EVALUATION OF INTEGRATED RESOURCE MANAGEMENT SKILLS OF BEEF CATTLE PRODUCERS USING THE CASE STUDY METHOD

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Bachelor of Science

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San Luis Obispo, California

1995

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
December, 1998

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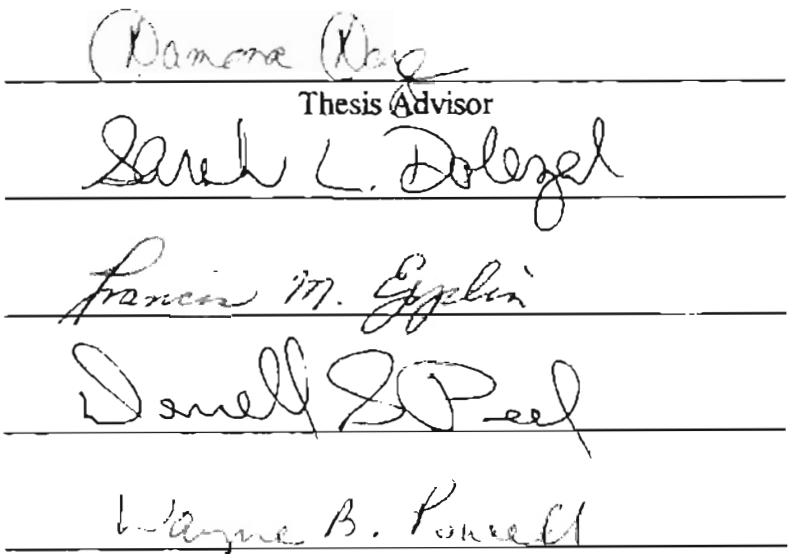
Thesis Approved:



Thesis Advisor

Dean of the Graduate College

ACKNOWLEDGMENTS

I would like to thank all who assisted me in completing this study.

I wish to thank my major advisor, Dr. Damona Doye. My appreciation extends to my other committee members Dr. Sally Dolezal, Dr. Francis Epplin, and Dr. Derrell Peel whose assistance and encouragement are very appreciated. I would like to thank Dr. Alan Barkema and the Department of Agricultural Economics for providing me with this research opportunity and their generous financial support.

Moreover, I wish to express my sincere gratitude to those who provided support throughout the entire research process. I would like to give special appreciation to my roommate, Anissa, for her suggestions to my research, strong encouragement at times of difficulty, and understanding throughout the entire research process. Also, to my sister Dina for her editing suggestions and on-going support. I also give special thanks to Dwayne, Tammy, and Holly Hurliman for your endless generosity and support.

Special thanks to my parents, Dennis and Kathy Tesconi, thank you for your love and encouragement the last two years.

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CHAPTER I

INTRODUCTION

Problem Statement

Beef cattle producers face an increasingly competitive environment. High feed grain prices, severe weather uncertainties, and changing trade patterns contribute to mixed market signals. Lower calf prices and intense competition for the consumer's meat dollar make survival for high-cost producers increasingly difficult. Further, research suggests that beef producers need to reduce their production costs to compete with pork and poultry producers (Featherstone, Langemeier, and Ismet).

Research estimates the average cost of production at approximately $85 per hundredweight (Doye and Northcutt, McGrann and Walter). At this rate, the individual producer's cost of production may be greater than the current market price of weaned calves. Since many cow-calf producers do not have profitable cow-calf enterprises, a greater emphasis is needed on management to decrease the cost of production. Although cattle prices improve cyclically, in the best price situation, some producers are not breaking even with their current management practices.

Generally, livestock producers focus their efforts on the specific area of the operation in which they possess the most expertise. Producers are traditionally more comfortable with the production-oriented aspects of the operation, for instance, specialty

areas such as beef breeding and nutrition. Consequently, critical factors in other areas of animal health, reproduction, forage, and financial management may be overlooked.

Information management is increasingly important to producers interested in profitable performance and survival over time. Record keeping (data collection) allows producers to document plant and animal production as well as financial practices that can be used in the control function of management. Although producers usually keep such records as number of cows calved, critical information such as pregnancy percentage or percent calves weaned per exposed female are not calculated. The performance aspect of financial, grazing, and feed efficiencies are almost completely neglected by most cow-calf producers (McGrann, 1997). A 1991 study conducted about the management information systems of commercial farm operators found that 75 percent of the operators spend less than ten hours per month maintaining and analyzing farm records (Batte, Schnitkey, Rister, and Frank).

