly always used a forage test and animal requirements. In contrast, almost half of Group 1 (49.6%) responded that they rarely used either forage tests or animal requirements as a determining factor in the supplementation

provided. Several others sources of information were included in this question (consult veterinarian, consult feed company representative, consult extension educator, use a

Table V-2 Question 2-Nutrition and Management Section[1]

2. How do you determine how much and what type of supplement to feed during winter?[2]

	1	2	3	4	5	6	7
a. Consult veterinarian							
Producer Group 1	13	15	5	17	20	26	106
	(6.44)	(7.43)	(2.48)	(8.42)	(9.90)	(12.87)	(52.48)
Producer Group 2	2	2	1	5	3	5	26
	(4.55)	(4.55)	(2.27)	(11.36)	(6.82)	(11.36)	(59.09)
b. Consult feed company representative							
Producer Group 1	39	20	21	27	14	25	67
	(18.31)	(9.39)	(9.86)	(12.68)	(6.57)	(11.74)	(31.46)
Producer Group 2	5	3	4	11	4	2	18
	(10.64)	(6.38)	(8.51)	(23.40)	(8.51)	(4.26)	(38.30)
c. Consult Extension educator							
Producer Group 1	24	20	25	35	12	18	71
	(11.71)	(9.76)	(12.20)	(17.07)	(5.85)	(8.78)	(34.63)
Producer Group 2	3	6	3	9	8	2	16
	(6.38)	(12.77)	(6.38)	(19.15)	(17.02)	(4.26)	(34.04)
d. Use a supplement that has worked well in the past							
Producer Group 1	125	62	39	25	3	2	3
	(48.26)	(23.94)	(15.06)	(9.65)	(1.16)	(0.77)	(1.16)
Producer Group 2	36	15	7	7	0	1	2
	(52.94)	(22.06)	(10.29)	(10.29)	(0.00)	(1.47)	(2.94)
e. Use forage tests & estimated animal requirements to calculate*							
Producer Group 1	40	25	23	17	12	19	96
	(17.24)	(10.78)	(9.91)	(7.33)	(5.17)	(8.19)	(41.38)
Producer Group 2	15	7	8	3	5	7	10
	(27.27)	(12.73)	(14.55)	(5.45)	(9.09)	(12.73)	(18.18)
f. Use OSU CowCulator or OSU Auto NRC to design a supplementation or feeding plan							
Producer Group 1	13	9	7	11	5	20	136
	(6.47)	(4.48)	(3.48)	(5.47)	(2.49)	(9.95)	(67.66)
Producer Group 2	4	3	3	2	3	3	29
	(8.51)	(6.38)	(6.38)	(4.26)	(6.38)	(6.38)	(61.70)

[1]top number=frequency, and bottom number=percentage distribution.

[2] measured on a likert scale, 1-7, where 1=nearly always, 7=rarely if ever.

*Significant mean difference in chi-square at 0.1 significance level.

**Significant mean difference in chi-square at 0.05 significance level.

***Significant mean difference in chi-square at 0.01 significance level.

supplement that worked previously, and use OSU extension programs); however, no statistically significant difference was found between the two groups.

Castration - Castration, implanting, and dehorning calves are just a few well-recognized management practices that significantly influence the value of calves. The value often represents $50-$100 more per head (Lalman and Doye 2005). Most preconditioning programs require castrating bull calves. Producers can expect higher prices for steer calves than for bull calves and higher prices for castrated calves in preconditioning programs. Group 2 producers more frequently castrated bull calves than did Group 1 producers. Of Group 2 producers, 73% reported nearly always castrating bull calves, compared with 54.1% for Group 1 (Table V-3). About 11-12% of each group rarely castrated bull calves. Research clearly shows that buyers pay a premium for steers compared with bulls, typically more than enough to pay the cost of castrating.

Implants - Few, if any, management practices are more cost effective or have a higher return on investment than properly used growth-promoting implants. Growth-promoting implants have been shown to improve growth rate 10-30% and feed efficiency 5-15% (Preston 1999). A large percentage of Group 1 producers are not capitalizing on the benefits of growth promoting implants, given that 63.5% reported rarely using implants on steer calves prior to weaning (Table V-3). Group 2 was distinctly and significantly different. Of Group 2 producers, 36.8% nearly always used implants. Producers are less likely to use implants on heifers that are not intended for breeding. Within Group 1, 72.2% rarely use implants and over half (52.9%) of Group 2 also responded that they do not implant heifer calves which are not intended to enter a breeding program. Over 75% of both groups responded that they rarely use implants on

heifer calves that are intended for replacements. Research has revealed there is little benefit and perhaps disincentives to using growth promoting implants on replacement heifers as heifers which were implanted had reduced fertility when compared to non-implanted heifers (Selk 1997).

Dehorn - Dehorned cattle are receiving increased attention due to major issues of safety, animal welfare, and carcass bruising. Injuries to producers and family members can be serious and costly when handling horned cattle. Dehorning will not eliminate the probability of injuries; it will however remove one of the causes. A growing issue is that of animal welfare. Consumers want to be assured that the product they consume has been produced with the welfare of the animal considered. Producers must be aware of these concerns and produce a product that meets consumer demand. The last and arguably most important concern is that of carcass bruising. Horned cattle generally use their horns in an offensive manner to gain advantages in feed bunks. When cattle butt each other, muscle bruising occurs. At harvest, bruises must be trimmed out, therefore decreasing carcass quality and value. Groups of horned cattle have more bruises than polled cattle. According to the National Beef Quality Audit 1995, the beef industry is losing $4.03/animal and $114,452,000 annually due to carcass bruising (Boleman et al. 1998). Due to the significant increase in carcass bruise damage, a higher price can be expected from the dehorning requirement (Lalman and Doye 2005). In preconditioning programs, dehorning is typically a requirement. In 2000, the National Beef Quality Audit identified future goals to increase quality of the United States beef. Reducing horned cattle to less than 5% was listed as the fifth most important industry goal. In the 2000 National Beef Quality Audit, 22.7% of cattle were horned, which was significantly less than reported in

the 1995 Audit (32.2%). Among producers in our study, over 12.4% of Group 1 neither dehorn nor tip calves whereas only 8.1% of Group 2 do not dehorn or tip (Table V-3). A strong point of interest is the frequency of producers who raised horned cattle. Of Group 1, 31.1% show dehorning as a practice that is not applicable to their operation, and

Table V-3 Questions 3-7 Nutrition and Management Section[1]

	1	2	3	4	5	6	7
3. Are bull calves that are not intended for breeding purposes castrated prior to weaning?[2]**							
Producer Group 1	171	37	26	30	9	9	34
	(54.11)	(11.71)	(8.23)	(9.49)	(2.85)	(2.85)	(10.76)
Producer Group 2	65	6	1	3	1	2	11
	(73.03)	(6.74)	(1.12)	(3.37)	(1.12)	(2.25)	(12.36)
4. Do you implant steer calves prior to weaning?[2*]**							
Producer Group 1	38	18	18	20	11	11	202
	(11.95)	(5.66)	(5.66)	(6.29)	(3.46)	(3.46)	(63.52)
Producer Group 2	32	5	4	8	4	4	30
	(36.78)	(5.75)	(4.60)	(9.20)	(4.60)	(4.60)	(34.48)
5. Do you implant heifer calves not intended for replacements prior to weaning?[2*]**							
Producer Group 1	29	11	14	12	8	13	226
	(9.27)	(3.51)	(4.47)	(3.83)	(2.56)	(4.15)	(72.20)
Producer Group 2	21	5	2	6	2	4	45
	(24.71)	(5.88)	(2.35)	(7.06)	(2.35)	(4.71)	(52.94)
6. Do you implant heifer calves that are intended for replacements prior to weaning?[2*]**							
Producer Group 1	13	8	10	9	5	16	251
	(4.17)	(2.56)	(3.21)	(2.88)	(1.60)	(5.13)	(80.45)
Producer Group 2	13	2	2	0	0	3	63
	(15.66)	(2.41)	(2.41)	(0.00)	(0.00)	(3.61)	(75.90)

7. Calves with horns are [3*]	N/A	Dehorned	Tipped	Neither
Producer Group 1	100	158	24	40
	(31.06)	(49.07)	(7.45)	(12.42)
Producer Group 2	18	57	5	7
	(20.69)	(65.52)	(5.75)	(8.05)

[1]top number=frequency, and bottom number=percentage distribution.
[2] measured on a likert scale, 1-7, where 1=nearly always, 7=rarely if ever.
[3] where 1=Not applicable to my operation, 2=Dehorned, 3=Tipped, 4=Neither.
*Significant mean difference in chi-square at 0.1 significance level.
**Significant mean difference in chi-square at 0.05 significance level.
***Significant mean difference in chi-square at 0.01 significance level.

Group 2 only has 20.7% of producers who are not applicable to dehorning. Among producers who raise horned calves, 10.1% of Group 2 do not dehorn or tip; however, almost twice as many Group 1 producers (18%) have yet to incorporate dehorning into their management routine.

Summary - In brief, producers in both groups are castrating and dehorning their calf crop, thus adding value at the minimal cost of labor and stress on calves during processing. However, the use of growth promoting implants is much more common among Group 2 producers, and apparently only these producers fully realize the economic return obtained by the added weight gain from implants.

Forages and Introduced Pasture

This section included management practices regarding hay feeding season, soil and forage test frequency, stocking rates and stockpiling forages. Every question, with the exception of soil testing frequency, noted a statistically significant difference between the two groups.

The reduction of feeding harvested forage while maintaining cow performance could substantially increase the profitability of cow/calf producers and lower overall costs of beef production (Adams et al. 1994). An Integrated Resource management project in Nebraska noted the harvested forage costs per calf weaned could account for up to 24% of total costs (Rasby et al. 1989). The use of hay can be critical to livestock during specific times. Although hay will never be eliminated from livestock production systems, many Oklahoma producers feed too much hay for too long a period of time (Redfearn 2003). The extended use of harvested forages in feeding programs is

expensive, not to mention labor intensive. Forage specialists and economists have clearly stated that minimizing harvested forages fed relative to grazing forages is generally more cost effective.

Hay Feeding Season - Producers were asked to specify the typical length of their hay-feeding season. A majority of producers in both Groups 1 and 2 have a hay feeding season more than 90 days, as approximately 66% of each group reported feeding hay for that period annually. Furthermore, 22% of both Groups reported feeding harvested forages for more than 121 days. Almost 16.9% of Group 2 producers reported their hay feeding season to be 0-60 days; however a mere 7.5% of Group 1 producers kept their use of hay within this range (Table V-4).

Stocking Rate - Arguably the most important management practice that affects profitability of livestock is the stocking rate. When stocking rates are too high, rangelands become over-utilized and subject to weed problems accompanied by reduced animal performance. In contrast, when the stocking rate is too low, rangelands are undergrazed and therefore lead to a reduced net economic return (Bidwell and Redfearn 2002). Stocking rate, regardless of the grazing system used, is the most critical factor in a successful forage system for optimizing animal performance and ensuring forage plant vigor (Lalman and Doye 2005). Of producers in both groups, 59.7% responded that they either do not know how or are unsure of the proper way to set and monitor a proper stocking rate. Over 60.9% of Group 2 producers know how to set and monitor a stocking rate, yet only 34.7% of Group 1 indicated being knowledgeable about appropriate stocking rates. Nearly two-thirds (65.3%) of Group 1 producers are not aware of or are

unsure about one of the most important management practices affecting cow/calf production (Table V-4).

Forage Testing - Feeding hay is extensive for most Oklahoma cattlemen, but they are also not fully evaluating the nutrition content of the hay they are producing or purchasing. Producers have numerous options in determining how much and what type of supplement to feed during winter months. Forage testing of hay and silage may be used to determine quality. This information can then be used to determine how herd nutritional requirements will be met by the forage supplied. When producers were asked how often they used forage tests to determine the nutritive value of hay and silage, a significant difference was noted between Groups 1 and 2. Within Group 1, 56.1% never use forage tests to determine the nutritive value of the hay or silage they produce, and 15.9% almost always did. In contrast, Group 2 consisted of 36% who rarely used forage tests on produced forage and 29.2% who almost always did (Table V-4).

Forage testing was less common for purchased silage or harvested forage than ranch-produced forage. Again a significant difference was found between Groups 1 and 2 (Table V-4). Forage testing for purchased hay was rarely employed by either Group 1 (68.9%) or Group 2 (53.8%), but more in Group 2 tested nearly always (23.8%) than did those in Group 1 (13%). These results may be related to knowledge, costs, and availability about forage testing. Some may not know how to utilize test results. Whatever the reason, many producers are not taking advantage of technology available to evaluate the value of the hay or silage in which they are investing.

Table V-4 Questions 8-12 Forages and Introduced Pasture[1]

8. Your typical hay-feeding season is[*]:

	< 30days	31-60 days	61-90 days	91-120 days	>121 days
Producer Group 1	8	16	80	146	72
	(2.48)	(4.97)	(24.84)	(45.34)	(22.36)
Producer Group 2	6	9	15	39	20
	(6.74)	(10.11)	(16.85)	(43.82)	(22.47)

9. If you raise introduced pasture, how frequently do you use a soil test?[3]

	1	2	3	4	5	6
Producer Group 1	23	44	113	91	34	18
	(7.12)	(13.62)	(34.98)	(28.17)	(10.53)	(5.57)
Producer Group 2	4	16	38	22	5	2
	(4.60)	(18.39)	(43.68)	(25.29)	(5.75)	(2.30)

10. Do you know how to set and monitor a proper stocking rate?[***]

	Yes	No	Not Sure
Producer Group 1	111	83	126
	(34.69)	(25.94)	(39.38)
Producer Group 2	53	9	25
	(60.92)	(10.34)	(28.74)

11. How often do you use forage test to determine the nutritive value of the hay or silage you produce?[2**]

	1	2	3	4	5	6	7
Producer Group 1	31	20	31	39	20	36	144
	(9.66)	(6.23)	(9.66)	(12.15)	(6.23)	(11.21)	(44.86)
Producer Group 2	17	9	15	10	6	7	25
	(19.10)	(10.11)	(16.85)	(11.24)	(6.74)	(7.87)	(28.09)

12. How often do you use forage test to determine the nutritive value of the hay or silage you purchase?[2**]

	1	2	3	4	5	6	7
Producer Group 1	23	18	17	24	16	35	182
	(7.30)	(5.71)	(5.40)	(7.62)	(5.08)	(11.11)	(57.78)
Producer Group 2	12	7	11	4	3	5	38
	(15.00)	(8.75)	(13.75)	(5.00)	(3.75)	(6.25)	(47.50)

[1] top number=frequency, and bottom number=percentage distribution.
[2] measured on a likert scale, 1-7, where 1=nearly always, 7=rarely if ever.
[3] where 1=Annually, 2=Every other year, 3=Once every 3-4 yrs, 4=Rarely, 5=Never, 6=N/A.
*Significant mean difference in chi-square at 0.1 significance level.
**Significant mean difference in chi-square at 0.05 significance level.
***Significant mean difference in chi-square at 0.01 significance level.

An option to reduce the amount of hay fed during the winter months is growing stockpiled forages. Stockpiled forage is forage allowed to accumulate in the pasture for grazing when production is slow during the winter months. The cost of grazing stockpiled forage per animal is typically lower than the cost of feeding hay or the cost of feeding a protein supplement on dry grass when sufficient rainfall is received (Lalman and Doye 2005). The survey divided stockpiling questions into native vegetation and introduced forages. The management practices differ among these two types of forages primarily in that nitrogen fertilization is recommended when stockpiling introduced forages, whereas native vegetation is from non-fertilized summer growth (Lalman and Doye 2005).

Stockpiling Native Vegetation – Stockpiling forages is defined as deferring grazing in a pasture to accumulate it for grazing when production is slow during the winter months. The majority of both groups have land in native vegetation (Group 1: 73.9%, Group 2: 82.6%), yet the use of stockpiling forages differs. Over half (53.4%) of Group 2 responded they nearly always stockpile native vegetation pastures for fall and winter grazing, and little more than a tenth responded they rarely if ever use this practice. Almost half (48.5%) of Group 1 stockpiles native vegetation, but 20.1% responded they rarely if ever stockpile (Table V-5). A potential explanatory factor could be attributed to the probability of larger producers having access to (own or lease) more acreage.

Stockpiling Introduced Forages - The majority of both groups (77.3% and 88%, respectively) responded that they have land in introduced forages, yet the use of stockpiling is quite different. The majority of Group 2 nearly always stockpile

(56.8%), and only 12.4% rarely use this practice, whereas only 40.2% of Group 1 stockpile and just over a third (30.5%) rarely use stockpiling on introduced forages (Table V-5). Although stockpiling is highly recommended by both forage specialists and agricultural economists as an option in reducing winter forage feeding costs, the management of stockpiling introduced forages could be the explanation behind the small use of this practice among Group 1 producers surveyed. Both Bermudagrass and Tall Fescue (introduced forages) require quality pasture preparation to produce quality fall-grown forages. Nitrogen application must be accurately applied and the grazing period should be monitored closely. Both require an increase in management time and cost which could potentially be a limited resource for Group 1 producers. Likewise, the availability of a greater number of acres of land which is not needed year round for pasture could be a potential explanatory factor behind larger producers stockpiling forages more frequently. Producers' frequency of conducting a soil test on introduced pasture differ but not significantly for the two groups.

Summary - Neither producer group is consistently forage testing either produced and purchased hay or silage, and a large majority of all producers are feeding harvested forages for over three months. Group 1 producers lack the knowledge of and confidence in applying proper stocking rates, as a large majority are uncertain of the accurate methods to determine stocking rate.

Quality Assurance and Animal Health

Questions regarding the overall health and management of the herd were included in this section. Parasite control, vaccination, carcass data, herd

identification, injection location, and body condition score were included. Statistical differences were found between the two groups in seven questions.

Table V-5 Questions 13-14A Forages and Introduced Pasture[1]

13. Do you have land in native vegetation?*

	Yes	No
Producer Group 1	232	82
	(73.89)	(26.11)
Producer Group 2	71	15
	(82.56)	(17.44)

13A. If yes in 13, do you stockpile forage grasses for fall and winter grazing?[2]**

	1	2	3	4	5	6	7
Producer Group 1	81	35	32	27	16	11	37
	(33.89)	(14.64)	(13.39)	(11.30)	(6.69)	(4.60)	(15.48)
Producer Group 2	32	7	19	5	1	4	5
	(43.84)	(9.59)	(26.03)	(6.85)	(1.37)	(5.48)	(6.85)

14. Do you have land in introduced forages? **

	Yes	No
Producer Group 1	218	64
	(77.30)	(22.70)
Producer Group 2	66	9
	(88.00)	(12.00)

14A. Do you stockpile fescue or bermudagrass for fall or winter grazing?[2]***

	1	2	3	4	5	6	7
Producer Group 1	70	33	31	35	9	27	51
	(27.34)	(12.89)	(12.11)	(13.67)	(3.52)	(10.55)	(19.92)
Producer Group 2	35	11	14	5	6	0	10
	(43.21)	(13.58)	(17.28)	(6.17)	(7.41)	(0.00)	(12.35)

[1]top number=frequency, and bottom number=percentage distribution.

[2] measured on a likert scale, 1-7, where 1=nearly always, 7=rarely if ever.

[3] where 1=Annually, 2=Every other year, 3=Once every 3-4 yrs, 4=Rarely, 5=Never, 6=N/A.

*Significant mean difference in chi-square at 0.1 significance level.

**Significant mean difference in chi-square at 0.05 significance level.

***Significant mean difference in chi-square at 0.01 significance level.

Tick Control - When controlling ticks in the cowherd, producers have several options. Pesticides, pasture rotation, and prescribed burning are common methods to control ticks to reduce weight-loss within the herd. The use of pesticides and pasture rotation were both examined; however, no difference between the two groups was found. Regarding prescribed burning, a significant difference was identified. Among Group 1 producers, over 63% rarely ever use prescribed burns to control ticks. Whereas, in Group 2, 18.6% of producers nearly always use prescribed burns, which is three times as many producers as Group 1 (5.1%) (Table V-6). Prescribed burning is an intense management practice which could potentially be intimidating and stressful for some producers.

Vaccination - A key feature of preconditioning programs is a specified vaccination and health management program. Group 1 producers were more likely not to vaccinate calves before marketing them (33.2%) or use a single vaccination (43.2%) compared with Group 2 (21.4% and 33.3%, respectively). Multiple vaccinations were the common practice of Group 2 producers (45.2%), but only 23.5% of Group 1 producers vaccinated their calves multiple times (Table V-6). The lower incidence of vaccinations may be related to time and cost of working calves for smaller producers whose household income is less dependent on the beef operation than for Group 2 producers. Working time, adequate facilities, and knowledge are all factors which contribute to vaccinating calves. A producer could potentially see the value in vaccination, but it might not outweigh the added inputs required. Additional costs of hired labor and simply the expense of vaccines are a potential weighting factor in producers' consideration of whether or not to vaccinate

Table V-6. Questions 15-17 Quality Assurance and Animal Health1

15. Which of the following steps do you use to control ticks to reduce beef cattle weight loss?[2]

	1	2	3	4	5	6	7
a. Pesticide (tags, spray, pour-on)							
Producer Group 1	201	65	19	21	5	2	11
	(62.62)	(19.31)	(5.92)	(6.54)	(1.56)	(0.62)	(3.43)
Producer Group 2	55	10	6	4	3	2	6
	(63.95)	(11.63)	(6.98)	(4.65)	(3.49)	(2.33)	(6.98)
b. Pasture rotation							
Producer Group 1	48	27	25	35	19	26	81
	(18.39)	(10.34)	(9.58)	(13.41)	(7.28)	(9.96)	(31.03)
Producer Group 2	22	5	7	7	3	3	18
	(33.85)	(7.69)	(10.77)	(10.77)	(4.62)	(4.62)	(27.69)
c. Prescribed fire* **							
Producer Group 1	13	15	15	12	17	23	162
	(5.06)	(5.84)	(5.84)	(4.67)	(6.61)	(8.95)	(63.04)
Producer Group 2	11	5	3	6	0	7	27
	(18.64)	(8.47)	(5.08)	(10.17)	(0.00)	(11.86)	(45.76)

16. When do you deworm nursing calves?[3]

	1	2	3	4
Producer Group 1	57	81	50	114
	(18.87)	(26.82)	(16.56)	(37.75)
Producer Group 2	11	19	7	40
	(14.29)	(24.68)	(9.09)	(51.95)

17. When do you vaccinate you calves for IBR, BVD,BRSV and PI3 prior to marketing them?[4]***

	1	2	3	4	5	6
Producer Group 1	103	47	69	18	52	21
	(33.23)	(15.16)	(22.26)	(5.81)	(16.77)	(6.77)
Producer Group 2	18	8	16	4	21	17
	(21.43)	(9.52)	(19.05)	(4.76)	(25.00)	(20.24)

[1]top number=frequency, and bottom number=percentage distribution.

[2] measured on a likert scale, 1-7, where 1=nearly always, 7=rarely if ever.

[3] where 1=Do not deworm calves, 2=60-120 days of age, 3=Mid-summer, 4=At weaning.

[4] where 1=Do not vaccinate prior to marketing, 2=Single vaccination 2-6 wks prior to weaning, 3=Single vaccination at weaning, 4=Single vaccination 2-3 wks after weaning, 5=Multiple vaccination at 2-6 wks prior to weaning & at weaning, 6=Multiple vaccination at weaning & at 2-3 wks after weaning.

*Significant mean difference in chi-square at 0.1 significance level.

**Significant mean difference in chi-square at 0.05 significance level.

***Significant mean difference in chi-square at 0.01 significance level.

calves. However, given the lower incidence of vaccinations among Group 1 producers, the greater propensity to incur diseases in put-together groups of calves from smaller cow-calf producers is understandable. Similarly, the reason buyers pay a premium for preconditioned calves is understandable. The time in which producers deworm nursing calves did not show a significant difference between the two groups.

Carcass Data - Collecting carcass data on herd offspring is one of the best ways in which the carcass quality of the calves that are produced can be more clearly evaluated. Only 7.6% of both Group 1 and Group 2 producers reported that they had ever collected carcass data on their calves. Almost 23% of Group 2 producers have collected carcass data, whereas a mere 3.5% of Group 1 producers have collected carcass data. Six times as many producers in Group 2 collected this type of information than Group 1 (Table V-7). The information obtained by collecting carcass data is an initial step in assessing the actual quality of the product produced. When marketing calves, the ability to provide potential buyers with previous information regarding past calf performance could potentially prove to develop a price premium for the calf crop. Another benefit of assessing calves' carcass is to aid in the evaluation of herd genetics. Potential quality improvements through bull selection and replacement heifers could improve both yield and quality grade.

Animal Identification - Although the primary motive for a national animal identification and tracking system is animal disease containment and control, many economists would argue that best management practices require linking costs and returns to individual cows rather than simply with entire herds. This may become even more important as the industry moves toward process verified, quality assurance programs to

best meet demands of beef consumers. Thus, individual animal identification is essential and may become mandatory nationally. If or when a mandatory system is implemented, producers will encounter additional costs associated with the identification process (Disney et al. 2001). Producers who are currently identifying cows will have an advantage as the transition period should be easier and perhaps less costly.

Cow Identification - As a whole, over 90% of all producers completing our survey are using at least one method of individual cow identification. Between the two groups, results differed. The majority of Group 1 producers (51.7%) use one method of identification, which could be visible ear tags, tattoos, electronic identification, freeze branding, or hot branding. Group 2 producers are more likely to use multiple methods of identification (54.8% of Group 2 producers). Twice as many Group 1 producers than Group 2 are not implementing at least one method of identification on their cow herd (Group 1: 10.3% and Group 2: 4.8%) (Table V-7).

Table V-7 Questions 18-23 Quality Assurance and Animal Health[1]

18. Have you ever collected carcass data from your finished calves?***

	Yes	No
Producer Group 1	11	302
	(3.51)	(96.49)
Producer Group 2	19	65
	(22.62)	(77.38)

18A. If yes to question 18:

a. Average Yield Grade

	<2	2-2.5	2.6-3.0	3.1-3.5	>3.5
Producer Group 1	1	5	6	1	0
	(7.69)	(38.46)	(46.15)	(7.69)	(0.00)
Producer Group 2	2	7	7	3	1
	(10.00)	(35.00)	(35.00)	(15.00)	(5.00)

b. Percent grading choice or higher

	<50	51-60	61-70	71-80	>80
Producer Group 1	2	5	5	2	1
	(13.33)	(33.33)	(33.33)	(13.33)	(6.67)
Producer Group 2	4	6	2	3	4
	(21.05)	(31.58)	(10.53)	(15.79)	(21.05)

c. Average carcass weight (lbs)

	<650	651-750	751-850	851-950	>950
Producer Group 1	2	3	7	4	0
	(12.50)	(18.75)	(43.75)	(25.00)	(0.00)
Producer Group 2	0	4	9	4	3
	(0.00)	(20.00)	(45.00)	(20.00)	(15.00)

Table V-7 Questions 18-23 Quality Assurance and Animal Health[1]

19. How do you individually identify cows?[3***]

	1	2	3	2,3	2,5,6	6	2,3,6	2,6	Mult
Producer Group 1	33	142	3	13	2	21	9	91	7
	(10.28)	(44.24)	(0.93)	(4.05)	(0.62)	(6.54)	(2.80)	(28.35)	(2.18)
Producer Group 2	4	25	0	2	4	9	5	35	3
	(4.60)	(28.74)	(0.00)	(2.30)	(4.60)	(10.34)	(5.75)	(40.23)	(3.45)

19A. Location of Hot Brand?

	Rib	Hip	Shoulder
Producer Group 1	4	121	3
	(3.13)	(94.53)	(2.34)
Producer Group 2	1	50	2
	(1.89)	(94.34)	(3.77)

[1]top number=frequency, and bottom number=percentage distribution.
[3] where 1=None, 2=Visible ear tags, 3=Tattoos, 4=Electronic ID, 5=Freeze brand, 6=Hot Brand.
*Significant mean difference in chi-square at 0.1 significance level.
**Significant mean difference in chi-square at 0.05 significance level.
***Significant mean difference in chi-square at 0.01 significance level.

Calf Identification - Of increasing importance is the identification of the calf crop. As the beef industry continues to fulfill demands of consumers, source verification is becoming one of the most highlighted issues the industry faces. Age and source verification are not in conjunction with the National Animal Identification System (NAIS), which is a government program designed for tracking and controlling animal health emergencies. Age or source verification are marketing criteria for which producers could potentially receive a premium. Meeting the requirements of a verification program is much easier if a producer already keeps records (Olson 2007). From a production standpoint, identification at birth is considered essential. Visible ear tags, tattoos, electronic ID, freeze and hot branding were the methods of identification listed on the survey. Identification methods were grouped into three primary groups: none, single identification, and multiple identification. Producers differed in their practices for individually identifying their calves. A little more than 23% of both groups do not identify their calves, yet the majority of Group 1 (54.5%) identify their calves with one method as does almost 45% of Group 2. Implementing multiple methods of identification was significantly lower for the calf crop compared with the cow herd, as 22.3% of Group 1 and 31.8% of Group 2 producers implement multiple identification methods. The most common method of individual identification of calves in both groups was the use of visible ear tags. Nearly half (49.4%) of Group 1 and a little more than a third (34.1%) of Group 2 producers chose visible ear tags as their singular form of calf identification. The second most common method for Group 1 producers was multiple identification, using visible ear tags and a hot brand, with 14.3% using these methods. The use of

ear tags and hot brands was also the second most common method among Group 2 producers with almost a quarter (24.7%) reporting using this identification practice (Table V-8). To maintain the integrity of United States beef, animal identification is a necessity. Industry specialists have predicted that the beef industry will move quickly toward full traceability of all animals and products. A fully traceable beef industry represents the leap from the historically commodity-based industry to a differentiated value-added product industry (Lalman and Doye 2005). Producers in the beef industry are facing an uncertainty in the next decade regarding a national identification system. Although this uncertainty has fostered an environment for concern among some, the beef industry also faces an opportunity.

Injection Site - Increasing the quality of carcasses produced not only depends on animal growth, but also upon specific herd health practices. Whether a producer is pulling a sick calf or administering vaccines to the entire herd during processing, properly administered injections are important (Lalman and Doye 2005). Moving the injection site area to the neck can reduce damage to expensive steak cuts and is also much easier for packers to locate lesions at the plant level. The tenderness of the carcass is affected not only from improper injections, but also from any intramuscular injection. The permanent damage to the carcass from an intramuscular injection can affect tenderness up to three inches surrounding the injection site. Producers can avoid carcass discounts by administering injections either subcutaneously, intravenously, or by administering them in the neck region (Lalman and Doye 2005). Among producers in both Group 1 and Group 2 well over three-fourths nearly always administer injections in the neck. Although a large majority of

producers are administering in the neck region, a significant difference was noted between the two groups. Ninety-five percent of Group 2 producers target the neck for injections “nearly always” (only 3.5% “sometimes” administering in the neck and only 1.2% “rarely if ever” inject in the neck region”. Group 1 was quite different. Although over 80% “nearly always” administer injections in the neck, the remaining 20% either “occasionally” use the neck or “rarely”, 13.7% and 5.5% respectively. Is the lack of neck injections a result of inadequate working facilities or simply a lack of producers’ knowledge of the injection site lesions that are caused by administering injections in the rump or hip? Nearly 20% of Group 1 producers are using the rump as a common injection site and 13.1% are commonly injecting in the hip region (Table V-8). Multiple factors affect the carcass quality of the beef produced, but producers should be aware of the effect improper injections have on the product they produce. A significant difference was not found between the two groups in reference to administering injections in the rump or hip.

Table V-8 Questions 20-21 Quality Assurance and Animal Health[1]

20. How do you individually identify calves?[3***]

	1	2	3	4	5	6	2,3	2,6	Mult
Producer Group 1	73	155	1	0	0	15	17	45	8
	(23.25)	(49.36)	(0.32)	(0.00)	(0.00)	(4.78)	(5.41)	(14.33)	(2.55)
Producer Group 2	20	29	0	1	1	7	1	21	5
	(23.53)	(34.12)	(0.00)	(1.18)	(1.18)	(8.24)	(1.18)	(24.71)	(5.88)

20A. Location of Hot Brand?

	Rib	Hip	Shoulder
Producer Group 1	3	59	2
	(4.69)	(92.19)	(3.13)
Producer Group 2	0	31	1
	(0.00)	(96.88)	(3.13)

21. Where do you administer injections?[2]

a. Neck[**]

	1	2	3	4	5	6	7
Producer Group 1	207	41	24	12	6	5	12
	(67.43)	(13.36)	(7.82)	(3.91)	(1.95)	(1.63)	(3.91)
Producer Group 2	76	6	2	1	0	0	1
	(88.37)	(6.98)	(2.33)	(1.16)	(0.00)	(0.00)	(1.16)

b. Rump

	1	2	3	4	5	6	7
Producer Group 1	21	23	20	25	16	27	91
	(9.42)	(10.31)	(8.97)	(11.21)	(7.17)	(12.11)	(40.81)
Producer Group 2	2	2	3	5	4	3	28
	(4.26)	(4.26)	(6.38)	(10.64)	(8.51)	(6.38)	(59.57)

Table V-8 Questions 20-21 Quality Assurance and Animal Health[1]

c. Hip or back leg

	1	2	3	4	5	6	7
Producer Group 1	17	12	17	19	24	36	97
	(7.66)	(5.41)	(7.66)	(8.56)	(10.81)	(16.22)	(43.69)
Producer Group 2	2	1	2	4	5	4	29
	(4.26)	(2.13)	(4.26)	(8.51)	(10.64)	(8.51)	(61.70)

[1]top number=frequency, and bottom number=percentage distribution.
[2] measured on a likert scale, 1-7, where 1=nearly always, 7=rarely if ever.
[3] where 1=None, 2=Visible ear tags, 3=Tattoos, 4=Electronic ID, 5=Freeze brand, 6=Hot Brand.
*Significant mean difference in chi-square at 0.1 significance level.
**Significant mean difference in chi-square at 0.05 significance level.
***Significant mean difference in chi-square at 0.01 significance level.

Cow Body Condition Score - To sustain profitable production from year to year, one key in cow-calf production is to have an accurate systematic procedure for culling cows. Although culling cows can be a difficult decision, the added cost of keeping an open cow in the herd is essentially detrimental to profitable beef production. Culling cows in an accurate and timely manner will ultimately be reflected in their market value. In 1994, the United States consumed about 6.4 billion pounds of non-fed beef, of which almost half (49.5%) came from slaughtered cows. Cull cows should be in adequate body condition to increase their market value to packers. A body condition score 3 or less greatly decreases the salvage value of such animals in that they have extremely small rib-eyes and a poor red-meat yield. Appropriate body condition for cull cows would be a body condition score of 4 or 5 as these cows make the "utility" grade (Selk 2007). Of producers in both groups, nearly a quarter (24.2%) cull cows at a body condition score of 1, 2, or 3 (Table V-9). By producer group, Group 1 producers more frequently cull lower body condition score cows (26.4%), whereas within Group 2, less than a fifth (19.8%) reported culling cows at a body condition score of less than 4. Numerous management tools can be used to maintain an accurate culling system, including accurate records of past calving performance, age, and assessment of body condition score each year.

Summary - Adding value to the calf crop by improving health through deworming and vaccination is a management practice that is used by a large majority of both groups, yet a large gap exists between the two practices. Producers are more likely to deworm their calves when compared to vaccination. This could potentially be linked to the added cost of vaccines or a lack of pharmaceutical knowledge, yet

should not be attributed to a lack of working facilities or adversity to handling the herd among producers who are deworming calves as the process of deworming requires individual contact with each calf. Herd identification is also a key management practice. Individual identification is implemented among almost all producers, but implementation of multiple methods is a practice more common to Group 2. With the likelihood of a National Animal Identification System on the horizon, producers with current multiple identification methods will likely find the transition easier to a standardized system.

Table V-9 Questions 22-23 Quality Assurance and Animal Health[1]

22. What is the average body condition score of your first calf cows at calving?[4]

	1	2	3	4	5	6	7	8	9
Producer Group 1	0	4	6	14	110	108	71	7	0
	(0.00)	(1.25)	(1.88)	(4.38)	(34.38)	(33.75)	(22.19)	(2.19)	(0.00)
Producer Group 2	2	1	1	2	23	29	26	3	0
	(2.30)	(1.15)	(1.15)	(2.30)	(26.44)	(33.33)	(29.89)	(3.45)	(0.00)

23. The body condition of cows culled from your herd is:[4]**

	1	2	3	4	5	6	7	8	9
Producer Group 1	4	22	57	48	95	49	29	10	1
	(1.27)	(6.98)	(18.10)	(15.24)	(30.16)	(15.56)	(9.21)	(3.17)	(0.32)
Producer Group 2	1	2	14	29	17	11	9	2	1
	(1.16)	(2.33)	(16.28)	(33.72)	(19.77)	(12.79)	(10.47)	(2.33)	(1.16)

[1]top number=frequency, and bottom number=percentage distribution.

[4] measured on a likert scale, 1-9, where 1=Extremely Thin, 9=Obese.

*Significant mean difference in chi-square at 0.1 significance level.

**Significant mean difference in chi-square at 0.05 significance level.

***Significant mean difference in chi-square at 0.01 significance level.

Marketing and Risk Management

Within the marketing and risk management section of the survey, producers responded to questions regarding preconditioning, marketing options of males and females, frequency and lot sizes of calves marketed, distribution of calf crop among different marketing alternatives, and tools used to manage market price fluctuation risk. Well over half of these questions yielded a significant difference between the groups.

Preconditioning Practices - The management of calves around the time of weaning to ensure adequate health and performance of the calf crop is a tool which adds both monetary value and quality to calves. Two of the most stressful periods on beef calves are weaning and transportation/receiving. To maintain health and growth of calves, adequate preconditioning nutrition and management is necessary to reduce mortality, shrink and morbidity. Specific practices included in preconditioning are weaning 45 days prior to marketing, respiratory vaccinations, treatment for parasites, castration, dehorning, and feed bunk familiarity. Producers who precondition at least 1% of their annual calf crop were included in the frequency evaluation of the following questions.

Weaning Period - In Oklahoma, a minimum of a 45-day weaning period is recommended to maximize the benefits of preconditioning (Lalman and Smith 2002). Far too often, livestock market facilities and stock trailers serve as bawl-out pens for just-weaned calves, thus only intensifying the degree of stress that calves endure during weaning and marketing. Three-fourths (74.6%) of Group 2 producers nearly always wean their calves at least 45 days prior to marketing, whereas less than half

(45.1%) of Group 1 producers wean 45 days prior to marketing (Table V-10). Of Group 1 producers, 20.7% rarely wean 45 days prior to marketing. Although some producers feel as though the "risk" of feeding calves to higher weights is not worth the added monetary return, the health and growth of calves which are weaned in a less "stressful" environment can add value to a feedlot or stocker operator. Preconditioning calves at the home ranch has been shown to increase profitability during finishing by up to $60 per head (Cravey 1996).

Respiratory Vaccinations - From a feeder or stocker operator perspective, a low mortality rate is one of the keys to success. One of the leading causes of death in beef calves is Bovine Respiratory Disease (BRD) which can be compounded by the stress of shipping and commingling in livestock markets. Producers add value to their calves by preparing their immune system for the stress they will face by administering respiratory vaccinations. Over half (56%) of Group 2 producers treat their calves with two rounds of respiratory vaccinations, but only 26% of Group 1 use this practice. Producers who rarely use respiratory vaccinations are predominantly in Group 1 (31.2%) (Table V-10). A possible explanation of the low implementation of vaccines within Group 1 is added cost, although basic vaccination can be estimated at approximately $2.00 per head (OSU Enterprise Budget Software, 2006).

Parasite Treatment - The growth and rate of weight gain of calves is essential to profitability. Beef calves suffering from internal parasite infection have lower feed intake and are more susceptible to increased health risks. Calves do not acquire full immunity to gastrointestinal parasites until a year after weaning, therefore weaned

calves are very vulnerable to internal parasites (Lalman and Doye 2005). Cattle infected with internal parasites have suppressed immune function and reduced ability to respond to vaccinations (Lalman et al. 2002). Over half of producers in both groups treated calves for internal and external parasites, more specifically 53.8% of Group 1 and 90.7% of Group 2. An even more significant difference can be noted between producers as only 1.9% of Group 2 producers rarely deworm, while 6% of Group 1 producers do not treat for parasite infestation (Table V-10).

Castration - Previous research consistently shows significant feeder calf price differences among feeder calf steers, heifers and bulls. Buyers pay higher prices for steers based on expected feedlot performance differences when compared to heifers and bulls. Producers can expect higher prices for steers than for bulls (Avent, Ward, and Lalman 2003). Over 96.2% of Group 2 producers nearly always market calves following healed castration, while less than three-fourths (67.5%) of Group 1 are marketing previously castrated steers. In contrast, 7.8% of Group 1 producers rarely if ever castrate, while all producers in Group 2 nearly always castrate preconditioned calves (Table V-10).

Dehorning - With an increased emphasis on quality assurance, all segments of the beef industry are working together to reduce the amount of carcasses lost to bruising (Lalman and Doye 2005). Calves with horns tend to use their horns offensively in feedlot situations, which subsequently lead to carcass bruising (Lalman and Doye 2005).The majority of preconditioning programs require dehorning, therefore producers can expect a higher market value derived from the dehorning requirement. Producers differed considerably in the dehorning practice. In

Group 1, 20.7% rarely dehorn, whereas Group 2 was significantly less, as only 6.3% rarely dehorn. The vast majority of Group 2 producers nearly always dehorn calves (83.3%). Although, almost half (49.3%) of Group 1 nearly always dehorn, the remaining 50% are not avoiding discounts at sale date by simply dehorning their calves (Table V-10). With respect to dehorning, castration, vaccination and deworming, a potential explanatory factor could be the lack of working facilities, labor, or knowledge of implementation and the added return received at marketing.

Feed Bunk Exposure - Maintaining feed intake of calves is part of sustaining growth as well as the health of calves. If newly weaned calves have been previously exposed to feed bunks or feed in a portable feeder, the likelihood of consistent intake during this period of high stress is greater. One of the greatest challenges of calves appears to be adjusting to significant and immediate ration changes (Simpson 2001). Increasing calf weights by using creep feeding is one way in which producers can increase returns to the cow-calf enterprise (Lalman and Doye 2005). Among producers in this study, over 60% of both groups nearly always market calves which are familiar with feed bunks (Group 1, 62.9%; Group 2, 85.2%). Only 1.9 % of Group 2 producers rarely expose their calves to feed bunks while more than four times (9%) as many Group 1 producers rarely if ever expose their calves to feed prior to sale (Table V-10).

Table V-10 Question 24-25-Marketing and Risk Management[1]

24. What percent of your annual calf crop do you sell as preconditioned calves?[3]

	1	2	3	4
Producer Group 1	28	35	22	86
	(16.37)	(20.47)	(12.87)	(50.29)
Producer Group 2	4	12	6	34
	(7.14)	(21.43)	(10.71)	(60.71)

25. Which of the following practices do you include as part of preconditioning?[2]

	1	2	3	4	5	6	7
a. Weaned at least 45 days prior to marketing**							
Producer Group 1	74	29	14	5	8	6	28
	(45.12)	(17.68)	(8.54)	(3.05)	(4.88)	(3.66)	(17.07)
Producer Group 2	41	6	2	2	0	1	3
	(74.55)	(10.91)	(3.64)	(3.64)	(0.00)	(1.82)	(5.45)
b. Two rounds of respiratory vaccinations***							
Producer Group 1	40	22	18	14	12	17	31
	(25.97)	(14.29)	(11.69)	(9.09)	(7.79)	(11.04)	(20.13)
Producer Group 2	28	2	1	4	3	4	8
	(56.00)	(4.00)	(2.00)	(8.00)	(6.00)	(8.00)	(16.00)
c. Treatment for internal and external parasites***							
Producer Group 1	86	38	16	5	5	4	6
	(53.75)	(23.75)	(10.00)	(3.13)	(3.13)	(2.50)	(3.75)
Producer Group 2	49	1	1	2	0	1	0
	(90.74)	(1.85)	(1.85)	(3.70)	(0.00)	(1.85)	(0.00)
d. Castration (healed prior to marketing)***							
Producer Group 1	112	28	5	6	2	5	8
	(67.47)	(16.87)	(3.01)	(3.61)	(1.20)	(3.01)	(4.82)
Producer Group 2	51	1	1	0	0	0	0
	(96.23)	(1.89)	(1.89)	(0.00)	(0.00)	(0.00)	(0.00)
e. Dehorning***							
Producer Group 1	74	25	8	9	3	5	26
	(49.33)	(16.67)	(5.33)	(6.00)	(2.00)	(3.33)	(17.33)
Producer Group 2	40	2	1	2	0	1	2
	(83.33)	(4.17)	(2.08)	(4.17)	(0.00)	(2.08)	(4.17)
f. Familiar with feed bunks*							
Producer Group 1	105	21	12	11	3	5	10
	(62.87)	(12.57)	(7.19)	(6.59)	(1.80)	(2.99)	(5.99)
Producer Group 2	46	2	1	3	1	0	1
	(85.19)	(3.70)	(1.85)	(5.56)	(1.85)	(0.00)	(1.85)

[1] top number=frequency, and bottom number=percentage distribution.
[2] measured on a likert scale, 1-7, where 1=nearly always, 7=rarely if ever.
[3] where 1=1-25%, 2=26-50%, 3=51-75%, 4=76%+
*Significant mean difference in chi-square at 0.1 significance level.
**Significant mean difference in chi-square at 0.05 significance level.
***Significant mean difference in chi-square at 0.01 significance level.

Weaning - Producers were asked about the time period between weaning non-preconditioned calves prior and marketing them (Table V-11). The majority typically weaned calves less than a week prior to marketing them (Group 1, 56.6%; Group 2, 69%). The associated risk of maintaining calves' health and growth after weaning is one reason producers are not motivated to feed calves to greater weights. The period of high, post-weaning stress is a time in which calves must be closely monitored to maintain health and quality of the calf crop, and the additional labor and management required is likely a factor for some producers.

Market Allocation of Calves – Numerous marketing opportunities are available for producers. Options include retaining ownership through some pasture program, retaining ownership through the feedlot, retaining ownership for breeding replacements or marketing them as breeding replacements[1]. Allocation differed significantly across the two producer groups (Table V-11). In reference to the male calf crop, 87.4% of producers in Group 1 sold over three-fourths of their crop as stocker cattle (400-700 lbs. calves), while 72.2% of Group 2 producers sold over three-fourths as stocker cattle. In the female crop, 11.7% of Group 1 producers kept over three-fourths of their female calves to sell as breeding animals while 15.8% of Group 2 producers retained half to three-fourths to sell as breeding animals (Table V-12).

[1]. Producers who responded 0% were excluded from the frequency evaluation.

Table V-11 Question 26-27 Marketing and Risk Management[1]

26. How many days prior to marketing are calves that are not preconditioned typically weaned?[2]**

	1	2	3	4
Producer Group 1	167	38	47	43
	(56.61)	(12.88)	(15.93)	(14.58)
Producer Group 2	49	6	3	13
	(69.01)	(8.45)	(4.23)	(18.31)

27. What percent of your male calves are[3]:

	1	2	3	4
a. Sold as stocker/feeder steers or bulls**				
Producer Group 1	9	18	9	249
	(3.16)	(6.32)	(3.16)	(87.37)
Producer Group 2	7	9	4	52
	(9.72)	(12.50)	(5.56)	(72.22)
b. Retained as stocker/feeder steers or bulls				
Producer Group 1	23	16	3	17
	(38.98)	(27.12)	(5.08)	(28.81)
Producer Group 2	6	10	4	14
	(17.65)	(29.41)	(11.76)	(41.18)
c. Retained for your own use as breeding animals				
Producer Group 1	26	4	0	1
	(83.87)	(12.90)	(0.00)	(3.23)
Producer Group 2	17	2	0	0
	(89.47)	(10.53)	(0.00)	(0.00)
d. Retained for sale as breeding animals				
Producer Group 1	19	11	0	3
	(57.58)	(33.33)	(0.00)	(9.09)
Producer Group 2	11	2	1	1
	(73.33)	(13.33)	(6.67)	(6.67)

[1]top number=frequency, and bottom number=percentage distribution.

[2] where 1=Less than 7, 2=7-20, 3=21-45, 4=More than 45

[3] where 1=1-25%, 2=26-50%, 3=51-75%, 4=76%+

*Significant mean difference in chi-square at 0.1 significance level.

**Significant mean difference in chi-square at 0.05 significance level.

***Significant mean difference in chi-square at 0.01 significance level.

Table V-12 Question 28-29 Marketing and Risk Management[1]

28. What percent of your female calves are[3]:

	1	2	3	4
a. Sold as stocker/feeder cattle				
Producer Group 1	37	42	42	142
	(14.07)	(15.97)	(15.97)	(53.99)
Producer Group 2	15	10	12	30
	(22.39)	(14.93)	(17.91)	(44.78)
b. Retained as stocker/feeder cattle				
Producer Group 1	26	12	3	9
	(52.00)	(24.00)	(6.00)	(18.00)
Producer Group 2	10	12	4	3
	(34.48)	(41.38)	(13.79)	(10.34)
c. Retained for your own use as breeding animals				
Producer Group 1	126	61	10	32
	(55.02)	(26.64)	(4.37)	(13.97)
Producer Group 2	35	20	6	4
	(53.85)	(30.77)	(9.23)	(6.15)
d. Retained for sale as breeding animals**				
Producer Group 1	34	18	1	7
	(56.67)	(30.00)	(1.67)	(11.67)
Producer Group 2	11	5	3	0
	(57.89)	(26.32)	(15.79)	(0.00)

29. Do you belong to a cattle cooperative, alliance, or similar marketing program?**

	1-Yes	2-No
Producer Group 1	10	309
	(3.13)	(96.87)
Producer Group 2	7	76
	(8.43)	(91.57)

29A. What percent of your annual calf crop is marketed as part of a cooperative, alliance, or similar marketing program?[3]

	1	2	3	4
Producer Group 1	6	2	1	1
	(60.00)	(20.00)	(10.00)	(10.00)
Producer Group 2	3	1	1	2
	(42.86)	(14.29)	(14.29)	(28.57)

[1]top number=frequency, and bottom number=percentage distribution.

[2] where 1=Less than 7, 2=7-20, 3=21-45, 4=More than 45

[3] where 1=1-25%, 2=26-50%, 3=51-75%, 4=76%+

*Significant mean difference in chi-square at 0.1 significance level.