Effective information systems can help position farmers to take advantage of opportunities, allowing them to be pro-active rather than reactive to management situations. To be used effectively in the decision-making process, data that are often recorded must be transformed into useful information. Information supports decision-making at all levels of an operation and is valuable in both daily and strategic decisions. The decision-making process can be improved by using accurate and timely information in an operation. To improve decision-making, beef cattle producers require additional tools and skills to manage their limited resources more effectively. Producers must make better management decisions to remain viable and competitive with larger, more business-oriented, commercial operations.

In general, most people are resistant to change. Likewise, livestock producers are often slow to change traditional practices without clear and proven evidence of improvement. Today's producer environment requires operators to take advantage of each opportunity to manage more efficiently by continually adopting new practices and strategies. Cow-calf producers have not adopted many production and financial practices recommended by research and Extension personnel. However, research and Extension personnel may not understand the constraints producers face in implementing recommended practices or the true objectives of the producers.

Since the long-term sustainability of a farm is determined by management practices, the primary issue is to gain a better understanding of the Integrated Resource Management (IRM) practices that allow cow-calf producers to efficiently achieve their production and financial goals.

Project Overview

The specific thesis topic is a component derived from a broader, interdisciplinary research project, "Improving Integrated Resource Management Skills of Beef Producers". This multi-institutional project is being conducted by Oklahoma State University, Langston University, Auburn University, Texas A&M University, and the Samuel Roberts Noble Foundation. Agronomy, Agricultural Economics, Animal Science, and Veterinary Medicine are the four disciplines represented in this project. The primary objective of this research project is to identify the disciplinary practices that are most important to the sustainability of family owned cow-calf operations. An interdisciplinary

team (including but not limited to an Agricultural Economist, Agronomist, Animal Scientist, and Veterinarian) will help to identify the production and economic practices that will support more effective IRM systems.

Objectives

The general objective of the research is to better understand the Integrated Resource Management practices that allow cow-calf producers to efficiently achieve their production and financial goals. The specific objectives were:

1. To determine if producers that use and maintain more extensive production and financial records as well as use external information are more likely to generate a profit.
2. To determine how much producers use research and Extension as a source of external information relative to other sources.
3. To evaluate the producers' adoption and use of practices advocated by IRM specialists to improve resource management.

Organization of Thesis

Chapter 2, the review of literature, introduces Integrated Resource Management and Standardized Performance Analysis as well as discusses financial management, profitability, farm information systems, personal preferences in decision-making, and technology adoption. Chapter 3 presents the methods and procedures of the research study. Summaries of the case study producers are presented in Chapter 4. Chapter 5

includes the findings and analysis of the study. A summary, conclusions, and recommendations are provided in Chapter 6. Included in the appendix is the Institutional Review Board approval, a letter of introduction to the project participants, and the survey instrument.

CHAPTER II

REVIEW OF LITERATURE

This review of literature was developed to provide a rationale and foundation for this study. It is divided into the following sections: 1) Integrated Resource Management, 2) Standardized Performance Analysis, 3) Financial Management, 4) Profitability, 5) Farm Information Systems, 6) Preferences in Decision-Making, and 7) Technology Adoption.

Integrated Resource Management

Integrated Resource Management (IRM) is a systematic approach of managing resources to achieve a specified goal in beef cattle operations. It is used to assess the availability of resources – financial, production, and environmental – and their efficient use in the decision-making process (Ward). IRM seeks to understand, measure, and account for direct and indirect effects from each production, marketing, and financial decision. Researchers and educators who apply the IRM concept attempt to better understand producers' real world decision-making (Doye and Northcutt, 1996).

IRM is interdisciplinary in nature, integrating knowledge from several interrelated disciplines with a focus on resource use within a system. According to Ward, IRM began as Integrated Reproduction Management in the early 1980's and later was broadened to

incorporate the interrelated nature of all production and financial decisions. Other similar concepts currently being used in agriculture include Integrated Pest Management, Holistic Resource Management, Whole-Farm Planning, and Total Quality Management (Ward).