**Significant mean difference in chi-square at 0.05 significance level.

***Significant mean difference in chi-square at 0.01 significance level.

Cattle Cooperative - Meeting the ever changing demands of consumers requires consistent market information. Strategic alliances have increased in recent years in an attempt to better understand buyers' needs and determine methods to improve coordination in meeting those demands (Lalman and Doye 2005). Numerous types and structures of alliances exist in an attempt to meet several different objectives. Whether the objective is to market more uniform calves in larger lots at a price premium or to obtain carcass data to maintain and improve the genetic composition of the herd, the existence of cattle cooperatives and alliances is increasing (Lalman and Doye 2005). A significant difference between the two groups is easily noticeable (Table V-12). Only 3.1% of Group 1 producers are members of a cattle cooperative, alliance or similar marketing program. Almost three times as many Group 2 producers (8.4%) belong to a strategic alliance. Although all producers, both small and large, full and part-time, can capitalize on the benefits of being part of an alliance, an especially significant benefit could be realized potentially by producers with a smaller herd. The percentage of calves sold through the strategic alliance was also examined; however, a significant difference was not found between the two groups.

Sale Lot Size - When marketing calves, sale lot size is important. Research shows consistently that buyers pay a premium for larger sale lots (Avent, Ward, and Lalman 2004). Buyers can reduce transaction costs by purchasing larger lots of uniform calves than purchasing several smaller lots and pooling them into larger groups for stocker and feedlot operations. The distribution of the two groups was significantly different for lot sizes marketed. Almost 50% of both groups (46% for Group 1 and 48.9% for Group 2) reported marketing in lots of 10 to 50 head (Table V-13). The drastic difference is with

the remaining 50% of each group. Almost half of Group 2 producers (46.6%) reported marketing calves in lots greater than 50 head, while 50.9% of Group 1 producers market the majority of their calf crop in lots of 1 to 9 head. A potential factor for Group 1 producers' small lot sizes at marketing is the fact that the majority of Group 1 producers did not have a defined breeding season. A set breeding period is a key part of establishing a uniform calf crop, and therefore larger sale lots. Smaller producers indicated they use more local livestock markets, some of which still sell calves one head at a time. Larger producers may be more apt to market more calves in regional markets, satellite auctions, and direct to buyers, all of which typically have larger sale lots.

Uniform Lots - Of equal importance is the uniformity of calves in the lot. Producers can expect a price premium for more uniform sale lots of calves for a variety of reasons. Increased eye appeal and decreased labor from no additional sorting are part of the value derived from a uniform lot of calves. Producers in Group 1 were split: 51.4% market calves in uniform lots, and the remaining 48.6% market in mixed lots (Table V-13). An overwhelming majority (81.6%) of Group 2 producers market calves in uniform lots and only 18.4% market in mixed lots. As previously stated, the leading factor which contributes to a uniform calf crop is a set breeding season, and the majority of Group 1 producers do not follow a set fall or spring season.

Timing of marketing (seasonally, regularly through the year, or sporadically through the year) was examined; however, the results were not statistically significant between the two groups of producers.

Table V-13 Questions 30-32 Marketing and Risk Management[1]

30. Which of the following best describes the way you typically market the majority of your calves?[2]

	1	2	3
Producer Group 1	21	60	234
	(6.67)	(19.05)	(74.29)
Producer Group 2	3	11	71
	(3.53)	(12.94)	(83.53)

31. Which of the following best describes the way you typically market the majority of your calves?[3]***

	1	2	3
Producer Group 1	165	149	10
	(50.93)	(45.99)	(3.09)
Producer Group 2	4	43	41
	(4.55)	(48.86)	(46.59)

32. Which of the following best describes the way you typically market the majority of your calves?[4]***

	1	2
Producer Group 1	155	164
	(48.59)	(51.41)
Producer Group 2	16	71
	(18.39)	(81.61)

[1]top number=frequency, and bottom number=percentage distribution.
[2] where 1=Regularly through the year (monthly), 2=Sporadically through the year, 3=Seasonally (1-3 times/year)
[3] where 1=Small lots, 2=Medium lots, 3=Truckload lots
[4] where 1=Mixed lots, 2=Uniform lots
*Significant mean difference in chi-square at 0.1 significance level.
**Significant mean difference in chi-square at 0.05 significance level.
***Significant mean difference in chi-square at 0.01 significance level.

Marketing Alternatives - Several different options for marketing ranch raised calves are available to producers. Whether producers sell calves through weekly sales or special sales (preconditioning or genetic sales), the location from the ranch can be an important factor.[2] The majority (85.7%) of producers in Group 1 sold more than 76% of their male calves at a local weekly sale (within 50 miles from the ranch), while only 44.4% of Group 2 producers use local sales for the majority of

[2] Producers who responded 0% were excluded from the frequency evaluation

their male calf crop (Table V-14). The allocation of the female calf crop was consistent with that for males; 81.8% of Group 1 and 43.9% of Group 2 marketed more than 76% of their female calves at the local auction (Table V-16). Producers in Group 2 were also more likely to sell their male calves directly from the ranch to a stocker operator. Only 30.4% of Group 1 producers sold more than 76% of their calf

Table V-14 Question 33 Marketing and Risk Management[1]

33 (males). What percent of your annual male calf crop is marketed or retained among the following alternatives?

Sold through a local or regional livestock market (within 50 miles from ranch)				
	1	2	3	4
a. Regular (weekly) sales[2]* **				
Producer Group 1	16	15	4	210
	(6.53)	(6.12)	(1.63)	(85.71)
Producer Group 2	16	5	4	20
	(35.56)	(11.11)	(8.89)	(44.44)
b. Special sales (e.g. preconditioned, breeding)[2]				
Producer Group 1	9	3	0	4
	(56.25)	(18.75)	(0.00)	(25.00)
Producer Group 2	2	1	0	2
	(40.00)	(20.00)	(0.00)	(40.00)
Sold through regional livestock market (more than 50 miles from ranch)				
	1	2	3	4
c. Regular (weekly) sales[2]				
Producer Group 1	10	5	1	28
	(22.73)	(11.36)	(2.27)	(63.64)
Producer Group 2	1	4	1	19
	(4.00)	(16.00)	(4.00)	(76.00)
d. Special sales (e.g. preconditioned, breeding)[2]				
Producer Group 1	3	4	1	4
	(25.00)	(33.33)	(8.33)	(33.33)
Producer Group 2	1	0	0	5
	(16.67)	(0.00)	(0.00)	(83.33)
e. Sold through a video/satellite auction[2]				
Producer Group 1	1	1	0	0
	(50.00)	(50.00)	(0.00)	(0.00)
Producer Group 2	1	1	0	0
	(50.00)	(50.00)	(0.00)	(0.00)

[1]top number=frequency, and bottom number=percentage distribution.

[2] where 1=1-25%, 2=26-50%, 3=51-75%, 4=76%+

*Significant mean difference in chi-square at 0.1 significance level.

**Significant mean difference in chi-square at 0.05 significance level.

***Significant mean difference in chi-square at 0.01 significance level.

crop to a stocker while the percentage for Group 2 was 40% (Table V-15). Avoiding the livestock market phase of marketing adds substantial value to the health of calves. The prolonged stress, commingling, and exposure to a variety of pathogens in

Table V-15 Question 33 Marketing and Risk Management[1]

33 (males). What percent of your annual male calf crop is marketed or retained among the following alternatives?

	1	2	3	4
Sold direct from ranch				
f. To a stocker operator[2*]				
Producer Group 1	13 (56.52)	3 (13.04)	0 (0.00)	7 (30.43)
Producer Group 2	3 (30.00)	3 (30.00)	2 (20.00)	2 (20.00)
g. To a feedlot[2]				
Producer Group 1	5 (83.33)	0 (0.00)	0 (0.00)	1 (16.67)
Producer Group 2	2 (28.57)	1 (14.29)	0 (0.00)	4 (57.14)
Retained only through stocker stage				
	1	2	3	4
h. On my ranch[2]				
Producer Group 1	4 (28.57)	3 (21.43)	0 (0.00)	7 (50.00)
Producer Group 2	4 (30.77)	4 (30.77)	0 (0.00)	5 (38.46)
i. As a custom stocker (e.g. background lot or wheat pasture)[2]				
Producer Group 1	1 (20.00)	0 (0.00)	1 (20.00)	3 (60.00)
Producer Group 2	0 (0.00)	2 (66.67)	0 (0.00)	1 (33.33)
Retained through stocker and feedlot stages				
	1	2	3	4
j. Stockered on my ranch, then custom feedlot[2]				
Producer Group 1	2 (66.67)	1 (33.33)	0 (0.00)	0 (0.00)
Producer Group 2	1 (25.00)	2 (50.00)	0 (0.00)	1 (25.00)
k. Custom stocker, then custom feedlot[2*]				
Producer Group 1	0 (0.00)	0 (0.00)	0 (0.00)	2 (100.00)
Producer Group 2	1 (100.00)	0 (0.00)	0 (0.00)	0 (0.00)
l. Other[2]				
Producer Group 1	10 (62.50)	1 (6.25)	1 (6.25)	4 (25.00)
Producer Group 2	3 (50.00)	1 (16.67)	0 (0.00)	2 (33.33)

[1]top number=frequency, and bottom number=percentage distribution.
[2] where 1=1-25%, 2=26-50%, 3=51-75%, 4=76%+
*Significant mean difference in chi-square at 0.1 significance level.
**Significant mean difference in chi-square at 0.05 significance level.
***Significant mean difference in chi-square at 0.01 significance level.

the sale barn environment is circumvented when producers sell calves directly to stockers, thus decreasing the likelihood of an abundance of health issues and potentially decreasing the death loss percentage. Although Group 2 producers potentially have a larger calf crop and subsequently larger sale lots, the fact that Group 1 producers are less likely to precondition eventually leads to calves that are unprepared to face the rigors of livestock markets.

Table V-16 Question 33 Marketing and Risk Management[1]

33 (females). What percent of your annual female calf crop is marketed or retained among the following alternatives?

	1	2	3	4
Sold through a local or regional livestock market (within 50 miles from ranch)				
a. Regular (weekly) sales[2]* **				
Producer Group 1	19	13	9	184
	(8.44)	(5.78)	(4.00)	(81.78)
Producer Group 2	15	5	3	18
	(36.59)	(12.20)	(7.32)	(43.90)
b. Special sales (e.g. preconditioned, breeding)[2]				
Producer Group 1	6	4	1	6
	(35.29)	(23.53)	(5.88)	(35.29)
Producer Group 2	5	2	0	2
	(55.56)	(22.22)	(0.00)	(22.22)
Sold through regional livestock market (more than 50 miles from ranch)				
c. Regular (weekly) sales[2]				
Producer Group 1	6	6	0	25
	(16.22)	(16.22)	(0.00)	(67.57)
Producer Group 2	2	4	2	16
	(8.33)	(16.67)	(8.33)	(66.67)
d. Special sales (e.g. preconditioned, breeding)[2]				
Producer Group 1	4	3	1	4
	(33.33)	(25.00)	(8.33)	(33.33)
Producer Group 2	2	1	0	5
	(25.00)	(12.50)	(0.00)	(62.50)
e. Sold through a video/satellite auction[2]				
Producer Group 1	2	0	0	0
	(100.00)	(0.00)	(0.00)	(0.00)
Producer Group 2	0	0	0	0
	(0.00)	(0.00)	(0.00)	(0.00)

[1]top number=frequency, and bottom number=percentage distribution.
[2] where 1=1-25%, 2=26-50%, 3=51-75%, 4=76%+
*Significant mean difference in chi-square at 0.1 significance level.
**Significant mean difference in chi-square at 0.05 significance level.
***Significant mean difference in chi-square at 0.01 significance level.

Table V-17 Question 33 Marketing and Risk Management[1]

33 (females). What percent of your annual female calf crop is marketed or retained among the following alternatives?

	1	2	3	4
Sold direct from ranch				
f. To a stocker operator[2]				
Producer Group 1	11	2	0	8
	(52.38)	(9.52)	(0.00)	(38.10)
Producer Group 2	2	1	2	1
	(33.33)	(16.67)	(33.33)	(16.67)
g. To a feedlot[2]				
Producer Group 1	2	0	0	1
	(66.67)	(0.00)	(0.00)	(33.33)
Producer Group 2	2	0	2	2
	(33.33)	(0.00)	(33.33)	(33.33)
Retained only through stocker stage				
h. On my ranch[2]				
Producer Group 1	10	5	1	9
	(40.00)	(20.00)	(4.00)	(36.00)
Producer Group 2	5	2	1	5
	(38.46)	(15.38)	(7.69)	(38.46)
i. As a custom stocker (e.g. background lot or wheat pasture)[2]				
Producer Group 1	1	0	1	4
	(16.67)	(0.00)	(16.67)	(66.67)
Producer Group 2	0	2	0	1
	(0.00)	(66.67)	(0.00)	(33.33)
Retained through stocker and feedlot stages				
j. Stockered on my ranch, then custom feedlot[2]				
Producer Group 1	0	1	0	0
	(0.00)	(100.00)	(0.00)	(0.00)
Producer Group 2	1	1	0	1
	(33.33)	(33.33)	(0.00)	(33.33)
k. Custom stocker, then custom feedlot[2]				
Producer Group 1	1	0	0	0
	(100.00)	(0.00)	(0.00)	(0.00)
Producer Group 2	0	0	0	0
	(0.00)	(0.00)	(0.00)	(0.00)
l. Other[2]				
Producer Group 1	14	6	4	9
	(42.42)	(18.18)	(12.12)	(27.27)
Producer Group 2	4	3	3	3
	(30.77)	(23.08)	(23.08)	(23.08)

[1]top number=frequency, and bottom number=percentage distribution.
[2] where 1=1-25%, 2=26-50%, 3=51-75%, 4=76%+
*Significant mean difference in chi-square at 0.1 significance level.
**Significant mean difference in chi-square at 0.05 significance level.
***Significant mean difference in chi-square at 0.01 significance level.

Futures & Options - The cycles of prices and production that characterize the beef industry require that cow-calf producers develop a strategic focus which will enable them to better deal with price fluctuation and risk associated with beef production. The primary consideration when marketing animals is to ensure the producer receives a fair market value for the animals. However, many factors cause cattle prices to fluctuate. Taking steps to manage price risk is a key in sustaining long-term cow-calf production. Producers can use futures or options to establish an expected fixed or minimum price for future cattle marketings. Producers were asked about their use of feeder cattle futures contracts to lock in expected prices (Table V-18). Group 2 more frequently used futures (17.3%) when compared to the 6.7% of Group 1. The use of locking in expected minimum prices with feeder cattle options contracts followed the same pattern. Over twice as many Group 1 (5.8%) producers use options, while 15.2% of Group 2 producers used this practice. The fact that well over half of both groups rarely ever use futures or options is potentially related to the lack of education about these price risk management strategies or their effectiveness in managing price risk. If producers do not understand the direct benefit, or the terminology associated with futures and options such as 'call', 'put', or 'hedging', a producer is less likely to invest in such a risk management tool.

Cash Contracts - A producer may establish a forward price for cattle by establishing a forward cash contract prior to weaning or delivery. Forward cash contracting is a straightforward means to reduce the risk of market price changes. Although details of shrink, weighing conditions, and price slides may have an impact on the value of a forward cash price, the price risk management associated with locking in a contract can give a sense of security and peace of mind to producers worth the monetary

difference between the contract value and current market price (Lalman and Doye 2005). Producers in Group 1 were more likely to use forward cash contracts than futures or options as 8.1% responded they nearly always or sometimes use cash contracting (Table V-18). Over twice the percentage of Group 2 producers (18.3%) used cash contracting.

Summary - In short, preconditioning programs or practices are common in Group 2. This could be attributed to a variety of reasons, including greater resources or the ability to accept added risk of retaining ownership. If value is not added through preconditiong, price risk management tools should be implemented, however a large percentage of Group 1 producers are simply using local sales and not implementing tools

Table V-18 Question 34 Marketing and Risk Management[1]

34. Indicate the use you make of tools to manage the risk of market price fluctuations?[2]

	1	2	3	4	5	6	7
a. Locking in expected fixed prices with feeder cattle futures contracts**							
Producer Group 1	1	3	9	4	4	15	276
	(0.32)	(0.96)	(2.88)	(1.28)	(1.28)	(4.81)	(88.46)
Producer Group 2	2	0	6	5	1	2	65
	(2.47)	(0.00)	(7.41)	(6.17)	(1.23)	(2.47)	(80.25)
b. Locking in expected minimum prices with feeder cattle options contracts***							
Producer Group 1	1	2	4	3	8	14	276
	(0.32)	(0.65)	(1.30)	(0.97)	(2.60)	(4.55)	(89.61)
Producer Group 2	2	3	1	5	1	1	66
	(2.53)	(3.80)	(1.27)	(6.33)	(1.27)	(1.27)	(83.54)
c. Forward priced with cash contracts (direct ranch sales or video auction for later delivery)**							
Producer Group 1	5	3	4	6	7	11	272
	(1.62)	(0.97)	(1.30)	(1.95)	(2.27)	(3.57)	(88.31)
Producer Group 2	4	3	4	3	1	1	66
	(4.88)	(3.66)	(4.88)	(3.66)	(1.22)	(1.22)	(80.49)

[1]top number=frequency, and bottom number=percentage distribution.

[2] measured on a likert scale, 1-7, where 1=nearly always, 7=rarely if ever.

*Significant mean difference in chi-square at 0.1 significance level.

**Significant mean difference in chi-square at 0.05 significance level.

***Significant mean difference in chi-square at 0.01 significance level.

to manage market price fluctuations. The beef industry operates in an environment of constant change, and the price of beef is no different. Within the beef industry price risk is associated with and essentially stems from seasonal production and cyclical inventory patterns. Price risk management is an important instrument which can be used to benefit and sustain long term profitability for cow-calf producers.

Business Planning and Management

Long Term Plan - A series of questions regarding planning, recordkeeping, and general management were included in the survey instrument. When asked about long-term planning, 62% of Group 1 did not have a long term plan in which they consider where they want their firm to be in five or more years (Table V-19). In contrast, 64.6% of Group 2 had a set plan regarding the development and growth of their production firm. Thus, there was a significant difference in long-term planning between the two groups. As anticipated, Group 1 producers with a smaller herd size and lower dependency on income from the beef enterprise had a lower probability of having a long-term plan. Economies of size should have minimal effect on a producer's likelihood of establishing a direction and path for the future. Therefore, the difference between the two groups may be related to the overall goals of the beef cattle enterprise as it relates to total household income.

Short Term Plan - Whether or not producers had a short-term plan was also considered. In the case of short-term plans, no significant difference was found between Groups 1 and 2, yet a difference was found between producers' frequency of whether or not the short term plan was written (Table V-19). Across both groups,

the majority of producers who have a short-term plan do not have this plan in writing (Group 1, 85.2%; Group 2, 73.7%). The frequency of producers having a written short term plan was greater for Group 2 (26.3%) than Group 1 (14.9%).

Recordkeeping - Financial recordkeeping is one effective way in which producers can both improve for the future and reflect on the past. Financial recordkeeping systems were grouped into three categories. First was simply keeping store receipts and bills in a box or file only, considered to be the minimal amount of recordkeeping. The second category included summarizing income and expenses using a notebook or ledger. This category entailed a slightly more formal system of recordkeeping, but does not include any computerized accounting or business program. The third category incorporated all responses involving a computerized recordkeeping system, such as Quicken, QuickBooks, Redwing, Farmworks, or a customized spreadsheet or database created by the producer.

Group 2's recordkeeping system was significantly different than Group 1 (Table V-19). Group 2 employed computerized technology for recordkeeping more than Group 1, as half of the producers in this group (47.7%) used a computerized method. However, 29.6% still used the minimal recordkeeping system. Group 1 was a mirror image of Group 2, as 39.2% use a box or file only, and nearly a third (32.9%) use computer technology. This distribution is expected. As hypothesized, producers with greater dependency on beef production would be more likely to incorporate a technology such as computerized recordkeeping. Past research has shown the same result. Both education and farm-size have a positive influence on

Table V-19 Questions 35-38 Business Planning and Management[1]

35. Do you have a long term (5 years or more) business plan for your farm?***

	Yes	No
Producer Group 1	117	191
	(37.99)	(62.01)
Producer Group 2	53	29
	(64.63)	(35.37)

35A. If yes in 35, is it a written plan?

	Yes	No
Producer Group 1	30	99
	(23.26)	(76.74)
Producer Group 2	16	41
	(28.07)	(71.93)

36. Do you have a short term (1-2 year) operational plan?

	Yes	No
Producer Group 1	200	109
	(64.72)	(35.28)
Producer Group 2	51	24
	(68.00)	(32.00)

36A. If yes in 36, is it a written plan?**

	Yes	No
Producer Group 1	30	172
	(14.85)	(85.15)
Producer Group 2	15	42
	(26.32)	(73.68)

37. How frequently are receipt and expense data typically entered into farm record system?[3]

	1	2	3	4	5	6
Producer Group 1	18	49	105	28	87	26
	(5.75)	(15.65)	(33.55)	(8.95)	(27.80)	(8.31)
Producer Group 2	9	19	28	6	21	5
	(10.23)	(21.59)	(31.82)	(6.82)	(23.86)	(5.68)

38. Which of the following best describes your financial record system?[4]*

	1	2	3	4	5	6	7
Producer Group 1	124	88	54	13	5	28	4
	(39.24)	(27.85)	(17.09)	(4.11)	(1.58)	(8.86)	(1.27)
Producer Group 2	26	20	25	7	3	5	2
	(29.55)	(22.73)	(28.41)	(7.95)	(3.41)	(5.68)	(2.27)

[1] top number=frequency, and bottom number=percentage distribution.
[2] measured on a likert scale, 1-7, where 1=nearly always, 7=rarely if ever.
[3] where 1=Daily, 2=Weekly, 3=Monthly, 4=Semi-annually, 5=Annually, 6=Rarely/Never.
[4] where 1=box, 2=ledger, 3=Quicken, 4=QuickBooks, 5=farm accouting pkg, 6=custom spreadsheet, 7=other.
*Significant mean difference in chi-square at 0.1 significance level.
**Significant mean difference in chi-square at 0.05 significance level.
***Significant mean difference in chi-square at 0.01 significance level.

adoption while age had a negative effect (Doye 2004). Computers and the benefits they provide continue to double and triple with time. Computer skills have made the transition from a benefit to a necessity in really every business entity. As technology progresses, it is expected that business-oriented beef producers will increasingly incorporate these practices into their beef-production firm.

Financial Summary - A sound road map for the ranch is comprised in part by a business plan and financial assessments (Lalman and Doye 2005). Ranchers can generate good business signals from their beef cow herd production and financial records and therefore be better prepared to make good business management decisions (Hughes 2007). Producers' use of such financial planning tools as balance sheets, cash flow, and income statements were among the different tools analyzed and a significant difference was noted between the two groups (Table V-20). The primary motivation for record keeping is for tax reporting purposes (Lalman and Doye 2005). For both groups, over 85% performed a yearly summary of the production enterprise for tax planning purposes at least once a year (87% for Group 1 and 90.4% for Group 2). Only 11.7% of Group 1 and 7.2% of Group 2 rarely, if ever complete a tax summary or report.

Balance Sheet and Cash Flow - A balance sheet is a summary of asset and liability valuations and is one of the most commonly used methods to measure a business's financial position. The cash flow plan is also an excellent communication tool for a producer when talking with a lender (Lalman and Doye 2005). Over 41% of Group 1 producers rarely complete a balance sheet or cash flow while over 75% of Group 2 complete both of these financial tools at least once a year. Although

nearly half of Group 1 producers do use both a balance sheet and cash flow plan, the fact remains that the other half completes these financial tools every 2-3 years or rarely if ever (Table V-20). The benefit derived from the balance sheet and cash flow is useful throughout the year and a future increase in implementation by Group 1 producers could foster a better environment for management decisions regarding beef cattle production.

Income Statement - The income statement combines information from the cash flow statement with changes in inventory and valuation of assets and liabilities from the balance sheet. The income statement essentially evaluates whether or not the business is profitable (Lalman and Doye 2005). A large majority of both groups completed an income statement at least once a year, 66.7% of Group 1 and 83.1% of Group 2. A third of Group 1 rarely if ever complete an income statement which is almost 10% less than the 40% plus of Group 1 producers who neither complete a balance sheet or cash flow plan (Table V-20). Determining the amount of revenue generated from cow-calf production is a key in long term sustainability. From year to year, reflection on past performance enables a producer to have the ability to make, fact-based management decisions.

Enterprise Budgets - Assessing each enterprise in the operation with a budget is used more commonly by Group 2 at least once a year (64.9%) compared with Group 1 at 43% (Table V-20). The fact that over half of Group 1 producers do not use enterprise specific budget projections was anticipated as the herd size is smaller and the percentage of household income from cow-calf production is less than 40%.

Historical Analysis - Historical financial statements document what has happened in the past, and can document seasonal patterns for cash flow which will aid in financial management decisions. For both groups the use of historical analysis was small (Table V-20). Although a higher percentage of Group 2 used Standardized Performance Analysis (SPA) for historical reflection, the fact that 78.7% of Group 1 and 62.5% of Group 2 rarely use SPA could potentially be linked to the lack of knowledge of the benefits. However, another reason may be the extensive data requirement of SPA and large time commitments to receive the first year results. Another explanatory factor is the fact that a number of our producers surveyed do not implement yearly record keeping tools; therefore, historical analysis would require additional labor from the producer.

Herd Records - Maintaining records on vaccinations, medical treatments, offspring, as well as sire and dam of animals is a practice that is highly recommended by industry experts. The only recordkeeping practice that yielded a statistically significant difference between the two groups was records on sire and dam of animals (Table V-21). A greater percentage of Group 1 producers keep records on the sire and dam of animals. The fact that Group 1 has a smaller herd size and therefore the time required to record the dam and sire of each calf is less than Group 2 producers with larger herds. Larger cow herds and multiple herd sires would require a greater labor investment in recordkeeping of specific calves with the larger crop. Group 2 producers could potentially have a larger pool of sires, and the actual specific sire of an individual calf might not be known. DNA technology and testing of offspring will make this more feasible in future years. Many cow-calf

record keeping systems are designed to enable a producer to enter a group of sires and therefore still be able to evaluate the characteristics of the associated offspring even if the exact bull is not known. Although Group 2 producers are faced with a larger herd and therefore a larger calf crop, evaluating the genetics of the calves produced is one way in which the value of the dam and sire can be analyzed.

Table V-20 Question 39-Business Planning and Management[1]

39. What kind of financial planning or assessment of your operation do you conduct?

	More than once per year	Annually	Every 2-3 years	Rarely, if ever
a. Summary for tax planning or reporting**				
Producer Group 1	59	208	4	36
	(19.22)	(67.75)	(1.30)	(11.73)
Producer Group 2	27	48	2	6
	(32.53)	(57.83)	(2.41)	(7.23)
b. Balance Sheet***				
Producer Group 1	43	111	9	118
	(15.30)	(39.50)	(3.20)	(41.99)
Producer Group 2	22	37	2	17
	(28.21)	(47.44)	(2.56)	(21.79)
c. Cash flow plan or budget for operation***				
Producer Group 1	44	96	15	126
	(15.66)	(34.16)	(5.34)	(44.84)
Producer Group 2	19	41	1	17
	(24.36)	(52.56)	(1.28)	(21.79)
d. Income Statement**				
Producer Group 1	39	151	7	88
	(13.68)	(52.98)	(2.46)	(30.88)
Producer Group 2	19	45	1	12
	(24.68)	(58.44)	(1.30)	(15.58)
e. Budgets projections for individual enterprises within the operation***				
Producer Group 1	33	89	10	152
	(11.62)	(31.34)	(3.52)	(53.52)
Producer Group 2	24	26	3	24
	(31.17)	(33.77)	(3.90)	(31.17)
f. Historical analysis such as Standardized Performance Analysis**				
Producer Group 1	13	36	10	218
	(4.69)	(13.00)	(3.61)	(78.70)
Producer Group 2	6	17	4	45
	(8.33)	(23.61)	(5.56)	(62.50)

[1]top number=frequency, and bottom number=percentage distribution.
*Significant mean difference in chi-square at 0.1 significance level.
**Significant mean difference in chi-square at 0.05 significance level.
***Significant mean difference in chi-square at 0.01 significance level.

Summary – Throughout the business planning and management section, several key areas including planning, recordkeeping, and financial analysis, reveal useful information about the current practices of producers. Group 2 producers more frequently have a long term plan for their cow-calf operation, whereas the frequency of Group 1 using a long term plan is much less. Another key point is the recordkeeping system most commonly used among producers in Group 1 does not

Table V-21 Question 40-Business Planning and Management Section[1]

40. Do you record and keep information on:

	1	2	3	4	5	6	7
a.Vaccination[2]							
Producer Group 1	154	41	27	15	10	10	64
	(47.98)	(12.77)	(8.41)	(4.67)	(3.12)	(3.12)	(19.94)
Producer Group 2	48	6	5	7	3	4	14
	(55.17)	(6.90)	(5.75)	(8.05)	(3.45)	(4.60)	(16.09)
b. Medical treatments[2]							
Producer Group 1	137	38	22	24	15	12	64
	(43.91)	(12.18)	(7.05)	(7.69)	(4.81)	(3.85)	(20.51)
Producer Group 2	30	9	8	8	8	6	14
	(36.14)	(10.84)	(9.64)	(9.64)	(9.64)	(7.23)	(16.87)
c. Number of offspring[2]							
Producer Group 1	207	28	15	17	7	5	40
	(64.89)	(8.78)	(4.70)	(5.33)	(2.19)	(1.57)	(12.54)
Producer Group 2	63	6	2	3	0	3	6
	(75.90)	(7.23)	(2.41)	(3.61)	(0.00)	(3.61)	(7.23)
d. Weights of offspring[2]							
Producer Group 1	74	18	14	18	15	24	146
	(23.95)	(5.83)	(4.53)	(5.83)	(4.85)	(7.77)	(47.25)
Producer Group 2	23	3	4	7	7	8	29
	(28.40)	(3.70)	(4.94)	(8.64)	(8.64)	(9.88)	(35.80)
e. Birthdates of offspring[2]							
Producer Group 1	186	24	16	21	9	9	50
	(59.05)	(7.62)	(5.08)	(6.67)	(2.86)	(2.86)	(15.87)
Producer Group 2	40	4	4	6	3	7	20
	(47.62)	(4.76)	(4.76)	(7.14)	(3.57)	(8.33)	(23.81)
f. Sire & Dam of animals[2*]**							
Producer Group 1	157	27	14	16	8	12	80
	(50.00)	(8.60)	(4.46)	(5.10)	(2.55)	(3.82)	(25.48)
Producer Group 2	28	6	7	7	11	4	20
	(33.73)	(7.23)	(8.43)	(8.43)	(13.25)	(4.82)	(24.10)

[1]top number=frequency, and bottom number=percentage distribution.
[2] measured on a likert scale, 1-7, where 1=nearly always, 7=rarely if ever.
*Significant mean difference in chi-square at 0.1 significance level.
**Significant mean difference in chi-square at 0.05 significance level.
***Significant mean difference in chi-square at 0.01 significance level.

involve the use of a computer and its advanced tools. The minimal recordkeeping system (filing receipts in a box or using a hand-written ledger) is common among Group 1, whereas employing computerized recordkeeping is common in Group 2. Conducting financial planning and assessments of the cow-calf operation could potentially be directly related to the recordkeeping system. Group 2 producers more commonly conduct financial assessments such as balance sheet, cash flow, and income statement, which is less labor intensive if the records have been previously entered into a computer record keeping system. Among Group 1 producers, completion of financial assessments was less common, which could be directly related to the fact that the majority of these producers are simply using a hand-method of record keeping.

Reproduction

Expected Progeny Differences - Nothing is more important to cow-calf profitability than getting a live calf born. Proper reproduction management is an essential part of maintaining a cow-herd which produces a high percentage of marketable calves each year. Sire selection and evaluation represents an important opportunity to enhance the profitability of the beef production enterprise. Sire selection represents the greatest opportunity for genetic change, and producers can find bulls that will increase or decrease nearly any trait of economic importance. Producers who stay abreast of advances in beef cattle genetics should profit from increased revenue and a decrease in production costs (Moser 2007). Selection tools available to cattle producers include Expected Progeny Differences (EPD), which are currently the highest accuracy selection tool which is

readily available (Selk 2007). DNA testing is available but only in a limited sense. EPDs allow for direct comparison of potential sires across herds and environments (Moser 2007). A notable percentage of Group 2 producers nearly always use EPDs when selecting a bull (69.3%). On the contrary, a large percentage of Group 1 producers rarely use EPDs as a tool in bull selection (34.2%) (Table V-22).

Breeding Season - How bulls are used differs significantly in terms of the length of breeding season. Regulating the time bulls are left with cows can affect the uniformity of the calf crop. Shortening the breeding and calving seasons will pay off in heavier and more uniform groups of calves to sell at weaning time. If a producer can market a sizeable number of calves in one lot, they will realize a greater price per pound than marketing similar calves sold in singles or small lots (Selk 2007). A 2004 research analysis of 394 ranch observations from Texas, Oklahoma, and New Mexico found a positive relationship between the number of days of the breeding season and the cost per hundredweight of calves weaned. The data suggested that for each day the breeding season was lengthened, the annual cost of producing a hundred pounds of weaned calf increased (Ramsey et al. 2005). A relatively high percentage of producers in Group 2 have established a limited time period bulls are left with cows and therefore have a set calving season (69%). For Group 1 producers, 50.2% leave bulls with cows year round (Table V-22). Of producers who indicated a set breeding season, almost half of both groups targeted a 60-90 day breeding season, both for fall and spring calving (fall calving – 63.1% for Group 1 and 46.5% for Group 2; spring calving – 50.3% and 60%, respectively).

Table V-22 Question 41-42 Reproduction Section[1]

41. How often are Expected Progeny Differences used as a tool in bull selection?[2]***

	1	2	3	4	5	6	7
Producer Group 1	97	35	39	28	9	20	88
	(30.70)	(11.08)	(12.34)	(8.86)	(2.85)	(6.33)	(27.85)
Producer Group 2	52	9	6	10	2	4	5
	(59.09)	(10.23)	(6.82)	(11.36)	(2.27)	(4.55)	(5.68)

42. What is your breeding season?***

	Bulls kept with Cows year-round	Fall calving	Spring calving	Spring & Fall Calving
Producer Group 1	148	25	82	42
	(49.83)	(8.42)	(27.61)	(14.14)
Producer Group 2	25	8	17	26
	(32.89)	(10.53)	(22.37)	(34.21)

42A. If you have a fall breeding season, how long do you leave the bull with cows?

	60 days or less	60-90 days	90-120 days
Producer Group 1	19	53	12
	(22.62)	(63.10)	(14.29)
Producer Group 2	15	20	8
	(34.88)	(46.51)	(18.60)

42B. If you have a spring breeding season, how long do you leave the bull with cows?

	60 days or less	60-90 days	90-120 days
Producer Group 1	33	77	43
	(21.57)	(50.33)	(28.10)
Producer Group 2	11	36	13
	(18.33)	(60.00)	(21.67)

[1]top number=frequency, and bottom number=percentage distribution.
[2] measured on a likert scale, 1-7, where 1=nearly always, 7=rarely if ever.
[3] where 1=Not applicable to my operation, 2=Dehorned, 3=Tipped, 4=Neither.
*Significant mean difference in chi-square at 0.1 significance level.
**Significant mean difference in chi-square at 0.05 significance level.
***Significant mean difference in chi-square at 0.01 significance level.

Cow Pregnancy Examinations - Performing pregnancy examinations on owned mature cows as well as raised replacement heifers is part of recommended cowherd management. The two producer groups differed regarding checking the pregnancy of their cows and heifers. Group 2 producers were much more likely to pregnancy check owned mature cows than Group 1 producers (Table V-23). Of Group 1 producers, 12.8% nearly always did a pregnancy exam and 49.4% rarely did. For Group 2 producers, the distribution of responses was bimodal, where 34.5% nearly always did and 29.9% rarely did. Smaller producers who are not as dependent on the beef enterprise do not have the same incentives as larger producers whose household income is more dependent on the cow-calf operation. As discussed earlier, Group 1 producers invest less in recordkeeping and other management practices that either manage costs or increase returns. This group likely devotes less time to physically managing the cowherd also. To conduct a pregnancy examination, cows need to be penned and palpated. This can cause stress on the cows, and could potentially discourage producers from implementing such a procedure. Thus the perceived cost of palpation could outweigh the benefits received. Larger producers may have better facilities, more available labor, and a stronger incentive to reduce costs of maintaining open cows.

Heifer Pregnancy Examinations - Equally important is pregnancy checking raised replacement heifers. Identifying and culling open heifers early will remove sub-fertile females from the herd, and reduce winter feeding costs for the operation. Identifying open heifers shortly after the breeding season is over allows for marketing the heifers while still young enough to go to a feedlot and be eligible for the choice beef market. From an economical standpoint, it is a sound business decision to cull non-pregnant

replacement heifers as soon as possible (Selk 2007). Producers in both groups are more likely to pregnancy check raised heifers than cows (Table V-23). Over half of Group 2 producers (53.6%) almost always perform pregnancy examinations on raised heifers compared with 21.9% for Group 1 producers. This result is likely related to culling strategies as producers may more often plan to cull first-calf heifers that are open than cows in the herd which have a breeding and calving history.

Table V-23 Question 43-44 -Reproduction Section[1]

	1	2	3	4	5	6	7
43A. Pregnancy examinations are performed on owned mature cows?[2*]**							
Producer Group 1	39	24	24	24	15	29	151
	(12.75)	(7.84)	(7.84)	(7.84)	(4.90)	(9.48)	(49.35)
Producer Group 2	30	3	6	5	9	8	26
	(34.48)	(3.45)	(6.90)	(5.75)	(10.34)	(9.20)	(29.89)
43B. Pregnancy examinations are performed on raised replacement heifers?[2*]**							
Producer Group 1	66	25	22	24	11	17	136
	(21.93)	(8.31)	(7.31)	(7.97)	(3.65)	(5.65)	(45.18)
Producer Group 2	45	6	4	3	0	4	22
	(53.57)	(7.14)	(4.76)	(3.57)	(0.00)	(4.76)	(26.19)
43C. Pregnancy examinations are performed on purchased heifers and/or cows?[2]							
Producer Group 1	123	29	8	12	6	16	100
	(41.84)	(9.86)	(2.72)	(4.08)	(2.04)	(5.44)	(34.01)
Producer Group 2	37	5	2	2	2	5	22
	(49.33)	(6.67)	(2.67)	(2.67)	(2.67)	(6.67)	(29.33)
44A. Breeding soundness evaluations are performed on mature bulls (2 years old & older)?[2*]**							
Producer Group 1	83	25	24	21	15	16	128
	(26.60)	(8.01)	(7.69)	(6.73)	(4.81)	(5.13)	(41.03)
Producer Group 2	43	8	4	6	6	4	11
	(52.44)	(9.76)	(4.88)	(7.32)	(7.32)	(4.88)	(13.41)
44B. Breeding soundness evaluations are performed on young bulls (<2 years old)?[2*]**							
Producer Group 1	107	27	22	11	8	14	108
	(36.03)	(9.09)	(7.41)	(3.70)	(2.69)	(4.71)	(36.36)
Producer Group 2	54	8	3	5	0	2	9
	(66.67)	(9.88)	(3.70)	(6.17)	(0.00)	(2.47)	(11.11)

[1]top number=frequency, and bottom number=percentage distribution.
[2] measured on a likert scale, 1-7, where 1=nearly always, 7=rarely if ever.
*Significant mean difference in chi-square at 0.1 significance level.
**Significant mean difference in chi-square at 0.05 significance level.
***Significant mean difference in chi-square at 0.01 significance level.

The frequency of pregnancy examinations conducted on purchased females was also examined. Results were not statistically different between Groups 1 and 2.

Breeding Soundness Evaluations - Producers searching for a cost efficient method to promote a successful breeding program may find breeding soundness examinations for bulls beneficial. Many times the value and importance of the bull in the breeding program is underestimated, as the bull is responsible for contributing half of the genetic material in 20 to 50 calves each year (Selk 2007). The use of breeding soundness evaluations on mature and young bulls was examined among both groups. Not surprising, Group 2 was twice as likely to nearly always examine the soundness of bulls when compared to Group 1 (34.6%, 62.2% respectively). Over 46.2% of Group 1 producers rarely evaluate the fertility of their bulls. The same pattern of implementation exists in reference to young bulls as well, as 41.1% of Group 1 producers rarely ever use breeding soundness evaluations, and only 13.6% of Group 2 rarely evaluate bulls. Well over three-fourths of Group 2 (76.6%) always evaluates the fertility of young bulls, while not even half of Group 1 do (45.1%) (Table V-23). This finding is consistent with differences between the two groups regarding use of EPDs, length of breeding season, and pregnancy checking breeding females.

The quality and fertility of bulls is extremely important and a key ingredient in producing a calf crop. Too often, producers simply expect bulls to breed, when a clear understanding of a bulls ability to breed is readily available. A potential explanatory factor could be a lack of labor or working facilities. If a producer does not have the manpower or penning facilities available to pen bulls and transport them

to a veterinarian, the breeding soundness evaluation may not appear to be an economical practice, yet if the calf crop is significantly reduced due to low fertility of the bull, the value of a breeding soundness evaluation increases sharply.

The percentage of heifers and cows requiring calving assistance were examined, however no statistically significant difference was found between the two groups. Results are summarized across both groups in Table V-24.

Summary – Both individually and cumulatively, breeding season, pregnancy examinations and breeding soundness evaluations provide value and added efficiency in production. In regard to breeding season, Group 2 producers more frequently have a set period in which bulls are exposed to the cow herd. In contrast, Group 1 producers are more likely to leave the bull with the cow herd year round. Conducting pregnancy examinations on owned mature cows and raised replacement heifers is twice as likely to occur in Group 2 as Group 1. Similarly, Group 1 producers are also less likely to conduct a breeding soundness evaluation on both mature and young bulls. Group 2 nearly always evaluates the breeding soundness of both bulls and cows. Sound knowledge of the reproductive efficiency is a key, as footing the feed bill of open cows or infertile bulls can be extremely costly to a producer.

Table V-24 Question 45-Reproduction Section[1]

45A. What percentage of Heifers require assistance in calving?[2]

	1	2	3	4
a. Easy pull				
Producer Group 1	174	13	1	4
	(90.63)	(6.77)	(0.52)	(2.08)
Producer Group 2	65	1	0	2
	(95.59)	(1.47)	(0.00)	(2.94)
b. Hard pull				
Producer Group 1	74	4	1	0
	(93.98)	(4.82)	(1.20)	(0.00)
Producer Group 2	43	0	0	0
	(100.00)	(0.00)	(0.00)	(0.00)
c. Ceasarian section				
Producer Group 1	15	0	0	0
	(100.00)	(0.00)	(0.00)	(0.00)
Producer Group 2	6	0	0	0
	(100.00)	(0.00)	(0.00)	(0.00)
d. No assistance				
Producer Group 1	4	8	28	238
	(1.44)	(2.88)	(10.07)	(85.61)
Producer Group 2	1	1	9	65
	(1.32)	(1.32)	(11.84)	(85.53)

45B. What percentage of cows require assistance in calving?[2]

	1	2	3	4
a. Easy pull				
Producer Group 1	98	0	0	4
	(96.08)	(0.00)	(0.00)	(3.92)
Producer Group 2	50	0	0	1
	(98.04)	(0.00)	(0.00)	(1.96)
b. Hard pull				
Producer Group 1	47	1	0	0
	(97.92)	(2.08)	(0.00)	(0.00)
Producer Group 2	22	0	0	0
	(100.00)	(0.00)	(0.00)	(0.00)
c. Ceasarian section				
Producer Group 1	6	0	0	0
	(100.00)	(0.00)	(0.00)	(0.00)
Producer Group 2	1	0	0	0
	(100.00)	(0.00)	(0.00)	(0.00)
d. No assistance				
Producer Group 1	1	1	2	294
	(0.34)	(0.34)	(0.67)	(98.66)
Producer Group 2	0	0	0	79
	(0.00)	(0.00)	(0.00)	(98.75)

[1] top number=frequency, and bottom number=percentage distribution.
[2] where 1=1-25%, 2=26-50%, 3=51-75%, 4=76%+
*Significant mean difference in chi-square at 0.1 significance level.
**Significant mean difference in chi-square at 0.05 significance level.
***Significant mean difference in chi-square at 0.01 significance level.

Genetics

Bull Purchase Price - Another potential indicator of how the cowherd enterprise is managed is how much producers pay for herd bulls. A significant difference was anticipated and found between the two groups. One producer in Group 1 reported a purchase price of $50,000. This observation was considered an outlier, as the next highest value was $5,000. Since this observation severely skewed the results, it was deleted in frequency statistical analyses. A $50,000 purchase price for a bull for a cowherd less than 100 head is a questionable economic decision and could only be made with household income heavily dependent on something other than the cow-calf enterprise. The mean purchase price of bulls for producers in Group 1 was $1,578.87, while the mean price for producers in Group 2 was $2,034.94. This resulted in a significant difference of $456.07 per bull. This difference verifies the assumption that producers with larger herds and a greater dependence on the income generated from beef production will invest more on bulls intended for use with commercial cows. Another point of interest in reference to the bull price was the distribution among the two groups (Table V-25). Within both groups, the majority paid $1,000 to $2,000 per bull, 62.9% for Group1 and 50% for Group 2. A large difference can be seen within the remaining 50%. Nearly a third (32.2%) of Group 2 producers paid between $2,000-$3,000, while 25.7% of Group 1 producers paid less than $1,000.

Source of Breeding Bulls - Of equal or more importance may be where herd bulls are purchased, from reputable seedstock producers or from local livestock markets. Verified producers of seedstock animals provide historical performance data on bulls, whereas the neighbor or local stockyard may not have access to or provide such genetic

information to buyers. Group 2 producers were more likely to raise their own bulls, while Group 1 producers were much more likely to use a neighbor's bull (Table V-26). Bull test station sales were used nearly always by 34% of Group 2 and only 16.6% of Group 1. The most common place to obtain bulls was purebred breeder sales, although a greater majority of Group 2 used them (76.4%) than Group 1 (52.9%). Over half of Group 1, and over three-quarters of Group 2, used purebred breeder sales. Only a tenth of Group 2 producers rarely ever use breeder sales, but over 32.3% of Group 1 rarely if ever purchase bulls from purebred breeders. Neither producer group commonly used the stockyards to purchase bulls, and no significant difference was found between the two groups in where they obtained replacement heifers.

Table V-25 Question 46-48-Genetics Section[1]

46. What is the average purchase price you normally pay for breeding bulls on commercial cows?[2]***

	1	2	3	4
Producer Group 1	83	203	32	5
	(25.70)	(62.85)	(9.91)	(1.55)
Producer Group 2	11	45	29	5
	(12.22)	(50.00)	(32.22)	(5.56)

47. Predominant breed of bulls used in your operation[3]

	1	2	3	4	5
Producer Group 1	163	64	34	18	23
	(53.97)	(21.19)	(11.26)	(5.96)	(7.62)
Producer Group 2	51	10	5	5	9
	(63.75)	(12.50)	(6.25)	(6.25)	(11.25)

48. Predominant breed of cows used in your operation[4]

	1	2	3	4	5
Producer Group 1	153	45	41	9	57
	(50.16)	(14.75)	(13.44)	(2.95)	(18.69)
Producer Group 2	45	4	15	1	19
	(53.57)	(4.76)	(17.86)	(1.19)	(22.62)

[1] top number=frequency, and bottom number=percentage distribution.
[2] Where 1=$0-$1000, 2=$1001-$2000, 3=$2001-$3000, 4>$3000
[3] Where 1=Angus, Reg Angus, 2=Charolais, Limousin, 3=Brahman, Brangus, 4=Simmental, Gelbvieh, 5=Hereford, Other
[4] Where 1=Angus, Reg Angus, Angus X Hereford 2=Charolais, Limousin, 3=Brahman, Brangus, 4=Simmental, Gelbvieh, 5=Hereford, Other
*Significant mean difference in chi-square at 0.1 significance level.
**Significant mean difference in chi-square at 0.05 significance level.
***Significant mean difference in chi-square at 0.01 significance level.

Table V-26 Question 49-50-Genetics Section[1]

49. Where do you obtain most breeding bulls?[2*]

	1	2	3	4	5	6	7
a. Raise my own*							
Producer Group 1	21	6	11	13	15	22	129
	(9.68)	(2.76)	(5.07)	(5.99)	(6.91)	(10.14)	(59.45)
Producer Group 2	7	5	5	7	4	6	21
	(12.73)	(9.09)	(9.09)	(12.73)	(7.27)	(10.91)	(38.18)
b. Neighbor**							
Producer Group 1	62	25	20	22	10	6	95
	(25.83)	(10.42)	(8.33)	(9.17)	(4.17)	(2.50)	(39.58)
Producer Group 2	5	6	4	1	3	5	30
	(9.26)	(11.11)	(7.41)	(1.85)	(5.56)	(9.26)	(55.56)
c. Stockyards							
Producer Group 1	7	3	10	8	6	14	160
	(3.37)	(1.44)	(4.81)	(3.85)	(2.88)	(6.73)	(76.92)
Producer Group 2	2	0	1	2	1	3	38
	(4.26)	(0.00)	(2.13)	(4.26)	(2.13)	(6.38)	(80.85)
d. Bull test station sales*							
Producer Group 1	21	15	5	11	9	8	148
	(9.68)	(6.91)	(2.30)	(5.07)	(4.15)	(3.69)	(68.20)
Producer Group 2	10	8	3	1	1	2	28
	(18.87)	(15.09)	(5.66)	(1.89)	(1.89)	(3.77)	(52.83)
e. Purebred breeder sales***							
Producer Group 1	95	41	22	12	4	7	76
	(36.96)	(15.95)	(8.56)	(4.67)	(1.56)	(2.72)	(29.57)
Producer Group 2	39	16	3	3	3	2	6
	(54.17)	(22.22)	(4.17)	(4.17)	(4.17)	(2.78)	(8.33)

50. Where do you obtain most replacement heifers?[2]

	1	2	3	4	5	6	7
a. Raise my own							
Producer Group 1	174	42	28	10	8	4	28
	(59.18)	(14.29)	(9.52)	(3.40)	(2.72)	(1.36)	(9.52)
Producer Group 2	55	12	3	2	2	0	6
	(68.75)	(15.00)	(3.75)	(2.50)	(2.50)	(0.00)	(7.50)
b. Purchase from another source with a known history							
Producer Group 1	61	39	27	34	14	12	73
	(23.46)	(15.00)	(10.38)	(13.08)	(5.38)	(4.62)	(28.08)
Producer Group 2	19	7	4	6	5	3	20
	(29.69)	(10.94)	(6.25)	(9.38)	(7.81)	(4.69)	(31.25)
c. Purchase from another source with an unknown history							
Producer Group 1	11	8	11	26	8	15	156
	(4.68)	(3.40)	(4.68)	(11.06)	(3.40)	(6.38)	(66.38)
Producer Group 2	3	2	2	1	2	6	39
	(5.45)	(3.64)	(3.64)	(1.82)	(3.64)	(10.91)	(70.91)

[1] top number=frequency, and bottom number=percentage distribution.
[2] measured on a likert scale, 1-7, where 1=nearly always, 7=rarely if ever.
*Significant mean difference in chi-square at 0.1 significance level.
**Significant mean difference in chi-square at 0.05 significance level.
***Significant mean difference in chi-square at 0.01 significance level.