Standardized Performance Analysis

The IRM philosophy gained industry support through the National Cattlemen's Association (now the National Cattlemen's Beef Association). Due to this industry support, Texas A&M University was commissioned to develop computer software to address the management information needs of beef producers (Doye and Northcutt, 1996). The resulting software, Standardized Performance Analysis (SPA), is used as a tool in IRM educational programs. As SPA integrates production and financial data into key performance measures that aid in managerial decision-making, it is a useful tool in the IRM approach.

The Cow-Calf Standardized Performance Analysis (SPA) guidelines were developed by producers, Extension staff, and the National Cattlemen's Beef Association Integrated Resource Management Committee. SPA is used as a decision-making tool for producers who wish to improve financial and production efficiency by more effectively using current resources. SPA analysis is used to identify areas of concern by documenting costs of production and identifying which costs can be managed. The SPA software is a tool for condensing a large amount of production and financial information into some convenient summaries and ratios for analysis. The information summarized in SPA output is only as good as the information provided for analysis. Thus, it is important

to develop and maintain a production and financial record keeping system that is accurate and up-to-date.

The SPA analysis is based on fiscal year production and financial data. SPA uses the financial statement formats, terminology, and performance measures recommended by the Farm Financial Standards Council (Texas Agricultural Extension Service, Oct. 1995). It facilitates the comparison of an operation's performance between years, producers, production regions, and production systems. The production portion of SPA includes performance measures for reproduction, production, grazing, and raised feed as well as for marketing, financial, and economic performance. The production and financial components of SPA are combined in an integrated analysis to determine financial and production performance. It is recommended that a SPA be completed on an annual basis (Texas Agricultural Extension Service, April 1995).

SPA producer reports are a valuable tool in identifying the strengths and weaknesses of an individual operation. SPA provides managerial information such as performance and cost reference points for the individual farm/ranch operation. For the producer, the most significant use of SPA is to monitor statistics such as cost of production and pounds weaned per exposed female (Doye and Northcutt, 1996). The summary reports generated by SPA include joint financial and production measures. Examples of such measures are investment per breeding cow, debt per breeding cow, total raised/purchased feed cost, gross cow-calf enterprise operating cost, percent return on enterprise assets, and unit cost of production or break-even price. Such measures allow producers to analyze existing practices and their impact on performance. It may

also initiate a better record keeping system and practices in order to attain the information more easily the following year.

Doye and Northcutt (1997) report that individual producers have been submitting their individual results to a national SPA database since 1992. The national statistics provide cow-calf managers with performance and cost reference points. Costs that are out of line compared with those of other producers around the country quickly become evident. Because the results are "standardized", they can be compared from year to year across geographic regions, allowing producers to compare their costs of production. The data were sorted by cost of production, then grouped accordingly into three categories of low, middle, and high production costs.

National SPA data show that least cost producers spend as much or more on pasture, bulls, and herd health than do the highest-cost producers. "Each producer must know his cost of production . . . Knowing where to cut (costs) and where not to, is a key to increasing efficiency" (Roybal, p. 2). McGrann supports this view in that the most important factor associated with low-cost, high performance producers is they spend more time managing and analyzing their situation to work smarter. Further, if any task is beyond their capabilities, then the least-cost producers will seek out the expertise necessary by making use of accountants and veterinarians. Other conclusions from the national results include:

- Low cost producers have less invested per cow, particularly in machinery and equipment.
- High cost producers carry higher debt levels per cow.
- The most significant difference in total cost of production between low- and

high-cost producers is in feed and grazing costs.

- On average, cost of production is highest for herds with less than 50 cows, lowest for herds with 500-999 cows.
- Average weaning weight and profitability are not correlated.
- Low cost producers often spend more than high cost producers on veterinary and medicine.

The Oklahoma SPA database was started in 1995. The departments of Agricultural Economics and Animal Science at Oklahoma State University along with the Oklahoma Cooperative Extension Service provided assistance to producers to help in completing the SPA analysis. The results of the Oklahoma database were similar to the national results (Doye and Northcutt).

- Low cost producers have much less invested per cow, across all asset categories: current, livestock, machinery and equipment, and real estate.
- High cost producers have higher debt levels per cow than low cost producers.
- Significant differences exist in total feed and grazing costs between low and high cost producers. The difference is not as great proportionally as in the national results, as expected given a more homogeneous production region.
- Average weaning weight and profitability are not correlated.
- Average weaning weight as well as pounds weaned per exposed female are lower for low cost producers than high cost producers.