Beef producers have a wide array of methods for exploiting the genetic diversity available in beef cattle, along with numerous excellent breeds from which to choose (Lalman and Doye 2005). When producers were asked to describe their commercial breeding program, a significant difference was found among two widely used practices, rotational crossbreeding and the use of composite bulls.

Rotational Crossbreeding - A large benefit to a rotational crossbreeding system is the generation of replacement females, but a large disadvantage is that breed complementarity is not maintained. Well over half of Group 2 producers (60.9%) use a rotational system, whereas 46.9% of Group 1 producers use this system (Table V-27). Often large producers can capitalize on some of the advantages of rotational systems by producing replacement females with outstanding maternal performance and mating older females to a male from a breed with good growth characteristics. A critical point of rotational crossbreeding is that each generation should use a different breed of male from the previous one, and this could become an additional expense for a smaller producer. Also, at least one breeding pasture or pen for each breed of male is required, and this could potentially create problems for smaller producers where it is possible that only one male is used at a time (Lalman and Doye 2005).

Composite Breeding Program - When crossbreeding systems are well planned, favorable increases in production and profitability occur. Within a composite system, only one breeding pasture is required and the composite herd also generates replacement animals. Of the producers evaluated, well over half of both groups do not use composite bulls; however, the use of this crossbreeding system is

twice as frequent among Group 2 producers as Group 1 (40.4% Group 2, 17% Group 1) (Table V-27). The development of a composite is an important process and requires sufficient resources to develop it properly. A producer can avoid losses of hybrid vigor by having a large herd of animals (Lalman and Doye 2005); therefore implementation of a composite system is not ideal for Group 1 producers. Whichever breeding system is chosen by the producer, the key is to maintain a sound record system, to record performance, the selection process, and financial progress. Successful producers focus their time and energy on sustainable and profitable beef production (Lalman and Doye 2005).

The use of terminal cross breeding as well as a producer's frequency of raising their own breeding stock did not yield a statistically significant difference between the two groups.

Summary – In brief, producers in Group 2 pay more for their breeding bulls and more commonly buy from purebred breeder sales. Group 1 producers also use purebred sales in which the expected value of the bull is known with greater certainty prior to purchase; however, the second most common location is a neighbor. Although using a neighbor's bull elevates the need to maintain and care for a bull year round, the genetic value could be an unknown. Technology in the field of genetics is continuously growing and expanding into every facet of beef production, and knowledge regarding the genetic value of the herd and calves produced will be of increasing interest.

Table V-27 Question 51-Genetics Section[1]

51. Describe your commercial breeding program.

a. Raise my own

	Yes	No
Producer Group 1	169	109
	(60.79)	(39.21)
Producer Group 2	43	30
	(58.90)	(41.10)

b. Rotational Cross**

	Yes	No
Producer Group 1	115	130
	(46.94)	(53.06)
Producer Group 2	42	27
	(60.87)	(39.13)

c. Terminal cross (2 breeds and do not keep heifers)

	Yes	No
Producer Group 1	51	176
	(22.47)	(77.53)
Producer Group 2	11	39
	(22.00)	(78.00)

d. Use composite bulls***

	Yes	No
Producer Group 1	38	185
	(17.04)	(82.96)
Producer Group 2	21	31
	(40.38)	(59.62)

[1]top number=frequency, and bottom number=percentage distribution.
*Significant mean difference in chi-square at 0.1 significance level.
**Significant mean difference in chi-square at 0.05 significance level.
***Significant mean difference in chi-square at 0.01 significance level.

Table V-28. Question 52-Genetics Section[1]

52. Rate these trait categories based on their importance relateve to your bull selection decisions.[2]

	1	2	3	4	5	6	7
a. Growth							
Producer Group 1	195	58	35	21	2	1	3
	(61.90)	(18.41)	(11.11)	(6.67)	(0.63)	(0.32)	(0.95)
Producer Group 2	54	20	7	1	1	0	0
	(65.06)	(24.10)	(8.43)	(1.20)	(1.20)	(0.00)	(0.00)
b. Reproduction							
Producer Group 1	207	56	26	12	8	3	3
	(65.71)	(17.78)	(8.25)	(3.81)	(2.54)	(0.95)	(0.95)
Producer Group 2	57	16	2	7	0	1	0
	(68.67)	(19.28)	(2.41)	(8.43)	(0.00)	(1.20)	(0.00)
c. Carcass weight							
Producer Group 1	95	60	53	56	17	10	14
	(31.15)	(19.67)	(17.38)	(18.36)	(5.57)	(3.28)	(4.59)
Producer Group 2	27	19	13	13	6	2	2
	(32.93)	(23.17)	(15.85)	(15.85)	(7.32)	(2.44)	(2.44)
d. Marbling							
Producer Group 1	53	40	62	61	33	23	33
	(17.38)	(13.11)	(20.33)	(20.00)	(10.82)	(7.54)	(10.82)
Producer Group 2	19	14	12	14	12	3	4
	(24.36)	(17.95)	(15.38)	(17.95)	(15.38)	(3.85)	(5.13)
e. External Fat							
Producer Group 1	40	37	56	75	41	25	29
	(13.20)	(12.21)	(18.48)	(24.75)	(13.53)	(8.25)	(9.57)
Producer Group 2	15	13	11	16	10	7	5
	(19.48)	(16.88)	(14.29)	(20.78)	(12.99)	(9.09)	(6.49)
f. Muscling							
Producer Group 1	110	83	50	33	16	8	8
	(35.71)	(26.95)	(16.23)	(10.71)	(5.19)	(2.60)	(2.60)
Producer Group 2	29	24	16	6	4	0	0
	(36.71)	(30.38)	(20.25)	(7.59)	(5.06)	(0.00)	(0.00)
g. Weaning weight							
Producer Group 1	157	72	50	13	7	5	11
	(49.84)	(22.86)	(15.87)	(4.13)	(2.22)	(1.59)	(3.49)
Producer Group 2	54	15	10	1	4	1	1
	(62.79)	(17.44)	(11.63)	(1.16)	(4.65)	(1.16)	(1.16)
h. Convenience (polled, disposition)							
Producer Group 1	192	55	38	17	5	3	4
	(61.15)	(17.52)	(12.10)	(5.41)	(1.59)	(0.96)	(1.27)
Producer Group 2	44	22	8	5	0	2	1
	(53.66)	(26.83)	(9.76)	(6.10)	(0.00)	(2.44)	(1.22)
i. Eye appeal or physical appearance							
Producer Group 1	151	87	44	17	7	3	5
	(48.09)	(27.71)	(14.01)	(5.41)	(2.23)	(0.96)	(1.59)
Producer Group 2	36	27	5	7	4	2	0
	(44.44)	(33.33)	(6.17)	(8.64)	(4.94)	(2.47)	(0.00)

[1]top number=frequency, and bottom number=percentage distribution.

[2] measured on a likert scale, 1-7, where 1=Extremely Important, 7=Extremely Unimportant.

*Significant mean difference in chi-square at 0.1 significance level.

**Significant mean difference in chi-square at 0.05 significance level.

***Significant mean difference in chi-square at 0.01 significance level.

Table V-29. Question 53-Genetics Section[1]

53. Rate these trait categories based on their importance relateve to your replacement female selection decisions.[2]

	1	2	3	4	5	6	7
a. Growth							
Producer Group 1	173	70	45	16	1	4	5
	(55.10)	(22.29)	(14.33)	(5.10)	(0.32)	(1.27)	(1.59)
Producer Group 2	47	20	12	2	2	1	0
	(55.95)	(23.81)	(14.29)	(2.38)	(2.38)	(1.19)	(0.00)
b. Reproduction							
Producer Group 1	239	42	15	8	2	1	6
	(76.36)	(13.42)	(4.79)	(2.56)	(0.64)	(0.32)	(1.92)
Producer Group 2	74	10	1	1	0	0	0
	(86.05)	(11.63)	(1.16)	(1.16)	(0.00)	(0.00)	(0.00)
c. Carcass weight							
Producer Group 1	64	45	73	64	21	14	22
	(21.12)	(14.85)	(24.09)	(21.12)	(6.93)	(4.62)	(7.26)
Producer Group 2	17	11	13	24	5	3	4
	(22.08)	(14.29)	(16.88)	(31.17)	(6.49)	(3.90)	(5.19)
d. Marbling							
Producer Group 1	42	30	68	60	36	30	36
	(13.91)	(9.93)	(22.52)	(19.87)	(11.92)	(9.93)	(11.92)
Producer Group 2	16	13	15	17	9	3	6
	(20.25)	(16.46)	(18.99)	(21.52)	(11.39)	(3.80)	(7.59)
e. External Fat							
Producer Group 1	34	50	63	67	40	15	35
	(11.18)	(16.45)	(20.72)	(22.04)	(13.16)	(4.93)	(11.51)
Producer Group 2	15	14	16	15	9	3	6
	(19.23)	(17.95)	(20.51)	(19.23)	(11.54)	(3.85)	(7.69)
f. Muscling							
Producer Group 1	81	70	71	47	17	11	10
	(26.38)	(22.80)	(23.13)	(15.31)	(5.54)	(3.58)	(3.26)
Producer Group 2	23	22	16	16	1	2	0
	(28.75)	(27.50)	(20.00)	(20.00)	(1.25)	(2.50)	(0.00)
g. Weaning weight							
Producer Group 1	142	73	42	28	12	4	9
	(45.81)	(23.55)	(13.55)	(9.03)	(3.87)	(1.29)	(2.90)
Producer Group 2	42	21	9	5	2	1	2
	(51.22)	(25.61)	(10.98)	(6.10)	(2.44)	(1.22)	(2.44)
h. Convenience (polled, disposition)							
Producer Group 1	221	54	24	6	2	2	4
	(70.61)	(17.25)	(7.67)	(1.92)	(0.64)	(0.64)	(1.28)
Producer Group 2	63	18	3	2	0	0	0
	(73.26)	(20.93)	(3.49)	(2.33)	(0.00)	(0.00)	(0.00)
i. Eye appeal or physical appearance							
Producer Group 1	164	81	35	19	5	3	6
	(52.40)	(25.88)	(11.18)	(6.07)	(1.60)	(0.96)	(1.92)
Producer Group 2	47	21	5	6	4	0	1
	(55.95)	(25.00)	(5.95)	(7.14)	(4.76)	(0.00)	(1.19)

[1]top number=frequency, and bottom number=percentage distribution.
[2] measured on a likert scale, 1-7, where 1=Extremely Important, 7=Extremely Unimportant.
*Significant mean difference in chi-square at 0.1 significance level.
**Significant mean difference in chi-square at 0.05 significance level.
***Significant mean difference in chi-square at 0.01 significance level.

Demographics

Demographic and entity questions were also included in the survey. Although differences among the two groups did not exist for every question, significant insight can be gained from a closer look at the areas covered.

Gender & Age - A significant majority of producers in this study were male (Table V-30), over 94.4% of Group 2 producers and 89.3% of Group 1 producers. Only 10.7% of Group 1 producers and 5.6% of Group 2 producers were female. Age was distributed fairly evenly, as no single age range held the vast majority (Table V-30). Less than a tenth of both Group 1 and Group 2 producers were less than 29 years old, and almost 30% of both Groups are at least 60 years old, 27.8% and 34.4% respectively.

Herd Inventory - Recall groups were based in part on number of commercial cows. The extent of purebred cows was also asked. Over half of both groups do not have females intended for purebred breeding purposes, (Group 1, 55.6%; Group 2, 54.2%) (Table V-31). Another herd inventory figure was the number of stockers grazed or back-grounded annually. Retaining ownership of calves for grazing or back grounding was much more common in Group 2, as 78.8% of producers retained calves as stockers (Table V-31). More than 51.6% of Group 1 do not graze or background any calves, while 41.2% of Group 2 graze 100-499 head annually.

Education & Race – The highest level of education attained by the primary operator did not yield a significant difference between the two producer groups (Table V-30). Of producers in Group 1, 31.3% have some college, while 32.5% are college graduates and 13% have a graduate or professional degree. Group 2

producers were very similar; as 25.6% have some college experience, 32.2% are college graduates, and 15.6% have an advanced degree. The primary race of the operators in our study was Caucasian, 91.1% of Group 1, and 92.1% of Group 2 (Table V-32).

Household Income - The net household income from all sources shows the majority of Group 1 producers (72.3%) receive $30,000-$89,999. A little more than 9.4% of Group 1 producers report less than $30,000, and the remaining 18.2% make at least $90,000 annually (Table V-32). Of Group 2 producers, 48.2% make $30,000-$89,999. Over a third (37.7%) earn over $90,000 annually, and 14.1% receive less than $30,000 in net income

Off-farm Work - Significant differences exist between the two producer groups regarding off-farm income (Table V-30). The majority (52.5%) of Group 1 producers have full-time off farm jobs, whereas in Group 2, over 72.2% do not have off-farm employment. In regards to spousal employment, 61.5% of Group 1 spouses have a full-time off farm job, while Group 2 spouses are divided between no off farm job (40.9%) and a full time off farm job (42.3%).

Farm Objectives – Questions were asked regarding attitudes or perceived importance of supplemental off-farm income, efforts to reduce labor, and internet usage. Importance of generating income so that off-farm income is not necessary is extremely important to 89.8% of Group 2, while only 44.2% of Group 1 consider it extremely important (Table V-31). This is expected as producers in Group 2 are more dependent on income from beef production. The importance of reducing labor and

internet use for business purposes was analyzed, yet no significant differences were found.

Table V-30. Question 54-57 Demographics Section[1]

54. Gender of primary operator

	Male	Female
Producer Group 1	285	34
	(89.34)	(10.66)
Producer Group 2	84	5
	(94.38)	(5.62)

55A. Extent of off-farm work:***

	None	Full-time Off farm job	Part-time off farm job
Producer Group 1	97	168	55
	(30.31)	(52.50)	(17.19)
Producer Group 2	65	14	11
	(72.22)	(15.56)	(12.22)

55B. Extent of Spouses off-farm work:**

	None	Full-time Off farm job	Part-time off farm job
Producer Group 1	59	147	33
	(24.69)	(61.51)	(13.81)
Producer Group 2	29	30	12
	(40.85)	(42.25)	(16.90)

56. Primary operator's age:

	<29	30-39	40-49	50-59	>60
Producer Group 1	23	47	71	93	90
	(7.10)	(14.51)	(21.91)	(28.70)	(27.78)
Producer Group 2	6	7	15	31	31
	(6.67)	(7.78)	(16.67)	(34.44)	(34.44)

57. What is the highest level of education attained by primary operator:[2]

	1	2	3	4	5	6
Producer Group 1	6	51	101	105	18	42
	(1.86)	(15.79)	(31.27)	(32.51)	(5.57)	(13.00)
Producer Group 2	1	17	23	29	6	14
	(1.11)	(18.89)	(25.56)	(32.22)	(6.67)	(15.56)

[1]top number=frequency, and bottom number=percentage distribution.
[2] where: 1=Less than high school graduate, 2=High school graduate, 3=Some college, 4=College graduate, 5=Some post-graduate work, 6=Graduate or professional degree.
*Significant mean difference in chi-square at 0.1 significance level.
**Significant mean difference in chi-square at 0.05 significance level.
***Significant mean difference in chi-square at 0.01 significance level.

Table V-31. Question 58A-59, and 62 Demographics Section[1]

58A. Number of breeding females in the herd: (Commercial Cow/Calf)***

	None	1-49	50-99	100-249	250-499	500-999	1000+ head
Producer Group 1	0	229	95	0	0	0	0
	(0.00)	(70.68)	(29.32)	(0.00)	(0.00)	(0.00)	(0.00)
Producer Group 2	0	0	0	59	20	7	4
	(0.00)	(0.00)	(0.00)	(65.56)	(22.22)	(7.78)	(4.44)

58B. Number of breeding females in the herd: (Purebred Cow/Calf)***

	None	1-49	50-99	100-249	250-499	500-999	1000+ head
Producer Group 1	139	98	12	0	0	0	1
	(55.60)	(39.20)	(4.80)	(0.00)	(0.00)	(0.00)	(0.40)
Producer Group 2	32	14	4	7	1	1	0
	(54.24)	(23.73)	(6.78)	(11.86)	(1.69)	(1.69)	(0.00)

59. Number of head of stockers grazed or back-grounded annually***

	None	1-49	50-99	100-499	500-999	1000+head
Producer Group 1	164	115	27	12	0	0
	(51.57)	(36.16)	(8.49)	(3.77)	(0.00)	(0.00)
Producer Group 2	18	7	13	35	6	6
	(21.18)	(8.24)	(15.29)	(41.18)	(7.06)	(7.06)

62A. How important is generating enough farm income so that off-farm income is not necessary?[2]***

	1	2	3	4	5	6	7
Producer Group 1	104	37	50	49	32	19	28
	(32.60)	(11.60)	(15.67)	(15.36)	(10.03)	(5.96)	(8.78)
Producer Group 2	67	12	6	2	1	0	0
	(76.14)	(13.64)	(6.82)	(2.27)	(1.14)	(0.00)	(0.00)

62B. How important is choosing practices to reduce labor use?[2]

	1	2	3	4	5	6	7
Producer Group 1	182	60	38	23	6	2	6
	(57.41)	(18.93)	(11.99)	(7.26)	(1.89)	(0.63)	(1.89)
Producer Group 2	63	17	6	1	0	0	2
	(70.79)	(19.10)	(6.74)	(1.12)	(0.00)	(0.00)	(2.25)

62C. How important is the use of internet for business purposes?[2]

	1	2	3	4	5	6	7
Producer Group 1	55	41	40	61	21	28	69
	(17.46)	(13.02)	(12.70)	(19.37)	(6.67)	(8.89)	(21.90)
Producer Group 2	22	8	12	12	10	8	13
	(25.88)	(9.41)	(14.12)	(14.12)	(11.76)	(9.41)	(15.29)

[1]top number=frequency, and bottom number=percentage distribution.

[2] measured on a likert scale, 1-7, where 1=Very Important, 7=Very Unimportant.

*Significant mean difference in chi-square at 0.1 significance level.

**Significant mean difference in chi-square at 0.05 significance level.

***Significant mean difference in chi-square at 0.01 significance level.

Table V-32. Questions 63-65 Demographics Section[1]

63. Which of the following best describes your 2003 household net income from all sources?***

	<$30,000	$30,000-$59,999	$60,000-$89,999	$90,000-$119,999	>$120,000
Producer Group 1	30	128	102	29	29
	(9.43)	(40.25)	(32.08)	(9.12)	(9.12)
Producer Group 2	12	28	13	14	18
	(14.12)	(32.94)	(15.29)	(16.47)	(21.18)

64. Approximately what percentage of your 2003 household net income came from your beef cattle operation?***

	0%	1%-20%	21%-40%	41%-60%	61%-80%	81%-100%
Producer Group 1	0	238	86	0	0	0
	(0.00)	(73.46)	(26.54)	(0.00)	(0.00)	(0.00)
Producer Group 2	0	0	0	36	28	26
	(0.00)	(0.00)	(0.00)	(40.00)	(31.11)	(28.89)

65. Race of Primary Operator:[2]

	1	2	3	4	5	6	7
Producer Group 1	288	3	20	0	0	5	0
	(91.14)	(0.95)	(6.33)	(0.00)	(0.00)	(1.58)	(0.00)
Producer Group 2	81	1	5	0	0	1	0
	(92.05)	(1.14)	(5.68)	(0.00)	(0.00)	(1.14)	(0.00)

[1]top number=frequency, and bottom number=percentage distribution.

[2] where: 1=White, 2=Black or African American, 3=American Indian or Alaska Native, 4=Native Hawaiian, 5=Asian, 6=More than one race.

*Significant mean difference in chi-square at 0.1 significance level.

**Significant mean difference in chi-square at 0.05 significance level.

***Significant mean difference in chi-square at 0.01 significance level.

CHAPTER VI

FACTORS AFFECTING ADOPTION

Introduction and Objectives

Considerable differences were found and discussed between producer groups. This raises questions regarding factors which influence producers' propensity to use or not use specific management practices. Do demographic characteristics of the producer and firm affect technology adoption, or are income and enterprise objectives a better determinant of the probability of adoption? The primary objective of this section is to derive a more precise understanding of the specific factors which affect the probability of Oklahoma cow-calf producers' adopting recommended beef management practices.

Methods and Procedures

After reviewing the cow calf survey, specific production practices where differences were found between producer groups were identified for further analysis. Production practices evaluated were implant usage in steers, length of hay feeding season, soil testing, forage testing, stockpiling grasses, calf vaccination, cow and calf identification, existence of a long-term plan, recordkeeping method, cash flow planning, cow and replacement heifer pregnancy exams, and bull breeding soundness

exams. These dependent variables are further defined in Table VI-1. The independent variables are defined in Table VI-2 and VI-3, and include number of breeding females, percent of household net income from the beef operation, operator's age, education, extent of off-farm work, importance of reducing labor use, and importance of generating farm income to avoid off-farm work. The dependent variables for the selected practices were grouped into binary responses, and therefore ordered logit analysis is applied. Within SAS, the logistic procedure was used for the logit models estimated (SAS Institute). The statistical analysis will attempt to determine if there is a significant relationship between demographic variables and adoption or use of specific management practices. Anticipated determinants with an effect included age, education, percent of household income from cattle, cow herd size, and off-farm work. While previous analysis focused on two groups of producers, here, a larger number of observations were used. All 729 surveys received were used in the logit analysis. The following equation represents a generalized form of the model for all dependent variables evaluated.

$$(1) \qquad Prob(\text{Producer i adopts recommended practice}) = \frac{e^{Z}}{1+e^{Z}}$$

Prob(*Producer i adopts recommended practice)* is the probability of *producer i* adopting specific recommended practices or technology and the *Recommended Practice* is the associated binomial value for each management practice. *e* is a

mathematical constant, the base of the natural logarithm, which equals approximately 2.718281828. *Z* is

$$Z = \alpha + B_1 COW + B_2 INCOME + B_3 AGE + B_4 EDU + B_5 OFFFARM + B_6 REDUCELABOR + B_7 GENFARM \quad (2)$$

Zero is defined as the "recommended" or "ideal" practice and 1 is not implementing the management practice. Where dependent variables and associated mean values are listed in TableVI-1. Independent variables are categorized response variables. COW is the number of commercial breeding females in the herd from 1-6, INCOME is the percentage of household net income from the beef cattle operation from 1-5; AGE is the primary operator's age from 1-5; EDU is the level of education attained by th primary operator either 0 or 1; OFFFARM is the extent of off-farm work of the primary operator from 1-3; REDLABOR is operators perceived importance of choosing practices to reduce labor; GENFARM is the operator's perceived importance of generating enough farm income to avoid off-farm work. All independent variables, associated mean values, and category explanation are listed in Tables VI-2 & VI-3.

Table VI-1. Factors Affecting Adoption, Dependent Variable Definitions

Dependent Variables	Variable Definition	Mean
Implant	Frequency of implant steer calves prior to weaning (0=nearly always, 1=rarely, if ever)	0.724 (0.018)
HaySeason	Typical hay-feeding season (0=≤60days, 1=>61days)	0.897 (0.011)
SoilTest	Frequency of conducting a soil test (0=at least bi-annually, 1=rarely, if ever)	0.621 (0.024)
ForageTestProduce	Frequency of conducting a forage test on produced forages (0=nearly always, 1=rarely, if ever)	0.729 (0.020)
ForageTestPurchase	Frequency of conducting a forage test on purchased forages (0=nearly always, 1=rarely, if ever)	0.818 (0.016)
GrassStockpile	Stockpiling forage grasses (0=nearly always, 1=rarely, if ever)	0.344 (0.024)
IntroducedStockpile	Stockpiling introduced forages (0=nearly always, 1=rarely, if ever)	0.399 (0.024)
Vac	Vaccination of calves prior to marketing (0=vaccinate, 1=do not vaccinate)	0.299 (0.017)
CowID	Individually identification of cows (0=Individually ID, 1=do not individually ID)	0.086 (0.010)
CalfID	Individually identification of calves (0=Individually ID, 1=do not individually ID)	0.21 (0.015)
LongTermPlan	Long term plan(5 years or more) (0=yes, 1=no)	0.573 (0.019)
RecordKeeping	Recordkeeping method used (0=computer usage, 1=hand method only)	0.629 (0.019)
CashFlow	Cash Flow or Budget (0=yes, 1=no)	0.4 (0.020)
BreedingSeason	Breeding Season (0=defined breeding period, 1=bulls w/ cows yr. round)	0.452 (0.020)
CowPregExam	Frequency of pregnancy exam on mature cows (0=nearly always, 1=rarely, if ever)	0.663 (0.021)
HeifPregExam	Frequency of pregnancy exam on replacement heifers (0=nearly always, 1=rarely, if ever)	0.529 (0.021)
Bull	Frequency of breeding soundness exam on young bulls (≤ 2yrs) (0=nearly always, 1=rarely, if ever)	0.403 (0.021)

Numbers in parentheses are standard errors

Table VI-2. Definitions of Variables Representing Factors Affecting Adoption

Independent Variables	Variable Definition	Mean
Cow	Number of commercial breeding females in herd (Categorical 1-6)	1.873 (0.042)
Income	Percentage of household net income from beef cattle operation (Categorical 1-5)	1.983 (0.051)
Age	Primary operator's age (Categorical 1-5)	3.626 (0.045)
Edu	Dummy variable (0=no college degree, 1=college graduate)	0.517 (0.019)
Off-Farm	Extent of off-farm work (1=none, 2=part-time job, 3=full-time job)	2.024 (0.034)
ReduceLabor	Importance of choosing practices to reduce labor use,1-7 Likert Scale (1=extremely important, 7=extremely unimportant)	1.828 (0.048)
GenFarm	Importance of generating enough farm income to avoid off-farm work,1-7 Likert Scale (1=extremely important, 7=extremely unimportant)	2.613 (0.072)

Numbers in parentheses are standard errors

Table VI-3. Categories for Variables Representing Factors Affecting Adoption

Category	Commercial Females (*Cow*)	Percentage Income (*Income*)	Age (*Age*)	Off-Farm Work (*Off-Farm*)	Reduce Labor (*ReduceLabor*)	Generate Farm Income (*GenFarm*)
1	25 head	1-20 percent	29 years or less	No off-farm job	Extremely Unimportant	Extremely Unimportant
2	75 head	21-40 percent	30-39	Part-time off-farm job		
3	175 head	41-60 percent	40-49	Full-time off farm job		
4	225 head	67-80 percent	50-59			
5	700 head	81-100 percent	60 years of age or older			
6	1500 head					
7					Extremely Important	Extremely Important

Results

Results of the logit analysis yielded several significant points of interest across the management practices selected. A summary of the results for each model (statistically significant independent variables, coefficients, odds ratio, and likelihood ratio) are listed in Tables VI-4 and VI-5.