SPA measures may be more useful in directing managers to ask the right questions than in providing solutions to the financial problems of the business. The SPA analysis is also used to develop and/or adopt tools to decide what to do. Such tools

include financial and production records, a complete set of financial statements (cash flow statement, income statement, balance sheets), budgets (cash flow and enterprise) and reports comparing actual to budgeted values.

Doye and Northcutt (1997) suggest that once the cost of production is determined, it can be compared to current calf prices. If the break-even price is less than calf prices, the calculated cost of production is used as a benchmark. If the break-even price is greater than calf prices, use the cost of production in evaluating options for change. Regardless of the break-even price, Doye and Northcutt (1996) indicate that two general questions should be considered:

- Can you cut costs strategically and maintain production at current levels?
- Can you increase production while holding the line on costs?

To strategically cut costs, an evaluation of investment costs/cow along with feed, grazing, cattle, interest, and overhead costs should be examined. To optimize production, the following areas are most commonly targeted: pregnancy percentage, weaning percentage, and pounds weaned per exposed female.

Financial Management

According to Plumley and Hornbaker, "The recent economic environment encountered by the farm sector has placed increased emphasis on the role of finance in farm management" (p. 9). Simply learning about recommended financial management principles does not insure that a person will be a more effective financial manager. The knowledge must be applied to improve the financial well-being of the individual or business (Gorham, DeVaney, and Bechman). Examples of recommended financial

practices include record keeping, goal setting, spending plans, funds for emergencies, wise use of credit, regular savings, insurance, retirement plans, and investments. Research shows that consumers believe that financial management practices like budgeting and saving are valuable (Gorham, DeVaney, and Bechman).

Characteristics of those who adopt recommended management practices have been the topic of previous research. In terms of using formal budgets, research found that young, married, well-educated households with high demand on available resources were more likely to adopt the practice of written budgets (Gorham, DeVaney, and Bechman). Also according to the same researchers, income level did not appear to significantly effect the practice of budgeting. Further, more families who budgeted their money, compared to families who did not budget, believed that they could increase their satisfaction with financial management by planning expenditures.

Even though financial management practices have been proven to increase net worth and satisfaction with financial resources, there is evidence of resistance and failure of consumers to adopt such practices (Gorham, DeVaney, and Bechman). Although audiences indicate a high interest in a topic, few take action on their beliefs. As cited by Gorham, DeVaney, and Bechman, researchers found that lack of time and knowledge were the two reasons most often given for not using recommended practices of budgeting, record keeping, comparing records to the budget, and preparing a balance sheet.

As perception of personal financial competency increased, the number of adopted financial practices increased. Gorham, DeVaney, and Bechman found that the older the participant, the greater the number of financial management practices adopted. The

discretionary time, urgency, and need for adopting financial management practices are likely to be greater as one ages. Some experts recommend that educational programming be "inexpensive, uncomplicated, and readily accessible" (Gorham, DeVaney, and Bechman).

Profitability

According to the 1992 United States Census of Agriculture, from 1974 to 1992, the size of beef cow herds changed by less than one percent, from 40.3 cows to 40.5 cows. Although the size of the average beef cow herd has not changed dramatically, profitability remains widely variable among producers (Featherstone, Langemeier, and Ismet). It is widely recognized that the majority of cow-calf producers do not generate a profit (McGrann and Parker). In a capitalistic system profitability serves as a guide to allocate resource use and aid decision-makers on what, when, and for whom they produce.

Profit as a term is frequently misused in the beef cattle sector. Financial profit is the net return to business equity capital. An increase in equity is a result of retained earnings remaining in the business. The business profitability is summarized in the statement of owner equity (McGrann, Parker, Michalke, Neibergs, and Stone, 1996). In the farm or ranch business, the importance of the source of equity change is often not fully understood. With low rates of earning, often too much is demanded of the business in terms of consumption and withdrawals to maintain or increase equity. For the farm or ranch business, change in owner's equity thus may be the most significant single measure of the financial progress.

Change in equity of the business is the one value that summarizes the overall business and related consumption, savings, and investment activity. A positive change in equity indicates growth in the wealth of the business and if a negative change in equity occurs, the opposite is true. The change in equity occurs as a result of business earnings, contributed capital and the valuation of assets or the actions of owners who contribute or take withdrawals of capital. If part of the "profits" stay in the business as "retained earnings", then equity will likely increase (McGrann and Parker).