Only significant variables for each model are listed. The odds ratio is a measure of effect size, and is the ratio of the odds of an event occurring in one group to the odds of it occurring in another group. The likelihood ratio is a statistical test in which the ratio is computed between the maximum of the likelihood function under the null hypothesis, and is a test of fit.

Among the independent variables, of evident importance was reducing labor, the dependence on cattle for income, herd size, and age of operator. These variables were statistically significant in multiple models. Several different combinations of the independent variables lead to different and unique interpretations regarding each model. Although the coefficients cannot be directly used to make implications of marginal effect, the sign (positive or negative) remains valid.

Implant, Recordkeeping, and Cash Flow – Both herd size and income dependency on the cattle operation are positively related to the use of implants, while age has a negative relationship. These relationships have a sound basis. If a producer is dependant upon cattle profits for household income, the use of implants to increase growth and therefore weights of calves is beneficial. Contrarily, as a producer's age increases, the probability of using growth promoting implants declines. As previously mentioned, administering implants requires adequate working facilities

and added labor, both of which could be factors which are costly and possibly more difficult for an older producer. The likelihood of an older producer seeing the value of implants outweighing the stress and cost of administration could potentially be an explanatory factor. This is similarly the case in reference to two of the business planning and management questions. When producers are more dependent upon cattle production, they are more apt to have a long term business plan and a cash flow analysis or budget for the operation, yet older cattle producers are less likely to maintain or use these financial planning tools.

Reproduction - A pattern of significant variables was easily seen within the practices regarding reproduction. Both income dependency and age were statistically significant among these practices. In line with industry experts recommendations of a set breeding season, conducting pregnancy exams, and bull soundness evaluations in a cow-calf enterprise, producers with a greater dependence on beef income are more likely to implement these practices. Age was again negatively related to these practices, and could potentially be attributed to a logistical factor. Limiting the breeding season, conducting pregnancy exams, and bull soundness exams are all management practices that benefit from specialized facilities and require handling the herd. From an aged cattleman's perspective, the associated risk of handling bulls or penning and palpating cows could simply not be worth the added profits. A producer with a small cow herd, one or two bulls and a grass pasture, might engage in cow-calf production simply because it is a way of life and cow-calf profits only serve as supplemental household income.

Stockpiling, Vaccination, & Recordkeeping – For these management practices, an influential factor was the importance of choosing management practices to reduce labor. The probability of stockpiling introduced forages was influenced by both herd size and a desire to reduce labor. As herd size increases, the time required to "hand" feed and replenish hay increases; consequently, implementing a stockpiling system should reduce the need for and cost of labor. The probability of a producer stockpiling introduced forages increases when the importance of choosing practices to reduce labor increases. Regarding calf vaccination, the greater dependency on beef also affected the probability of vaccinating calves. A potential explanatory factor could be directly derived from dependence on beef production for household income. Producers marketing healthy calves could see a greater return, in addition to reducing death loss of calves prior to marketing due to health issues. This could potentially be linked to larger producers, who are more apt to retain calves through the stocker stage. Then, the associated labor involved with pulling and treating sick calves would be reduced substantially by vaccinating the calf crop.

The probability of a producer using a computerized method of recordkeeping was positively related to both herd size and the importance of reducing labor. As herd size increases, a producer is more likely to use a computerized recordkeeping method. As the importance of choosing management practices to reduce labor increases, the probability of using computerized record-keeping method also increases. With a larger herd, the use of a computerized record-keeping method, while technologically intimidating to some, provides vast benefits in the area of reducing labor. Financial analysis can be generated at the 'click' of a mouse, and tax

summaries can be created with ease, whereas a box or ledger system requires countless hours of hand-calculation and analysis, and results could potentially fall victim to human error.

Table VI-4. Factors Affecting Adoption, Logit Results

Dependent Variable	Significant Independent Variables	Coefficient	Odds Ratio	Likelihood Ratio
Implant (0=Nearly Always, 1=Rarely)	Percent Income from Cow/Calf Operation	0.4103*** (24.71)	1.51	25.37***
Length of Hay Feeding Season (0= <60 Days, 1= >61 Days)	Herd Size(Cow)	0.0019** (7.42)	1.00	11.85**
	Education	.646* (4.22)	1.91	
Soil Test (0=Annually or Biannually, 1=Rarely)	Age	0.225** (4.44)	1.25	14.06***
	Reduce Labor	0.355*** (8.79)	0.70	
Forage Test (Produced Forage) (0=Nearly Always, 1=Rarely)	Percent Income from Cow/Calf Operation	.334*** (11.52)	1.40	15.72***
	Education	0.507** (4.21)	1.66	
Forage Test (Purchased Forage) (0=Nearly Always, 1=Rarely)	Herd Size(Cow)	.0018** (4.57)	1.00	12.81**
	Generate Farm Income	.167* (4.13)	.85	
Stockpile Grasses Winter Grazing (0=Nearly Always, 1=Rarely)	Reduce Labor	.36*** (11.23)	0.70	11.97***
Stockpile Introduced Forages (0=Nearly Always, 1=Rarely)	Herd Size(Cow)	.0042** (6.48)	1.00	20.6***
	Reduce Labor	0.29** (8.99)	0.75	
Calf Vaccination (0=Vac prior to Mkt, 1=Do not Vac)	Percent Income from Cow/Calf Operation	.258*** (8.08)	1.29	10.27***
	Reduce Labor	0.18** (5.46)	0.84	
Individual Cow Identification (0=Individually ID, 1=Do not Indiv. ID)	Reduce Labor	.272*** (6.98)	0.76	6.15**
Individual Calf Identification (0=Individually ID, 1=Do not Indiv. ID)	Reduce Labor	.188** (5.83)	0.83	5.58**

*Significance levels where α=0.1
**Significance levels where α=0.05
***Significance levels where α=0.01

Table VI-5. Factors Affecting Adoption, Logit Results

Dependent Variable	Significant Independent Variables	Coefficient	Odds Ratio	Likelihood Ratio
Long Term Plan (0=Do, 1=Do Not)	Percent Income from Cow/Calf Operation	0.323*** (16.83)	1.38	33.37***
	Age	-.352*** (18.38)	0.70	
Recordkeeping Method (0=Computer used, 1=By hand only)	Herd Size(Cow)	.002** (6.44)	1.00	16.07***
	Reduce Labor	0.19** (5.4)	0.82	
Cash Flow (0=Do, 1=Do Not)	Percent Income from Cow/Calf Operation	0.407*** (19.09)	1.50	50.54***
	Age	-0.245*** (7.4)	0.78	
	Reduce Labor	.356*** (16.77)	0.70	
Breeding Season (0=defined season, 1=bull w/ cows yr. round)	Percent Income from Cow/Calf Operation	.247*** (9.71)	1.28	
	Age	-0.22*** (7.2)	0.80	
Pregnancy Exam (Mature Cows) (0=Nearly Always, 1=Rarely)	Percent Income from Cow/Calf Operation	0.321*** (9.71)	1.38	51.81***
	Age	-.432*** (17.48)	0.65	
	Education	.678*** (8.01)	1.97	
	Generate Farm Income	.211*** (7.56)	0.81	
Pregnancy Exam (Replacement Heifers) (0=Nearly Always, 1=Rarely)	Percent Income from Cow/Calf Operation	0.504*** (29.27)	1.66	54.38***
	Age	-.293*** (10.08)	0.75	
	Reduce Labor	272*** (8.11)	0.76	
Bull Soundness Exam (<2 years old) (0=Nearly Always, 1=Rarely)	Herd Size (Cow)	.006** (8.1)	1.01	55.11***
	Percent Income from Cow/Calf Operation	.313** (7.17)	1.37	
	Reduce Labor	.302*** (11.19)	0.74	

*Significance levels where α=0.1
**Significance levels where α=0.05
***Significance levels where α=0.01

Summary and Interpretations

Consistency exists throughout all the management practices evaluated, as the relationship between the independent variables and associated dependent variables follow the same pattern. With an increase in age the probability to implement several management practices declines (e.g., cash flow, pregnancy examination on replacement heifers, pregnancy examination on mature cows, controlling breeding season, long term plan). Likewise, as the dependency upon beef production increases, so does the probability of a producer using the management practice (e.g., implants, forage test on produced forages, calf vaccination, long term planning, cash flow planning, breeding season control, pregnancy examination on replacement heifers, pregnancy examination on mature cows, bull breeding soundness examination). The goal or importance of reducing labor is significant in over half the practices selected (e.g., soil test, stockpile grasses, stockpile introduced forages, calf vaccination, cow identification, calf identification, recordkeeping, cash flow, pregnancy exam replacement heifers, bull soundness exam). This suggests an emphasis for research and educational programs.

With increasing herd size, the probability of adopting a given management practice increases (e.g., hay feeding season, forage testing of purchased forages, stockpile introduced forages, recordkeeping, bull soundness exam). This result is similar to that found by Grisham and Gillespie when they examined adoption among Louisiana dairy industry. With an increase in number of milking cows, dairy producers' likelihood of using computerized technology for recordkeeping purposes also increases.

The age variable had a negative impact on the probability of a producer's to implementing specific management practices. In research evaluating producers' likelihood of adopting rotational grazing in Louisiana, older farmers were less likely to adopt the best management practices defined by the authors(Kim, Gillespie and Paudel 2004). This result is similar to the interpretation presented here. The age of producers affects not only financial analysis and planning practices, but also reproduction management practices.

Reducing farm labor is an area of significant interest. Producers with higher off-farm income are more likely to adopt farm technologies that economize on management time than those that are time intensive (Fernandez-Cornejo et al. 2002). Among producers in this study, with the importance of reducing labor increasing, they are more likely to adopt several management practices (e.g. soil test, stockpile grasses, stockpile introduced forages, calf vaccination, cow and calf identification, computerized record keeping, cash flow planning, pregnancy examinations on replacement heifers, and bull breeding soundness evaluation).

Overall, results found from the logit analysis are consistent, not only among the different management practices, but also in relationship to previous studies. The interpretations of the significant influential variables are conclusive with the hypothesized outcome, which is a combination of several theories. As dependency on income increases, a producer would, in theory, want to maximize profits, and therefore would be more likely to implement recommended practices to increase profitability. Likewise, as a producer's age increases, incorporating new technologies might involve additional labor as well as additional risk of the unknown outcome. A

producer who sees reducing labor as very important is likely a profit maximizer, therefore implementing recommended practices to increases profits. Producers with larger herds, are likely more dependent upon beef production, and are likely not 'hobby' producers. For this reason, producers' with a larger herd are therefore more likely to implement recommended practices.

CHAPTER VII

IMPLICATIONS AND CONCLUSIONS

Most land grant institutions have one or more faculty with interest in beef production economics and marketing. Similarly, most state extension services offer a variety of timely beef educational programs addressing both production and economic issues and decisions. In recent years, several states (Alabama, Georgia, Kentucky, Louisiana, Oklahoma, and Tennessee) have initiated "master cattleman" or similarly named educational programs for producers to provide in-depth training in multidisciplinary areas. Typically, producers are required to complete 20 or more hours of coursework covering an array of topics.

Understanding more about the relationship between adoption of different sets of production and management practices and about adoption rates relative to farm size, and importance of off-farm work relative to income from the beef cattle operation suggests ways that educational information could be better packaged or targeted. Analyses reported here showed a clear difference in an array of management practices spanning several aspects of cow-calf production between two groups of producers in Oklahoma. Group 1 was smaller cowherd owners who are less dependent on cow-calf production as a source of household income. Group 2 consisted of larger cowherd owners who are more dependent on cow-calf production as a source of household income. Management areas examined included nutrition

and management, forages and introduced pasture, quality assurance and animal health, marketing and risk management, reproduction, and genetics. Significant differences were found between the two groups on numerous management practices.

The explanation of the demographics related to producers' likelihood of practicing a recommended management practice assists educators in identifying who is or is not implementing a practice. Dependency on beef production, age, and a goal to reduce labor are only a few of the variables which help define and answer this question. Therefore this research provides a clearer understanding of those producers who could be targeted for improvement.

Clearly, as an educator preparing materials for and speaking to a group of producers consisting of some producers from Group 1 and some from Group 2, the educational needs differ. For instance, material that should be emphasized for small producers with limited dependence on the beef enterprise might focus on why large producers have adopted technology such as implants and established calving periods. Different topics would likely be of more interest to larger producers who receive a higher proportion of their household income from beef. Knowing the audience better should increase teaching effectiveness and enhance learning for the producer. It may also suggest more programs should be targeted to specific groups wherever possible or that interaction among the groups be a planned component of the educational program to allow participants to learn from the experiences of each other and to better understand the industry as a whole.

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APPENDIXES

APPENDIX A – RESPONSES FROM ALL SURVEYS

Table VII-1. Question 1 – Nutrition and Management Section[1]

1. For cattle grazing spring and summer pasture, do you provide:

	1	2	3	4	5	6	7
a. A commercial mineral[2]	374	64	29	28	15	8	27
	(68.62)	(11.74)	(5.32)	(5.14)	(2.75)	(1.47)	(4.95)
b. White salt[2]	170	39	29	35	17	38	115
	(38.37)	(8.80)	(6.55)	(7.90)	(3.84)	(8.58)	(25.96)
c. Both white salt & a commercial mineral[2]	268	61	41	36	23	23	119
	(46.94)	(10.68)	(7.18)	(6.30)	(4.03)	(4.03)	(20.84)
d. No salt or mineral supplement[2]	15	2	9	12	8	21	300
	(4.09)	(0.54)	(2.45)	(3.27)	(2.18)	(5.72)	(81.74)

[1]top number=frequency, and bottom number=percentage distribution

[2] measured on a likert scale, 1-7, where 1=nearly always, 7=rarely if ever

Table VII-2. Question 2-Nutrition and Management Section[1]

2. How do you determine how much and what type of supplement to feed during winter?[2]

	1	2	3	4	5	6	7
a. Consult veterinarian							
	28	27	22	42	38	51	208
	(6.73)	(6.49)	(5.29)	(10.10)	(9.13)	(12.26)	(50.00)
b. Consult feed company representative							
	80	41	51	72	36	44	124
	(17.86)	(9.15)	(11.38)	(16.07)	(8.04)	(9.82)	(27.68)
c. Consult Extension educator							
	51	41	50	65	43	39	142
	(11.83)	(9.51)	(11.60)	(15.08)	(9.98)	(9.05)	(32.95)
d. Use a supplement that has worked well in the past							
	266	135	82	58	6	6	7
	(47.50)	(24.11)	(14.64)	(10.36)	(1.07)	(1.07)	(1.25)
e. Use forage tests & estimated animal requirements to calculate							
	97	58	53	36	27	44	175
	(19.80)	(11.84)	(10.82)	(7.35)	(5.51)	(8.98)	(35.71)
f. Use OSU CowCulator or OSU Auto NRC to design a supplementation or feeding plan							
	29	24	15	22	14	38	275
	(6.95)	(5.76)	(3.60)	(5.28)	(3.36)	(9.11)	(65.95)

[1] top number=frequency, and bottom number=percentage distribution
[2] measured on a likert scale, 1-7, where 1=nearly always, 7=rarely if ever

Table VII-3. Questions 3-7 Nutrition and Management Section[1]

	1	2	3	4	5	6	7
3. Are bull calves that are not intended for breeding purposes castrated prior to weaning?[2]							
	391	72	49	57	16	21	91
	(56.10)	(10.33)	(7.03)	(8.18)	(2.30)	(3.01)	(13.06)
4. Do you implant steer calves prior to weaning?[2]							
	130	40	31	37	18	29	418
	(18.49)	(5.69)	(4.41)	(5.26)	(2.56)	(4.13)	(59.46)
5. Do you implant heifer calves not intended for replacements prior to weaning?[2]							
	87	26	24	25	15	29	489
	(12.52)	(3.74)	(3.45)	(3.60)	(2.16)	(4.17)	(70.36)
6. Do you implant heifer calves that are intended for replacements prior to weaning?[2]							
	38	20	19	14	10	27	559
	(5.53)	(2.91)	(2.77)	(2.04)	(1.46)	(3.63)	(81.37)

7. Calves with horns are [3]

1	2	3	4
229	367	47	69
(32.16)	(51.54)	(6.60)	(9.69)

[1] top number=frequency, and bottom number=percentage distribution

[2] measured on a likert scale, 1-7, where 1=nearly always, 7=rarely if ever

[3] where 1=Not applicable to my operation, 2=Dehorned, 3=Tipped, 4=Neither

Table VII-4. Questions 8-12 Forages and Introduced Pasture[1]

8. Your typical hay-feeding season is:

< 30days	31-60 days	61-90 days	91-120 days	>121 days
25	49	157	323	167
(3.47)	(6.80)	(21.78)	(44.80)	(23.16)

9. If you raise introduced pasture, how frequently do you use a soil test?[2]

1	2	3	4	5	6
66	92	247	186	73	44
(9.32)	(12.99)	(34.89)	(26.27)	(10.31)	(6.21)

10. Do you know how to set and monitor a proper stocking rate?

Yes	No	Not Sure
274	165	264
(38.98)	(23.47)	(37.55)

11. How often do you use forage test to determine the nutritive value of the hay or silage you produce?[3]

1	2	3	4	5	6	7
89	50	78	73	45	72	302
(12.55)	(7.05)	(11.00)	(10.30)	(6.35)	(10.16)	(42.60)

12. How often do you use forage test to determine the nutritive value of the hay or silage you purchase?[3]

1	2	3	4	5	6	7
59	43	48	48	30	59	398
(8.61)	(6.28)	(7.01)	(7.01)	(4.38)	(8.61)	(58.10)

[1] top number=frequency, and bottom number=percentage distribution.

[2] where 1=Annually, 2=Every other year, 3=Once every 3-4 yrs, 4=Rarely, 5=Never, 6=N/A.

[3] measured on a likert scale, 1-7, where 1=nearly always, 7=rarely if ever.

Table VII-5. Questions 13-14A Forages and Introduced Pasture[1]

13. Do you have land in native vegetation?

Yes	No
519	175
(74.78)	(25.22)

13A. If yes in 13, do you stockpile forage grasses for fall and winter grazing?[2]

1	2	3	4	5	6	7
183	65	76	53	32	27	103
(33.95)	(12.06)	(14.10)	(9.83)	(5.94)	(5.01)	(19.11)

14. Do you have land in introduced forages?

Yes	No
486	135
(78.26)	(21.74)

14A. Do you stockpile fescue or bermudagrass for fall or winter grazing?[2]

1	2	3	4	5	6	7
172	78	77	66	30	39	127
(29.20)	(13.24)	(13.07)	(11.21)	(5.09)	(6.62)	(21.56)

[1] top number=frequency, and bottom number=percentage distribution.
[2] measured on a likert scale, 1-7, where 1=nearly always, 7=rarely if ever.

Table VII-6. Questions 15-17 Quality Assurance and Animal Health

15. Which of the following steps do you use to control ticks to reduce beef cattle weight loss?[2]

	1	2	3	4	5	6	7
a. Pesticide (tags, spray, pour-on)							
	445	109	56	35	11	4	42
	(63.39)	(15.53)	(7.98)	(4.99)	(1.57)	(0.57)	(5.98)
b. Pasture rotation							
	1	2	3	4	5	6	7
	132	51	55	67	35	40	170
	(24.00)	(9.27)	(10.00)	(12.18)	(6.36)	(7.27)	(30.91)
c. Prescribed fire							
	1	2	3	4	5	6	7
	42	33	31	38	34	44	314
	(7.84)	(6.16)	(5.78)	(7.09)	(6.34)	(8.21)	(58.58)

16. When do you deworm nursing calves?[3]

1	2	3	4
125	182	111	286
(17.76)	(25.85)	(15.77)	(40.63)

17. When do you vaccinate you calves for IBR, BVD,BRSV and PI3 prior to marketing them?[4]

1	2	3	4	5	6
206	90	149	36	137	85
(29.30)	(12.80)	(21.19)	(5.12)	(19.49)	(12.09)

[1] top number=frequency, and bottom number=percentage distribution.

[2] measured on a likert scale, 1-7, where 1=nearly always, 7=rarely if ever.

[3] where 1=Do not deworm calves, 2=60-120 days of age, 3=Mid-summer, 4=At weaning.

[4] where 1=Do not vaccinate prior to marketing, 2=Single vaccination 2-6 wks prior to weaning, 3=Single vaccination at weaning, 4=Single vaccination 2-3 wks after weaning, 5=Multiple vaccination at 2-6 wks prior to weaning & at weaning, 6=Multiple vaccination at weaning & at 2-3 wks after weaning.

Table VII-7. Questions 18-19a Quality Assurance and Animal Health[1]

18. Have you ever collected carcass data from your finished calves?

Yes	No
60	642
(8.55)	(91.45)

18A. If yes to question 18:

a. Average Yield Grade

<2	2-2.5	2.6-3.0	3.1-3.5	>3.5
4	23	21	7	3
(6.90)	(39.66)	(36.21)	(12.07)	(5.17)

b. Percent grading choice or higher

<50	51-60	61-70	71-80	>80
10	16	13	13	10
(16.13)	(25.81)	(20.97)	(20.97)	(16.13)

c. Average carcass weight (lbs)

<650	651-750	751-850	851-950	>950
5	14	32	12	3
(7.58)	(21.21)	(48.48)	(18.18)	(4.55)

19. How do you individually identify cows?[2]

1	2	3	4	5	6
65	586	104	3	34	298
(5.96)	(53.71)	(9.52)	(0.27)	(3.11)	(27.21)

19A. Location of hot brand?

Rib	Hip	Shoulder
16	282	26
(4.94)	(87.04)	(8.02)

[1]top number=frequency, and bottom number=percentage distribution.

[2] where 1=None, 2=Visible ear tags, 3=Tattoos, 4=Electronic ID, 5=Freeze brand, 6=Hot Brand.

Table VII-8. Questions 20-21 Quality Assurance and Animal Health [1]

20. How do you individually identify calves?[2]

1	2	3	4	5	6
155	497	72	4	14	156
(17.26)	(55.35)	(8.02)	(0.45)	(1.56)	(17.37)

20A. Location of hot brand?

Rib	Hip	Shoulder
8	145	16
(4.73)	(85.80)	(9.47)

21. Where do you administer injections?[3]

a. Neck

1	2	3	4	5	6	7
490	83	41	29	8	8	22
(71.95)	(12.19)	(6.02)	(4.26)	(1.17)	(1.17)	(3.23)

b. Rump

1	2	3	4	5	6	7
38	37	43	61	30	59	205
(8.03)	(7.82)	(9.09)	(12.90)	(6.34)	(12.47)	(43.34)

c. Hip or back leg

1	2	3	4	5	6	7
33	23	27	42	45	69	221
(7.17)	(5.00)	(5.87)	(9.13)	(9.78)	(15.00)	(48.04)

[1] top number=frequency, and bottom number=percentage distribution.
[2] where 1=None, 2=Visible ear tags, 3=Tattoos, 4=Electronic ID, 5=Freeze brand, 6=Hot Brand.
[3] measured on a likert scale, 1-7, where 1=nearly always, 7=rarely if ever.

Table VII-9. Questions 22-23 Quality Assurance and Animal Health

22. What is the average body condition score of your first calf cows at calving?[2]

1	2	3	4	5	6	7	8	9
3	8	16	39	233	226	155	18	1
(0.43)	(1.14)	(2.29)	(5.58)	(33.33)	(32.33)	(22.17)	(2.58)	(0.14)

23. The body condition of cows culled from your herd is:[2]

1	2	3	4	5	6	7	8	9
15	35	115	135	191	92	75	22	7
(2.18)	(5.09)	(16.74)	(19.65)	(27.80)	(13.39)	(10.92)	(3.20)	(1.02)

[1]top number=frequency, and bottom number=percentage distribution.