Profit in agriculture may be measured using accrual adjusted financial statements (Farm Financial Standards Council). These statements account for inventory change: valuation of raised breeding livestock, payables, receivables, depreciation, accrued interest, and tax. Cash based financial statements, out of pocket expenses, income tax reports, cash flows, and partial budgets do not measure business or enterprise profitability. McGrann reported, "The cow-calf sector has very few producers developing annual financial statements that measure profit. Business financial performance analysis is a shortcoming in the sector. This is true even for those producers that depend on the enterprise for a living" (McGrann, Parker, Michalke, Neibergs, and Stone, 1996).

If all cow-calf producers were profit oriented, then the low rates of return would persuade more of them to take their capital out of the cattle sector. The majority of the capital in the cow-calf sector could generate higher earnings in other activities. In evaluating opportunities to impact the financial performance of the cow-calf sector, it is important to recognize that profit maximization and cost minimization are consistent with one another.

As cited by Featherstone, Langemeier, and Ismet the difference in profitability between the top quartile and bottom quartile of producers (United States beef cow herds) is over $285 per cow. Further these researchers believed, "Whether these differences in profitability are due to economies of scale or to production inefficiency within the industry is not clear. Factors that may explain this difference in profitability include input usage, sale weights, death loss, and marketing and financing differences" (Langemeier, Featherstone, and Ismet, p.175).

Farm Information Systems

In the farming industry, the use of information in the decision making process has become more important. Jarvis states that the management of diverse information is central to sound decision making. In making decisions to allocate limited resources, producers rely on information obtained from many sources, such as personal experience and records, other producers, magazines, newspapers, consultants, researchers, and Extension personnel (Jarvis). All farmers/ranchers manage information as they observe crops and livestock, talk to neighbors, and read. Gustafson, Nielson, and Morehart say, "Farmers maintain financial records for a variety of reasons including report filing, planning, resource management" (p.165). Each farmer must decide how much of his/her information is formalized into a written or computerized system (Lazarus, Streeter, and Jofre-Giraudo). These same researchers state that prior to the wide use of computers, generally farmers kept only written financial records as was required by law. Today many producers still limit their data collection to the legal minimum.

According to Batte, Jones, and Schnitkey (1990), "Increased education should increase understanding of the complexities of production and financial relationships and therefore increase the demand for information" (p. 939). These researchers further discuss that increased education will likely correspond with an increased awareness of computers as well as an improved ability to judge their usefulness in the business environment. Computers and professional services are becoming commonplace in farm businesses.

Batte, Schnitkey, Rister, and Frank conducted a study to evaluate the farmers' use of information and the adoption of modern information systems. For this study, the population was directed at commercial size farmers with annual sales greater than $100,000. Among the beef farms, production records were the primary focus of record keeping. Researchers found that relative to dairy and farrowing operations, fewer of the cow-calf producers kept records of when the pregnant animals were due. However, more of them kept weight of offspring. Further the study showed that only 54 percent of the cow-calf producers kept records of feed fed to animals, suspecting that it is a much less critical success factor compared with the other operations.

This research further reported that the analysis of livestock enterprise systems indicates few differences across the various size operations. More than 80 percent of the cow-calf operators reported using manual record systems (Batte, Schnitkey, Rister, and Frank). This characteristic appeared not to be influenced by herd size, but producers of larger herd sizes reported adoption of self-designed computer programs in addition to manual records. When comparing large herds with the intermediate size (100-199 cows) herds, researchers found that operators reported a greater use of sire/dam records. This

study also indicated the most important uses of farm records in cow-calf herds were in regards to culling decisions, for tax planning, and for evaluating the profitability of the herd. Compared with other breeding animals (dairy and pork) in the study, cow-calf producers found records less important for determining feed rations and when to breed animals, but reported records to be more important for decisions about expanding or contracting herd size.

According to Batte, Schnitkey, Rister, and Frank, the small and intermediate herd operators use the computer most for tax computation, business planning, and crop production, while the larger operators used computers for business correspondence, herd production, and marketing/price analysis. When compared to the other farm types in the study, few cow-calf producers had adopted computer information systems. The researchers indicated this may be due to few existing computer information systems that address the information needs of beef producers.

Additionally the study reported, in the use of professional services, only three services were reported by more than 50 percent of the cow-calf operators. These services are the tax preparer, county Extension agent, and veterinary consultant. The tax preparer and the veterinary consultant were reported as being quite useful. The larger herd operators reported a higher frequency of use of an accountant or financial advisor when compared with the other cow-calf operators. Otherwise, little difference exists with respect to the percentage of operators using various professional services across herd size.