[2] measured on a scale of 1-9, where 1=Extremely Thin, 9=Obese.

Table VII-10.Question 24-25 Marketing and Risk Management

24. What percent of your annual calf crop do you sell as preconditioned calves?[2]

1	2	3	4
48	82	50	217
(12.09)	(20.65)	(12.59)	(54.66)

25. Which of the following practices do you include as part of preconditioning?[3]

	1	2	3	4	5	6	7
a. Weaned at least 45 days prior to marketing							
	207	56	35	15	14	12	44
	(54.05)	(14.62)	(9.14)	(3.92)	(3.66)	(3.13)	(11.49)
b. Two rounds of respiratory vaccinations							
	136	40	34	29	22	36	67
	(37.36)	(10.99)	(9.34)	(7.97)	(6.04)	(9.89)	(18.41)
c. Treatment for internal and external parasites							
	250	59	26	13	7	8	14
	(66.31)	(15.65)	(6.90)	(3.45)	(1.86)	(2.12)	(3.71)
d. Castration (healed prior to marketing)							
	274	42	12	12	4	11	19
	(72.68)	(11.94)	(3.18)	(3.18)	(1.06)	(2.92)	(5.04)
e. Dehorning							
	208	36	16	17	3	9	52
	(61.00)	(10.56)	(4.69)	(4.99)	(0.88)	(2.64)	(15.25)
f. Familiar with feed bunks							
	259	36	25	26	6	9	23
	(67.45)	(9.38)	(6.51)	(6.77)	(1.56)	(2.34)	(5.99)

[1]top number=frequency, and bottom number=percentage distribution.

[2] where 1=1-25%, 2=26-50%, 3=51-75%, 4=76%+

[3] measured on a likert scale, 1-7, where 1=nearly always, 7=rarely if ever.

Table VII-11. Question 26-27 Marketing and Risk Management[1]

26. How many days prior to marketing are calves that are not preconditioned typically weaned?[2]

1	2	3	4
321	78	96	124
(51.86)	(12.60)	(15.51)	(20.03)

27. What percent of your male calves are[3]:

	1	2	3	4
a.Sold as stocker/feeder steers or bulls				
	36	55	21	478
	(6.10)	(9.32)	(3.56)	(81.02)
b. Retained as stocker/feeder steers or bulls				
	54	45	14	53
	(32.53)	(27.11)	(8.43)	(31.93)
c. Retained for your own use as breeding animals				
uncorrected	124	13	1	2
	(88.57)	(9.29)	(0.71)	(1.43)
d. Retained for sale as breeding animals				
	69	23	8	18
	(58.47)	(19.49)	(6.78)	(15.25)

[1] top number=frequency, and bottom number=percentage distribution.
[2] where 1=Less than 7, 2=7-20, 3=21-45, 4=More than 45
[3] where 1=1-25%, 2=26-50%, 3=51-75%, 4=76%+

Table VII-12. Question 28-29 Marketing and Risk Management[1]

28. What percent of your female calves are[2]:

	1	2	3	4
a.Sold as stocker/feeder cattle				
	92	92	85	263
	(17.29)	(17.29)	(15.98)	(49.44)
b. Retained as stocker/feeder cattle				
	57	35	16	26
	(42.54)	(26.12)	(11.94)	(19.40)
c. Retained for your own use as breeding animals				
	266	125	33	76
	(53.20)	(25.00)	(6.60)	(15.20)
d. Retained for sale as breeding animals				
	82	44	8	18
	(53.95)	(28.95)	(5.26)	(11.84)

29. Do you belong to a cattle cooperative, alliance, or similar marketing program?

1-Yes	2-No
39	655
(5.62)	(94.38)

29A. What percent of your annual calf crop is marketed as part of a cooperative, alliance, or similar marketing program?[2]

1	2	3	4
21	5	4	9
(52.85)	(12.82)	(10.26)	(23.08)

[1]top number=frequency, and bottom number=percentage distribution.

[2] where 1=1-25%, 2=26-50%, 3=51-75%, 4=76%+

[3] where 1=Less than 7, 2=7-20, 3=21-45, 4=More than 45

Table VII-13. Questions 30-32 Marketing and Risk Management[1]

30. Which of the following best describes the way you typically market the majority of your calves?[2]

1	2	3
34	128	524
(4.96)	(18.66)	(76.38)

31. Which of the following best describes the way you typically market the majority of your calves?[3]

1	2	3
305	319	89
(42.78)	(44.74)	(12.48)

32. Which of the following best describes the way you typically market the majority of your calves?[4]

1	2
306	392
(43.84)	(56.16)

[1] top number=frequency, and bottom number=percentage distribution.

[2] where 1=Regularly through the year (monthly), 2=Sporadically through the year, 3=Seasonally (1-3 times/year)

[3] where 1=Small lots, 2=Medium lots, 3=Truckload lots

[4] where 1=Mixed lots, 2=Uniform lots

Table VII-14. Question 33 a-e (males) Marketing and Risk Management[1]

33 (males). What percent of your annual male calf crop is marketed or retained among the following alternatives?

Sold through a local or regional livestock market (within 50 miles from ranch)

	1	2	3	4
a. Regular (weekly) sales[2]				
	42	39	12	358
	(9.31)	(8.65)	(2.66)	(79.38)
b. Special sales (e.g. preconditioned, breeding)[2]				
	15	8	1	15
	(38.46)	(20.51)	(2.56)	(38.46)

Sold through regional livestock market (more than 50 miles from ranch)

	1	2	3	4
c. Regular (weekly) sales[2]				
	16	18	8	78
	(13.33)	(15.00)	(6.67)	(65.00)
d. Special sales (e.g. preconditioned, breeding)[2]				
	11	9	1	13
	(32.35)	(26.47)	(2.94)	(38.24)
e. Sold through a video/satellite auction[2]				
	3	2	0	1
	(50.00)	(33.33)	(0.00)	(16.67)

[1] top number=frequency, and bottom number=percentage distribution.

[2] where 1=1-25%, 2=26-50%, 3=51-75%, 4=76%+

Table VII-15. Question 33 f-l (males) Marketing and Risk Management[1]

33 (males). What percent of your annual male calf crop is marketed or retained among the following alternatives?

Sold direct from ranch

	1	2	3	4
f. To a stocker operator[2]	26 (44.83)	13 (22.41)	2 (3.45)	17 (29.31)
g. To a feedlot[2]	7 (33.33)	6 (28.57)	0 (0.00)	8 (38.10)

Retained only through stocker stage

	1	2	3	4
h. On my ranch[2]	14 (28.57)	11 (22.45)	2 (4.08)	22 (44.90)
i. As a custom stocker (e.g. background lot or wheat pasture)[2]	1 (10.00)	4 (40.00)	1 (10.00)	4 (40.00)

Retained through stocker and feedlot stages

	1	2	3	4
j. Stockered on my ranch, then custom feedlot[2]	5 (38.46)	5 (38.46)	0 (0.00)	3 (23.08)
k. Custom stocker, then custom feedlot[2]	3 (60.00)	0 (0.00)	0 (0.00)	2 (40.00)
l. Other[2]	22 (52.38)	6 (14.29)	2 (4.76)	12 (28.57)

[1]top number=frequency, and bottom number=percentage distribution.

[2] where 1=1-25%, 2=26-50%, 3=51-75%, 4=76%+

Table VII-16. Question 33 a-e (females) Marketing and Risk Management[1]

33 (females). What percent of your annual female calf crop is marketed or retained among the following alternatives?

Sold through a local or regional livestock market (within 50 miles from ranch)

	1	2	3	4
a. Regular (weekly) sales[2]				
	223	34	15	309
	(38.38)	(5.85)	(2.58)	(53.18)
b. Special sales (e.g. preconditioned, breeding)[2]				
	553	9	2	17
	(95.18)	(1.55)	(0.34)	(2.93)

Sold through regional livestock market (more than 50 miles from ranch)

	1	2	3	4
c. Regular (weekly) sales[2]				
	492	17	6	66
	(84.68)	(2.98)	(1.03)	(11.36)
d. Special sales (e.g. preconditioned, breeding)[2]				
	561	8	1	11
	(96.56)	(1.38)	(0.17)	(1.89)
e. Sold through a video/satellite auction[2]				
	579	1	0	1
	(99.66)	(0.17)	(0.00)	(0.17)

[1] top number=frequency, and bottom number=percentage distribution.

[2] where 1=0-25%, 2=26-50%, 3=51-75%, 4=76%+

Table VII-17. Question 33 f-l (females) Marketing and Risk Management[1]

33 (females). What percent of your annual female calf crop is marketed or retained among the following alternatives?

Sold direct from ranch

	1	2	3	4
f. To a stocker operator[2]				
	552	8	4	17
	(95.01)	(1.38)	(0.69)	(2.93)
g. To a feedlot[2]				
	573	1	2	5
	(98.62)	(0.17)	(0.34)	(0.86)

Retained only through stocker stage

	1	2	3	4
h. On my ranch[2]				
	541	12	3	25
	(93.12)	(2.07)	(0.52)	(4.30)
i. As a custom stocker (e.g. background lot or wheat pasture)[2]				
	571	3	2	5
	(98.28)	(0.52)	(0.34)	(0.86)

Retained through stocker and feedlot stages

	1	2	3	4
j. Stockered on my ranch, then custom feedlot[2]				
	574	3	0	4
	(98.80)	(0.52)	(0.00)	(0.69)
k. Custom stocker, then custom feedlot[2]				
	581	0	0	0
	(100.00)	(0.00)	(0.00)	(0.00)
l. Other[2]				
	529	14	11	27
	(91.05)	(2.41)	(1.89)	(4.65)

[1] top number=frequency, and bottom number=percentage distribution.

[2] where 1=0-25%, 2=26-50%, 3=51-75%, 4=76%+

Table VII-18. Question 34 Marketing and Risk Management[1]

34. Indicate the use you make of tools to manage the risk of market price fluctuations?[2]

	1	2	3	4	5	6	7
a. Locking in expected fixed prices with feeder cattle futures contracts							
	13	12	27	18	10	36	557
	(1.93)	(1.78)	(4.01)	(2.67)	(1.49)	(5.35)	(82.76)
b. Locking in expected minimum prices with feeder cattle options contracts							
	11	11	15	22	13	31	562
	(1.65)	(1.65)	(2.26)	(3.31)	(1.95)	(4.66)	(84.51)
c. Forward priced with cash contracts (direct ranch sales or video auction for later delivery)							
	22	11	15	19	14	29	560
	(3.28)	(1.64)	(2.24)	(2.84)	(2.09)	(4.33)	(83.58)

[1] top number=frequency, and bottom number=percentage distribution.

[2] measured on a likert scale, 1-7, where 1=nearly always, 7=rarely if ever.

Table VII-19. Questions 35-38 Business Planning & Management[1]

35. Do you have a long term (5 years or more) business plan for your farm?

Yes	No
390	291
(57.27)	(42.73)

35A. If yes in 35, is it a written plan?

Yes	No
229	83
(73.40)	(26.60)

36. Do you have a short term (1-2 year) operational plan?

Yes	No
236	433
(35.28)	(64.72)

36A. If yes in 36, is it a written plan?

Yes	No
358	86
(80.63)	(19.37)

37. How frequently are receipt & expense data typically entered into farm record system?[2]

1	2	3	4	5	6
45	123	230	62	175	59
(6.47)	(17.67)	(33.05)	(8.91)	(25.14)	(8.48)

38. Which of the following best describes your financial record system?[3]

1	2	3	4	5	6	7
244	181	143	36	13	59	14
(35.11)	(26.04)	(20.58)	(5.18)	(1.87)	(8.49)	(2.01)

[1] top number=frequency, and bottom number=percentage distribution.

[2] where 1=Daily, 2=Weekly, 3=Monthly, 4=Semi-annually, 5=Annually, 6=Rarely/Never.

[3] where 1=box, 2=ledger, 3=Quicken, 4=QuickBooks, 5=Farm Accouting pkg, 6=Custome Spreadsheet, 7=Other.

Table VII-20. Question 39-Business Planning & Management[1]

39. What kind of financial planning or assessment of your operation do you conduct?:

	More than once per year 1	Annually 2	Every 2-3 years 3	Rarely, if ever 4
a. Summary for tax planning or reporting				
	150	433	10	71
	(22.59)	(65.21)	(1.51)	(10.69)
b. Balance Sheet				
	117	253	20	214
	(19.37)	(41.89)	(3.31)	(35.43)
c. Cash flow plan or budget for operation				
	121	213	29	243
	(19.97)	(35.15)	(4.79)	(40.10)
d. Income Statement				
	113	321	15	161
	(18.52)	(52.62)	(2.46)	(26.39)
e. Budgets projections for individual enterprises within the operation				
	109	185	23	288
	(18.02)	(30.58)	(3.80)	(47.60)
f. Historical analysis such as Standaradized Performance Analysis				
	31	86	32	433
	(5.33)	(14.78)	(5.50)	(74.40)

[1]top number=frequency, and bottom number=percentage distribution.

Table VII-21. Question 40-Business Planning & Management Section[1]

40. Do you record & keep information on:

	1	2	3	4	5	6	7
a.Vaccination[2]							
	362	75	49	50	21	18	132
	(51.20)	(10.61)	(6.93)	(7.07)	(2.97)	(2.55)	(18.67)
b. Medical treatments[2]							
	310	77	52	60	31	27	130
	(45.12)	(11.21)	(7.57)	(8.73)	(4.51)	(3.93)	(18.92)
c. Number of offspring[2]							
	475	52	30	37	10	14	78
	(68.25)	(7.47)	(4.31)	(5.32)	(1.44)	(2.01)	(11.21)
d. Weights of offspring[2]							
	195	36	27	52	36	47	279
	(29.02)	(5.36)	(4.02)	(77.40)	(5.36)	(6.99)	(41.52)
e. Birthdates of offspring[2]							
	409	48	29	43	22	24	116
	(59.19)	(6.95)	(4.20)	(6.22)	(3.18)	(3.47)	(16.79)
f. Sire & Dam of animals[2]							
	342	54	30	41	27	28	164
	(49.85)	(7.87)	(4.37)	(5.98)	(3.94)	(4.08)	(32.91)

[1]top number=frequency, and bottom number=percentage distribution.

[2] measured on a likert scale, 1-7, where 1=nearly always, 7=rarely if ever.

Table VII-22. Question 41-42 Reproduction Section[1]

41. How often are Expected Progeny Differences used as a tool in bull selection?[2]

1	2	3	4	5	6	7
257	69	72	60	25	36	173
(37.14)	(9.97)	(10.40)	(8.67)	(3.61)	(5.20)	(25.00)

42. What is your breeding season?

Bulls kept with Cows year round	Fall calving	Spring calving	Spring & Fall
282	58	162	130
(44.62)	(9.18)	(25.63)	(20.57)

42A. If you have a fall breeding season, how long do you leave the bull with cows?

60 days or less	60-90 days	90-120 days
68	135	41
(27.87)	(55.33)	(16.8)

42B. If you have a spring breeding season, how long do you leave the bull with cows?

60 days or less	60-90 days	90-120 days
83	204	91
(21.96)	(53.97)	(27.07)

[1]top number=frequency, and bottom number=percentage distribution.

[2] measured on a likert scale, 1-7, where 1=nearly always, 7=rarely if ever.

Table VII-23. Question 43-44 -Reproduction Section[1]

	1	2	3	4	5	6	7
43A. Pregnancy examinations are performed on owned mature cows?[2]							
	135	44	53	43	49	53	299
	(19.97)	(6.51)	(7.84)	(6.36)	(7.25)	(7.84)	(44.23)
43B. Pregnancy examinations are performed on raised replacement heifers?2							
	203	56	49	35	25	30	261
	(30.80)	(8.50)	(7.44)	(5.31)	(3.79)	(4.55)	(39.61)
43C. Pregnancy examinations are performed on purchased heifers and/or cows?2							
	279	58	24	20	19	29	206
	(43.94)	(9.13)	(3.78)	(3.15)	(2.99)	(4.57)	(32.44)
44A. Breeding soundness evaluations are performed on mature bulls (2 years old & older)?2							
	212	63	46	55	35	34	232
	(31.31)	(9.31)	(6.79)	(8.12)	(5.17)	(5.02)	(34.27)
44B. Breeding soundness evaluations are performed on young bulls (<2 years old)?2							
	275	59	38	32	18	26	199
	(42.50)	(9.12)	(5.87)	(4.95)	(2.78)	(4.02)	(30.76)

[1]top number=frequency, and bottom number=percentage distribution.

[2] measured on a likert scale, 1-7, where 1=nearly always, 7=rarely if ever.

Table VII-24. Question 45 -Reproduction Section[1]

45A. What percentage of Heifers require assistance in calving?[2]

	1	2	3	4
a.Easy pull				
	552	29	2	12
	(92.77)	(4.87)	(0.34)	(2.02)
b. Hard pull				
	581	12	2	0
	(97.65)	(2.02)	(0.34)	(0.00)
c. Ceasarian section				
	595	0	0	0
	(100.00)	(0.00)	(0.00)	(0.00)
d. No assistance				
	25	16	60	494
	(4.20)	(2.69)	(10.08)	(83.03)

45B. What percentage of Cows require assistance in calving?[2]

	1	2	3	4
a.Easy pull				
	610	2	1	10
	(97.91)	(0.32)	(0.16)	(1.61)
b. Hard pull				
	621	2	0	0
	(99.68)	(0.32)	(0.00)	(0.00)
c. Ceasarian section				
	623	0	0	0
	(100.00)	(0.00)	(0.00)	(0.00)
d. No assistance				
	13	2	5	603
	(2.09)	(0.32)	(0.80)	(96.79)

[1]top number=frequency, and bottom number=percentage distribution.

[2] where 1=0-25%, 2=26-50%, 3=51-75%, 4=76%+

Table VII-25. Question 46-48-Genetics Section[1]

46. What is the average purchase price you normally pay for breeding bulls on commercial cows?[2]

1	2	3	4	5
85	406	100	20	
(0.14)	(0.66)	(0.16)	(0.03)	

47. Predominant breed of bulls used in your operation[3]

1	2	3	4	5
357	115	70	30	75
(55.18)	(17.77)	(10.82)	(4.64)	(11.59)

48. Predominant breed of cows used in your operation[4]

1	2	3	4	5
338	78	87	17	139
(51.29)	(11.84)	(13.20)	(2.58)	(21.09)

[1]top number=frequency, and bottom number=percentage distribution.

[2] Where 1=$0-$1000, 2=$1001-$2000, 3=$2001-$3000, 4>$3000

[2] Where 1=Angus, Reg Angus, 2=Charolais, Limousin, 3=Brahman, Brangus, 4=Simmental, Gelbvieh, 5=Hereford, Other

[3] Where 1=Angus, Reg Angus, Angus X Hereford 2=Charolais, Limousin, 3=Brahman, Brangus, 4=Simmental, Gelbvieh, 5=Hereford, Other

Table VII-26. Question 49-50 Genetics Section[1]

49. Where do you obtain most breeding bulls?[2]

	1	2	3	4	5	6	7
a. Raise my own							
	62	20	34	39	28	41	239
	(13.39)	(4.32)	(7.34)	(8.42)	(6.05)	(8.86)	(51.62)
b. Neighbor							
	91	46	37	38	20	18	221
	(19.32)	(9.77)	(7.86)	(8.07)	(4.25)	(3.82)	(46.92)
c. Stockyards							
	12	9	12	18	10	27	332
	(2.86)	(2.14)	(2.86)	(4.29)	(2.38)	(6.43)	(79.05)
d. Bull test station sales							
	45	30	16	23	16	24	285
	(10.25)	(6.83)	(3.64)	(5.24)	(3.64)	(5.47)	(64.92)
e. Purebred breeder sales							
	249	84	37	30	15	21	124
	(44.46)	(15.00)	(6.61)	(5.36)	(2.68)	(3.75)	(22.14)

50. Where do you obtain most replacement heifers?[2]

	1	2	3	4	5	6	7
a. Raise my own							
	400	83	45	31	15	6	49
	(63.59)	(13.20)	(7.15)	(4.93)	(2.38)	(0.95)	(7.79)
b. Purchase from another source with a known history							
	134	78	48	75	28	28	146
	(24.95)	(14.53)	(8.94)	(13.97)	(5.21)	(5.21)	(27.19)
c. Purchase from another source with an unknown history							
	25	14	15	41	14	38	329
	(5.25)	(2.94)	(3.15)	(8.61)	(2.94)	(7.98)	(69.12)

[1]top number=frequency, and bottom number=percentage distribution.

[2] measured on a likert scale, 1-7, where 1=nearly always, 7=rarely if ever.

Table VII-27. Question 51 Genetics Section[1]

51. Describe your commercial breeding program.

a. Raise my own

Yes	No
361	225
(61.60)	(38.40)

b. Rotational Cross

Yes	No
252	258
(49.41)	(50.59)

c. Terminal cross (2 breeds and do not keep heifers)

Yes	No
99	357
(21.71)	(78.29)

d. Use composite bulls

Yes	No
93	362
(20.44)	(79.56)

[1]top number=frequency, and bottom number=percentage distribution.

Table VII-28. Question 52 Genetics Section[1]

52. Rate these trait categories based on their importance relative to your bull selection decisions.[2]

	1	2	3	4	5	6	7
a. Growth							
	420	141	73	36	6	2	5
	(61.49)	(20.64)	(10.69)	(5.27)	(0.88)	(0.29)	(0.73)
b. Reproduction							
	465	115	49	28	9	6	6
	(68.58)	(16.96)	(7.23)	(4.13)	(1.33)	(0.88)	(0.88)
c. Carcass weight							
	199	123	120	117	42	21	31
	(30.47)	(18.84)	(18.38)	(17.92)	(6.43)	(3.22)	(4.75)
d. Marbling							
	138	96	118	128	65	45	59
	(21.26)	(14.79)	(18.18)	(19.72)	(10.02)	(6.93)	(9.09)
e. External Fat							
	106	77	126	162	70	50	58
	(16.33)	(11.86)	(19.41)	(24.96)	(10.79)	(7.70)	(8.94)
f. Muscling							
	246	179	108	74	30	10	16
	(37.10)	(27.00)	(16.29)	(11.16)	(4.52)	(1.51)	(2.41)
g. Weaning weight							
	350	163	94	28	16	10	17
	(51.62)	(24.04)	(13.86)	(4.13)	(2.36)	(1.47)	(2.51)
h. Convenience (polled, disposition)							
	389	134	89	36	13	8	7
	(57.54)	(19.82)	(13.17)	(5.33)	(1.92)	(1.18)	(1.04)
i. Eye appeal or physical appearance							
Producer Group 1	333	178	87	47	16	9	9
	(49.04)	(26.22)	(12.81)	(6.92)	(2.36)	(1.33)	(1.33)

[1]top number=frequency, and bottom number=percentage distribution.

[2] measured on a likert scale, 1-7, where 1=Extremely Important, 7=Extremely Unimportant.

Table VII-29. Question 53 Genetics Section[1]

53. Rate these trait categories based on their importance relative to your replacement female selection decisions.[2]

	1	2	3	4	5	6	7
a. Growth							
	385	151	92	31	7	6	8
	(56.62)	(22.21)	(13.53)	(4.56)	(1.03)	(0.88)	(1.18)
b. Reproduction							
	534	89	25	13	6	1	10
	(78.76)	(13.13)	(3.69)	(1.92)	(0.88)	(0.15)	(1.47)
c. Carcass weight							
	146	101	145	130	42	31	45
	(22.81)	(15.78)	(22.66)	(30.21)	(6.56)	(4.84)	(7.03)
d. Marbling							
	110	81	135	121	74	56	67
	(17.08)	(12.58)	(20.96)	(18.79)	(11.48)	(8.70)	(10.40)
e. External Fat							
	92	103	135	138	76	40	64
	(14.20)	(15.90)	(20.83)	(21.30)	(11.73)	(6.17)	(9.88)
f. Muscling							
	165	157	152	108	34	20	20
	(25.15)	(23.93)	(23.17)	(16.46)	(5.18)	(3.05)	(3.05)
g. Weaning weight							
	308	170	84	55	26	6	17
	(46.25)	(25.53)	(13.61)	(8.26)	(3.90)	(0.90)	(2.55)
h. Convenience (polled, disposition)							
	477	120	46	21	3	5	5
	(70.46)	(17.73)	(6.79)	(3.10)	(0.44)	(0.74)	(0.74)
i. Eye appeal or physical appearance							
	358	167	77	41	13	9	10
	(53.04)	(24.74)	(11.41)	(6.07)	(1.93)	(1.33)	(1.48)

[1]top number=frequency, and bottom number=percentage distribution.

[2] measured on a likert scale, 1-7, where 1=Extremely Important, 7=Extremely Unimportant.

Table VII-30. Question 54-57 Demographics Section[1]

54. Gender of primary operator

Male	Female
626	77
(88.92)	(10.94)

55A. Extent of off-farm work

None	Full-time Off farm job	Part-time Off farm job
282	299	127
(39.77)	(42.17)	(17.91)

55B. Extent of Spouses off-farm work

None	Full-time Off farm job	Part-time Off farm job
159	280	88
(30.17)	(53.13)	(16.70)

56. Primary operator's age:

<29	30-39	40-49	50-59	>60
47	89	151	223	203
(6.59)	(12.48)	(21.18)	(31.28)	(28.47)

57. What is the highest level of education attained by primary operator:2

1	2	3	4	5	6
17	123	205	208	54	108
(2.37)	(17.18)	(28.63)	(29.05)	(7.54)	(15.08)

[1]top number=frequency, and bottom number=percentage distribution.

[2] where: 1=Less than high school graduate, 2=High school graduate, 3=Some college, 4=College graduate, 5=Some post-graduate work, 6=Graduate or professional degree.

Table VII-31. Question 58A-59 and 62 Demographics Section[1]

58A. Number of breeding females in the herd: (Commercial Cow/Calf)

None	1-49	50-99	100-249	250-499	500-999	1000+ head
37	314	141	130	30	8	5
(5.56)	(47.22)	(21.20)	(19.55)	(4.51)	(1.20)	(0.75)

58B. Number of breeding females in the herd: (Purebred Cow/Calf)

None	1-49	50-99	100-249	250-499	500-999	1000+ head
253	202	38	23	6	1	2
(48.19)	(38.48)	(7.24)	(4.38)	(1.14)	(0.19)	(0.38)

59. Number of head of stockers grazed or back-grounded annually

None	1-49	50-99	100-499	500-999	1000+head
292	197	74	92	14	7
(43.20)	(29.14)	(10.95)	(13.61)	(2.07)	(1.04)

62A. How important is generating enough farm income so that off-farm income is not necessary?[2]

1	2	3	4	5	6	7
316	86	95	74	53	28	46
(45.27)	(12.32)	(13.61)	(10.60)	(7.59)	(4.01)	(6.59)

62B. How important is choosing practices to reduce labor use?[2]

1	2	3	4	5	6	7
399	141	82	41	10	9	10
(57.66)	(20.38)	(11.85)	(5.92)	(1.45)	(1.30)	(1.45)

62C. How important is the use of internet for business purposes?[2]

1	2	3	4	5	6	7
143	86	91	120	61	56	130
(20.82)	(12.52)	(13.25)	(17.47)	(8.88)	(8.15)	(18.92)

[1]top number=frequency, and bottom number=percentage distribution.

[2] measured on a likert scale, 1-7, where 1=Very Important, 7=Very Unimportant.

Table VII-32. Questions 63-65 Demographics Section[1]

63. Which of the following best describes your 2003 household net income from all sources?

<$30,000	$30,000-$59,999	$60,000-$89,999	$90,000-$119,999	>$120,000
83	263	176	77	77
(12.28)	(38.91)	(26.04)	(11.39)	(11.39)

64. Approximately what percentage of your 2003 household net income came from your beef cattle operation?

0%	1%-20%	24%-40%	41%-60%	61%-80%	81%-100%
92	305	131	76	48	41
(13.28)	(44.01)	(18.90)	(10.97)	(6.93)	(5.92)

65. Race of Primary Operator:[2]

1	2	3	4	5	6	7
628	9	43	0	1	15	
(90.23)	(1.29)	(6.18)	(0.00)	(0.14)	(2.16)	(0.00)

[1] top number=frequency, and bottom number=percentage distribution.

[2] where: 1=White, 2=Black or African American, 3=American Indian or Alaska Native, 4=Native Hawaiian, 5=Asian, 6=More than one race.

APPENDIX B – MASTER CATTLEMAN SURVEY INSTRUMENT

Beef Cattle Management Practices Assessment

Purpose

The purpose of the research is to document current management practices of Oklahoma beef producers in the areas of nutrition, business management and planning, marketing and risk management, forage production, genetics, animal health, and natural resources. OSU has not conducted a statewide assessment of beef management practices in at least 15 years. As cattle and calves are consistently the number one ranked commodity within the state based on value of production and account for approximately 1/3 of the state's agricultural production in most years, current information is needed as a basis for research and education program planning.

Procedures

Producers who participate in Extension meetings or request a copy of the Beef Cattle Manual will be encouraged to complete the assessment. Completing the initial assessment is expected to take 30 minutes. A sample of beef producers drawn by the Oklahoma Agricultural Statistics Service may also be used. If funds are available three years from now, a similar follow-up assessment will be conducted.

Benefits of the study

Benefits that will accrue to participants and other Oklahoma beef producers include redirection of research and educational programs to address best management practices for beef production.

Data storage and use

No identifying information will be recorded on the survey instrument. Computer files with survey data will be developed so that statistical analysis can be conducted. Only statistical measures will be reported; no individual responses will be reported. Data will be stored in password-secure locations fifteen years.

Participation is voluntary and can be discontinued at any time.

For information on subjects' rights, contact Dr. Sue C. Jacobs, IRB Chair, 415 Whitehurst Hall, 405-744-1676 or irb@okstate.edu.

Oklahoma Beef Cattle Project Baseline Assessment

Cow-Calf Producers

Please describe your current beef production and management practices. Your honest feedback will help in planning future educational programs. The survey should take less than 30 minutes to complete. Please do not sign this form. Your information will remain confidential. There are no wrong answers. Some questions have more than one part. Please fill in a bubble for each part of a question.

Completely fill in the bubbles to mark your selection(s) – Example: All beef producers should be (mark only one):

① Healthy ② Wealthy ③ Wise ● All of the preceding

Nutrition and Management	**Nearly Always**						**Rarely, if ever**
1. For cattle grazing spring and summer pasture, do you provide:							
a. A commercial mineral	①	②	③	④	⑤	⑥	⑦
b. White salt	①	②	③	④	⑤	⑥	⑦
c. Both white salt and a commercial mineral	①	②	③	④	⑤	⑥	⑦
d. No salt or mineral supplement	①	②	③	④	⑤	⑥	⑦
2. How do you determine how much and what type of supplement to feed during winter?							
a. Consult veterinarian	①	②	③	④	⑤	⑥	⑦
b. Consult feed company representative	①	②	③	④	⑤	⑥	⑦
c. Consult Extension educator	①	②	③	④	⑤	⑥	⑦
d. Use a supplement that has worked well in the past	①	②	③	④	⑤	⑥	⑦
e. Use forage tests and estimated animal requirements to calculate	①	②	③	④	⑤	⑥	⑦
f. Use OSU CowCulator or OSU Auto NRC to design a supplementation or feeding plan	①	②	③	④	⑤	⑥	⑦
3. Are bull calves that are not intended for breeding purposes castrated prior to weaning?	①	②	③	④	⑤	⑥	⑦

Implants are pellets that are inserted just under the skin on the backside of the ear of growing calves that release extremely low concentrations of various hormones or hormone-like substances.

4. Do you implant steer calves prior to weaning?	①	②	③	④	⑤	⑥	⑦
5. Do you implant heifer calves not intended for replacements prior to weaning?	①	②	③	④	⑤	⑥	⑦
6. Do you implant heifer calves that are intended for replacements prior to weaning?	①	②	③	④	⑤	⑥	⑦

7. Calves with horns are

Not applicable to my operation	Dehorned	Tipped	Neither
①	②	③	④

Forages and Introduced Pasture

8. Your typical hay-feeding season is (mark one):

Less than 30 days	31-60 days	61-90 days	91-120 days	More than 121 days
①	②	③	④	⑤

9. If you raise introduced pasture such as Bermuda grass, fescue or smooth brome, Old World bluestem, or weeping lovegrass, how frequently do you use a soil test?

Annually	Every other year	Once every 3-4 years	Rarely	Never	N/A
①	②	③	④	⑤	⑥

10. Rotational grazing involves utilizing subdivided paddocks of pasture at different times. Continuous grazing involves using the whole pasture at one time. Research and practical experience have shown that the most important component of grazing management is a proper and flexible stocking rate, not which grazing system you use. Do you know how to set and monitor a proper stocking rate?

Yes	No	Not Sure
①	②	③

How often do you (fill in only one bubble per line):	**Nearly Always**						**Rarely, if ever**
11. Forage test to determine nutritive value of the hay or silage you **produce**?	①	②	③	④	⑤	⑥	⑦
12. Forage test to determine nutritive value of hay or silage you **purchase**?	①	②	③	④	⑤	⑥	⑦

Stockpiling forage means deferring grazing in a pasture to accumulate it for grazing when production is slow during the winter months.

13. Do you have land in native vegetation (e.g. prairie, shrubland or forest)? Yes ① ② No

	Nearly Always						**Rarely, if ever**
13A. If yes in 13, do you stockpile forage grasses for fall and winter grazing?	①	②	③	④	⑤	⑥	⑦

14. Do you have land in introduced forages? Yes ① ② No

	Nearly Always						**Rarely, if ever**
14A. Stockpiling fall growth of bermudagrass and tall fescue requires nitrogen fertilization during late summer. Do you stockpile fescue or bermudagrass for fall or winter grazing?	①	②	③	④	⑤	⑥	⑦

Quality Assurance and Animal Health	**Nearly Always**						**Rarely, if ever**
15. Which of the following steps do you use to control ticks to reduce beef cattle weight loss?							
a. Pesticide (tags, spray, pour-on)	①	②	③	④	⑤	⑥	⑦
b. Pasture rotation	①	②	③	④	⑤	⑥	⑦
c. Prescribed fire	①	②	③	④	⑤	⑥	⑦

16. When do you deworm nursing calves?

Do not deworm calves	①	③	Mid-summer (spring calves)
60-120 days of age (branding)	②	④	At weaning

17. When do you vaccinate your calves for IBR, BVD, BRSV and PI3 (respiratory disease complex) prior to marketing them?

Do not vaccinate prior to marketing	①	④	Single vaccination 2-3 weeks after weaning
Single vaccination 2-6 weeks prior to weaning	②	⑤	Multiple vaccination at 2-6 weeks prior to weaning and at weaning
Single vaccination at weaning	③	⑥	Multiple vaccination at weaning and at 2-3 weeks after weaning

18. Have you ever collected carcass data from your finished calves? Yes ① ② No

18A. If yes:

a. Average Yield Grade	< 2	2-2.5	2.6-3.0	3.1-3.5	> 3.5
	①	②	③	④	⑤
b. Percent grading choice or higher	< 50	51-60	61-70	71-80	>80
	①	②	③	④	⑤
c. Average carcass weight (lbs)	< 650	651-750	751-850	851-950	> 950
	①	②	③	④	⑤

19. How do you individually identify cows? Mark all that apply.

None (skip to next question)	①	④	Electronic ID
Visible ear tags	②	⑤	Freeze brand
Tattoos	③	⑥	Hot brand → 19A. Location of the hot brand:

Rib ① Hip ② Shoulder ③

20. How do you individually identify calves? Mark all that apply.

None (skip to next question)	①	④	Electronic ID
Visible ear tags	②	⑤	Freeze brand
Tattoos	③	⑥	Hot brand → 20A. Location of the hot brand:

Rib ① Hip ② Shoulder ③

	Nearly Always						Rarely, if ever
21. Where do you administer injections?							
a. Neck	①	②	③	④	⑤	⑥	⑦
b. Rump	①	②	③	④	⑤	⑥	⑦
c. Hip or back leg	①	②	③	④	⑤	⑥	⑦

	Extremely Thin ←								→ Obese
22. What is the average body condition score of your first calf cows at calving?	①	②	③	④	⑤	⑥	⑦	⑧	⑨
23. The body condition of cows culled from your herd is	①	②	③	④	⑤	⑥	⑦	⑧	⑨

Marketing and Risk Management

24. What percent of your annual calf crop do you sell as preconditioned calves? _____ %

25. Which of the following practices do you include as part of preconditioning as used in the previous question?

	Nearly Always						Rarely, if ever
a. Weaned at least 45 days prior to marketing	①	②	③	④	⑤	⑥	⑦
b. Two rounds of respiratory vaccinations	①	②	③	④	⑤	⑥	⑦
c. Treatment for internal and external parasites	①	②	③	④	⑤	⑥	⑦
d. Castration (healed prior to marketing)	①	②	③	④	⑤	⑥	⑦
e. Dehorning	①	②	③	④	⑤	⑥	⑦
f. Familiar with feed bunks	①	②	③	④	⑤	⑥	⑦

26. How many days prior to marketing are calves that are not preconditioned typically weaned?

Less than 7	7-20	21-45	More than 45
①	②	③	④

27. What percent of your male calves are:

a. Sold as stocker/feeder steers or bulls	_____ %
b. Retained as stocker/feeder steers or bulls	_____ %
c. Retained for your own use as breeding animals	_____ %
d. Retained for sale as breeding animals	_____ %
Total	100 %

28. What percent of your female calves are:

a. Sold as stocker/feeder cattle	_____ %
b. Retained as stocker/feeder cattle	_____ %
c. Retained for your own use as breeding animals	_____ %
d. Retained for sale as breeding animals	_____ %
Total	100 %

29. Do you belong to a cattle cooperative, alliance, or similar marketing program? Yes ① ② No

29A. If yes in 29, what percent of your annual calf crop is marketed as part of a cooperative, alliance, or similar marketing program? _____ %

30. Which of the following best describes the way you typically market the majority of your calves? Mark only **ONE**.

① Regularly throughout the year (e.g. monthly)

② Sporadically throughout the year

③ Seasonally (1-3 times per year)

31. Which of the following best describes the way you typically market the majority of your calves? Mark only **ONE**.

① Small lots (1 to 9 head)

② Medium lots (10-50 head)

③ Truckload lots

32. Which of the following best describes the way you typically market the majority of your calves? Mark only **ONE**.

① Mixed lots (steers and heifers or variable weights/size in the same group)

② Uniform lots (steers or heifers all the same weight/size)

33. What percent of your annual calf crop is marketed or retained among the following alternatives? The sum for each column should total 100.

	Males	**Females**
Sold through a local or regional livestock market (within 50 miles of ranch)		
a. Regular (weekly) sales	_____ %	_____ %
b. Special sales (e.g. preconditioned, breeding)	_____ %	_____ %
Sold through regional livestock markets (more than 50 miles from ranch)		
c. Regular (weekly) sales	_____ %	_____ %
d. Special sales (e.g. preconditioned, breeding)	_____ %	_____ %
e. Sold through a video/satellite auction	_____ %	_____ %
Sold direct from ranch		
f. To a stocker operator	_____ %	_____ %
g. To a feedlot	_____ %	_____ %
Retained only through stocker stage		
h. On my ranch	_____ %	_____ %
i. As a custom stocker (e.g. background lot or wheat pasture)	_____ %	_____ %
Retained through stocker and feedlot stages		
j. Stockered on my ranch, then custom feedlot	_____ %	_____ %
k. Custom stocker, then custom feedlot	_____ %	_____ %
l. Other	_____ %	_____ %
Total	100 %	100%

34. Indicate the use you make of tools to manage the risk of market price fluctuations:

	Nearly Always						**Rarely, if ever**
a. Locking in expected fixed prices with feeder cattle futures contracts	①	②	③	④	⑤	⑥	⑦
b. Locking in expected minimum prices with feeder cattle options contracts	①	②	③	④	⑤	⑥	⑦
c. Forward priced with cash contracts (e.g. direct ranch sales or video auction for later delivery)	①	②	③	④	⑤	⑥	⑦

Business Planning and Management

35. Do you have a long term (5 years or more) business plan for your farm, clearly stating where you want the farm to be? No ① ② Yes → 35A. If yes, is it a written plan? No ① ② Yes

36. Do you have a short term (1 - 2 year) operational plan?
No ① ② Yes → 36A. If yes, is it a written plan? No ① ② Yes

37. How frequently are receipt and expense data typically entered into your farm record system?

Daily	Weekly	Monthly	Semi-annually	Annually	Rarely/Never
①	②	③	④	⑤	⑥

38. Which of the following best describes your financial record system? Mark only one.

① Store receipts and bills in box or file only
② Summarize income and expenses using a notebook or ledger
③ Computerized records using Quicken or other personal financial software
④ Computerized using QuickBooks or other double entry business accounting software
⑤ Computerized using accounting package designed for farms (e.g. Redwing, FarmWorks)
⑥ Computerized using spreadsheet or database of my own design
⑦ Other (please describe): _____

39. What kind of financial planning or assessment of your operation do you conduct?

	More than once per year	Annually	Every 2-3 years	Rarely, if ever
a. Summary for tax planning or reporting	①	②	③	④
b. Balance sheet	①	②	③	④
c. Cash flow plan or budget for whole operation	①	②	③	④
d. Income statement	①	②	③	④
e. Budgets projections for individual enterprises within operation, such as cow/calf, stockers, hay	①	②	③	④
f. Historical analysis for individual enterprises, such as Standardized Performance Analysis (SPA)	①	②	③	④
g. Other (please describe): _____				

	Nearly Always						Rarely, if ever
40. Do you record and keep information on							
a. Vaccinations	①	②	③	④	⑤	⑥	⑦
b. Medical treatments	①	②	③	④	⑤	⑥	⑦
c. Number of offspring	①	②	③	④	⑤	⑥	⑦
d. Weights of offspring	①	②	③	④	⑤	⑥	⑦
e. Birthdates of offspring	①	②	③	④	⑤	⑥	⑦
f. Sire and dam of animals	①	②	③	④	⑤	⑥	⑦

Reproduction	Nearly Always						Rarely, if ever
41. How often are Expected Progeny Differences (EPD) used as a tool in bull selection?	①	②	③	④	⑤	⑥	⑦

42. What is your breeding season? Mark all that apply.

① Bulls kept with cows year-round

② Fall calving

42A. If you have a fall breeding season, how long do you leave the bull with cows? (Include artificial insemination period, if any.)

60 days or less ① 60-90 days ② 90-120 days ③

③ Spring calving

42B. If you have a spring breeding season, how long do you leave the bull with cows? (Include artificial insemination period, if any.)

60 days or less ① 60-90 days ② 90-120 days ③

	Nearly Always						Rarely, if ever
43. Pregnancy examinations are performed on							
a. Owned mature cows	①	②	③	④	⑤	⑥	⑦
b. Raised replacement heifers	①	②	③	④	⑤	⑥	⑦
c. Purchased heifers and/or cows	①	②	③	④	⑤	⑥	⑦
44. Breeding soundness evaluations are performed on							
a. Mature bulls (2 years and older)	①	②	③	④	⑤	⑥	⑦
b. Young bulls (< 2 years old)	①	②	③	④	⑤	⑥	⑦

45. What percentage require assistance in calving?

	Easy pull	Hard pull	Ceasarian section	No assistance	Total
a. Heifers	_____%	_____%	_____%	_____%	100%
b. Cows	_____%	_____%	_____%	_____%	100%

Genetics

46. What is the average purchase price you normally pay for breeding bulls used on commercial cows?

$_____

47. Predominant breed of bulls used in your operation (Mark only one.):

Angus	①	⑥	Brangus
Hereford	②	⑦	Brahman
Charolais	③	⑧	Gelbvieh
Limousin	④	⑨	Red Angus
Simmental	⑤	⓪	Other

48. Predominant breed of cows used in your operation (Mark only one.):

Angus	①	⑦	Brahman
Hereford	②	⑧	Gelbvieh
Charolais	③	⑨	Red Angus
Limousin	④	⓪	Angus X Hereford
Simmental	⑤	Ⓐ	Other
Brangus	⑥		

	Nearly Always						Rarely, if ever
49. Where do you obtain most breeding bulls?							
a. Raise my own	①	②	③	④	⑤	⑥	⑦
b. Neighbor	①	②	③	④	⑤	⑥	⑦
c. Stockyards	①	②	③	④	⑤	⑥	⑦
d. Bull test station sales	①	②	③	④	⑤	⑥	⑦
e. Purebred breeder sales	①	②	③	④	⑤	⑥	⑦
f. Other (please specify): _____							
50. Where do you obtain most replacement heifers?							
a. Raise my own	①	②	③	④	⑤	⑥	⑦
b. Purchase from another source with a known history	①	②	③	④	⑤	⑥	⑦
c. Purchase from another source with an unknown history	①	②	③	④	⑤	⑥	⑦

	Yes	No
51. Describe your commercial breeding program.		
a. Bull is same breed as commercial cow herd.	①	②
b. Rotational cross	①	②
c. Terminal cross (2 breeds and do not keep heifers)	①	②
d. Use composite bulls	①	②
e. Other: Please describe _____	①	②

_____

52. Rate these trait categories based on their importance relative to your **bull** selection decisions:	**Extremely Important**						**Extremely Unimportant**
a. Growth	①	②	③	④	⑤	⑥	⑦
b. Reproduction	①	②	③	④	⑤	⑥	⑦
c. Carcass weight	①	②	③	④	⑤	⑥	⑦
d. Marbling	①	②	③	④	⑤	⑥	⑦
e. External fat	①	②	③	④	⑤	⑥	⑦
f. Muscling	①	②	③	④	⑤	⑥	⑦
g. Weaning weight	①	②	③	④	⑤	⑥	⑦
h. Convenience (good disposition, polled, etc.)	①	②	③	④	⑤	⑥	⑦
i. Eye appeal or physical appearance	①	②	③	④	⑤	⑥	⑦

53. Rate these trait categories in order of importance relative to **replacement female** selection:	**Extremely Important**						**Extremely Unimportant**
a. Growth	①	②	③	④	⑤	⑥	⑦
b. Reproduction	①	②	③	④	⑤	⑥	⑦
c. Carcass weight	①	②	③	④	⑤	⑥	⑦
d. Marbling	①	②	③	④	⑤	⑥	⑦
e. External fat	①	②	③	④	⑤	⑥	⑦
f. Muscling	①	②	③	④	⑤	⑥	⑦
g. Weaning weight	①	②	③	④	⑤	⑥	⑦
h. Convenience (good disposition, good udder history, polled, etc.)	①	②	③	④	⑤	⑥	⑦
i. Eye appeal or physical appearance	①	②	③	④	⑤	⑥	⑦

Demographics – All Survey Respondents

54. Gender of primary operator: Male ① ② Female

55. Extent of off-farm work:

	No off-farm work	Full-time off-farm job	Part-time off-farm job
You	①	②	③
Spouse (if applicable)	①	②	③

56. Primary operator's age:

29 Years of age or less	30 to 39	40 to 49	50 to 59	60 years of age or more
①	②	③	④	⑤

57. What is the highest level of education attained by primary operator:

Less than high school graduate	①	④	College graduate
High school graduate	②	⑤	Some post-graduate work
Some college	③	⑥	Graduate or professional degree

58. Number of breeding females in the herd:

	None	1-49	50-99	100-249	250-499	500-999	1000+ head
a. Commercial Cow/calf	①	②	③	④	⑤	⑥	⑦
b. Purebred Cow/calf	①	②	③	④	⑤	⑥	⑦

59. Number of head of stockers grazed or back-grounded annually

None	1-49	50-99	100-499	500-999	1000+ head
①	②	③	④	⑤	⑥

60. In what county is your primary ranching operation? _____

61. State: _____

62. How important is:	**Very Important**						**Very Unimportant**
a. Generating enough farm income so that off-farm work is not necessary?	①	②	③	④	⑤	⑥	⑦
b. Choosing practices to reduce labor use?	①	②	③	④	⑤	⑥	⑦
c. Use of the internet for business purposes?	①	②	③	④	⑤	⑥	⑦

63. Which of the following best describes your 2003 household **net** income from all sources?

Less than $30,000	①	④	$90,000 to $119,999
$30,000 to $59,999	②	⑤	More than $120,000
$60,000 to $89,999	③		

64. Approximately what percentage of your 2003 household net income came from your beef cattle operation?

0 percent	①	④	41 to 60 percent
1 to 20 percent	②	⑤	61 to 80 percent
21 to 40 percent	③	⑥	81 to 100 percent

65. Race of primary operator:

White	①	④	Native Hawaiian or other Pacific Islander
Black or African American	②	⑤	Asian
American Indian or Alaska Native	③	⑥	More than one race

Please return your assessment to your local county Extension office or mail to

Damona Doye
Oklahoma State University
513 Ag Hall
Stillwater, OK 74078

Thank you for your participation.

VITA

Mallory Kay Vestal

Candidate for the Degree of

Masters of Science

Thesis: Production Practices and Management Intensity of Oklahoma Cow-Calf Producers Across Income and Herd Size

Major Field: Agricultural Economics

Biographical:

Personal Data**:** Raised in Tulia, Texas, Born to Ted and Kathy Vestal on August 12, 1883. Graduated from Tulia High School in May 2001.

Education: Graduated from West Texas A&M University, Canyon, Texas, May 2005; received a Bachelor of Science degree in Agricultural Business with a Minor in Animal Science; completed the requirements for the Master of Science degree in Agricultural Economics at Oklahoma State University in July 2007.

Experience: Graduate Research Assistant, Oklahoma State University Department of Agricultural Economics, January 2007 to May 2007; Graduate Assistant Women's Equestrian, Oklahoma State University Athletic Department, July 2005-December 2006.

Name: Mallory Kay Vestal Date of Degree: July 2007

Institution: Oklahoma State University

Title of Study: PRODUCTION PRACTICES AND MANAGEMENT INTENSITY OF OKLAHOMA COW-CALF PRODUCERS ACROSS INCOME AND HERD SIZE

Pages in Study: 153 Candidate for the degree of Master of Science

Major Field: Agricultural Economics

Scope and Method of Study: The purpose of this study was to analyze management practices of two groups of Oklahoma cow-calf producers based on commercial herd size and income dependency from beef production. Logit models were estimated to determine the demographic characteristics which influence producer implementation of selected management practices.

Findings and Conclusions: Numerous differences were found in all aspects of cow-calf production between the two study groups. Specific demographic variables which affect implementation of selected management practices include age, education, herd size, income dependency from beef production, and the importance of reducing labor. Extension educators and industry leaders can learn much by having extensive knowledge regarding their audience. In an educational program allowing participants to learn from the experiences of each other and to better understand the industry as a whole will not only add to the short term benefit, but will also enhance learning for years to come.

Advisor's Approval Dr. Clement Ward