In this study, 52 percent of the cow-calf producers owned less than 100 cows. Relative to the other farm types, cow-calf producers were least apt to use only a

computer-based record systems. Most used a combination of manual and computerized systems. The results of the study indicate that farmers vary widely in the maintenance and use of farm records. Further, this study suggested that the use of farm records has increased in recent years (Batte, Schnitkey, Rister, and Frank).

Preferences in Decision-Making

"Production and marketing decisions are made throughout the period, are conditional upon past actions, and must be made in light of current and expected future prices and animal performance" (Lambert, p. 9). The business success of farm/ranch operations is as dependent on human resources as on physical and financial resources. "Psychological characteristics of farm and ranch operators influence business decisions and the ability of the business to respond effectively to changes in the operating environment" (Jose and Crumly, p. 121). Psychological characteristics play an essential role in the decision-making process as well as in organizing the production processes. According to Jose and Crumly, business goals that are based on personal strengths and preferences can increase both personal satisfaction and financial stability.

Jose and Crumly conducted a study of Nebraska farm families participating in an Extension education program coordinated by the Nebraska Cooperative Extension Service and the Agricultural Economics Department from the University of Nebraska-Lincoln. The purpose of the study was to gain insight into the interaction between psychological perception and the economic decision preferences of farm operators. Specifically one of the objectives was to identify the influence of psychological type on management objectives. The Myers Briggs Type Indicator (MBTI) was selected to study

the farm managers based on its ability to distinguish a number of psychological characteristics related to business management (Jose and Crumly).

The purpose of the MBTI is to identify the basic preferences of people in regard to perception and judgement. According to Briggs Myers, "The MBTI is primarily concerned with the valuable differences in people that result from where they like to focus their attention, the way they like to take in information, the way they like to decide, and the kind of lifestyle they adopt" (p. 4).

The first scale is Extroversion/Introversion (E/I), which determines how people maintain their focus and energize themselves for tasks to be completed. Extroverts like variety and action, communicate freely, and are impatient in slow moving jobs. Introverts work well alone, dislike distractions and interruptions, and like quiet for concentration. The second is Sensing/Intuition (S/N) which describes the ways in which one perceives and acquires information. Sensing types prefer problems with standard methods of solution and tend to be good at precise work because they make few errors of facts. Intuitive types like new problem-solving techniques, reach conclusions quickly and are patient with complicated situations that insure change. The third scale, Thinking/Feeling (T/F), describes ways of making decisions or judgements about something. Thinking types like analysis and logical order, like things better than people, and are fair-minded with a need to be treated fairly. Feeling types are aware of people and their feelings, respond to praise, harmony, and respond positively to people's feelings. The fourth scale is Judgement/Perception (J/P) which relates to lifestyle. Judging types work best when their work is planned ahead and like to have a finished end product. Perceptive types adapt well to changing situations, sometimes postpone

unpleasant tasks, and welcome new insight. Indicators of the basic preferences and attitudes are motivation, values, and behavior (Jose and Crumly, Briggs Myers).

According to Jose and Crumly, MBTI has been used to enhance managerial effectiveness and to improve organizational communications in a variety of business environments. Management styles vary, yet when a style and process remain consistent with type, effective results were produced for a variety of business settings. For instance, some managers possessed an advantage in human resource management while other managers had an advantage when production oriented skills were required (Jose and Crumly).

In terms of age differences, a person's basic typological type does not change as he/she gets older. As people mature, their decision-making process should also mature. Experience adds perspective to decision-making. Decisions become more subjective because of that experience. The maturity of the individuals rather than the chronological age is the determining factor (Jose and Crumly).

Jose and Crumly concluded that the group studied was a different typological type when compared to the general population because of a high incidence of "introverted, sensing" types. The group preferred judgement over perception in their association of work habits and lifestyle. "The personality characteristics of the majority of producers makes them more comfortable in a production environment that is relatively free of government regulation" (Jose and Crumly, p. 130). Along with this, personality characteristics of the sensing judging (SJ) types are not as receptive to rapid changes in their environment. The SJ's prefer to have ample time to evaluate a situation and also

seek the opinions of their peers when a change occurs such as a new technology or regulation is imposed.

According to the study by Jose and Crumly, the difference between thinking and feeling individuals was apparent in the respondents' preferences for the use of farm profits. Sensing feeling (SF) types preferred family and personal consumption while the sensing thinking (ST) types preferred to purchase capital items. Further the researchers found that the ST type accumulated more debt and more assets and also had a higher propensity to spend leisure time off the farm conducting farm business. The researchers indicated that very pragmatic, family-oriented producers dominated the group studied. Usually such producers are reluctant to integrate complex computer models, commodity futures trading, and long-term financial and family goals into their decision-making model. However, for this group the participants implemented all the tools except futures trading. According to the researchers, there was still a strong preference for practical, orderly solutions.

Jose and Crumly said, "Extension programs have been a major conduit of knowledge to producers" (p. 131). Jose and Crumly indicated, "Extension faculty often feel it is a necessity to convey a large body of knowledge in a short period of time" (p. 131). Sensing/judging (SJ) types prefer to teach and learn in a methodical, well-organized, manner with "minimal reliance on textbooks and formal lectures" (Jose and Crumly p. 131). Almost two-thirds of the producers in the study indicated that they preferred sequential techniques and practical, decisive information dispersed in a manner that produces clear conclusions. Jose and Crumly concluded, "Extension programs that use a systematic approach to production, financial, and family goals will be more readily

adopted" (p. 131). Successful Extension programs will allow for more flexibility in the families' decision-making model.

Jose and Crumly also indicated that a limitation for the adoption of Extension education may be the premise that income maximization is not the main goal of the family farmers. As cited by Jose and Crumly, these results were consistent with previous studies in that profit maximization is not the highest priority goal for many producers.

Technology Adoption

Many new technologies have been developed for agricultural production. As adoption is often associated with risk, many variables contribute to a new technology's rate of adoption. Such variables include the perceived attributes of the innovation, characteristics of the individual, and the means of communication used to diffuse information about the innovation (Rogers, Jarvis). Literature on diffusion of innovations suggests strong relationships between technology adoption patterns and individual and business characteristics (Batte, Jones, and Schnitkey).

According to Rogers, the visibility of an innovation and its apparent relative advantage influence its rate of adoption. Individuals in a social system adopt innovations at different rates over a period of time. Individuals can be classified into adopter categories (innovators, early adopters, early majority, late majority, and laggards) according to when they first begin to use a new idea (Rogers). Rogers defined innovativeness as "the degree to which an individual is relatively earlier in adopting new ideas than the other members of his social system" (p. 262). Some differences in socioeconomic characteristics between earlier adopter and later adopters are 1.) earlier

adopters are not different from later adopters in age, 2.) earlier adopters have more years of education than later adopters, 3.) earlier adopters have larger sized business units than later adopters, and 4.) earlier adopters have more specialized operations than later adopters (Rogers).

According to research by Feder, Just, and Zilberman, the empirical studies they reviewed reinforced the conclusions from the theoretical adoption models. For instance, larger farmers adopted innovations with higher fixed costs at a higher rate. Innovations which were neutral to scale were eventually adopted by all classes of farmers, but larger farmers were typically among the early adopters. Also, similar innovations experienced different adoption patterns in different areas with different farmers. Since new technology apparently offers the individual an opportunity to increase production and income, it is uncertain as to why the introduction of new technologies is only partially successful as indicated by the variation in the rates of adoption. Factors that may serve as constraints in the rapid adoption of innovations include lack of credit, limited access to information, aversion to risk, inadequate farm size, inadequate incentives associated with farm tenure arrangements, insufficient human capital, absence of equipment to relieve labor shortages (thus preventing timeliness of operations), chaotic supply of complementary inputs, and inappropriate transportation infrastructure (Feder, Just, and Zilberman).

Yaron, Dinar, and Voet cited numerous studies that suggested larger farms/ranchers were more likely to adopt innovations. This was due to the inability of small farms to cover the fixed cost of a new technology such as financing, learning a new application, and developing new markets. Off-farm income could also affect the rate of

adoption by providing a source of cash flow to buffer the risk associated with new agricultural practices (Feder, Just, and Zilberman). Other factors that could limit the adoption technology include the absence of an adequate support system such as credit, transportation, and marketing channels. Also, producers with a higher level of experience could diminish the likelihood of an individual to adopt (Yaron, Dinar, and Voet).

According to Shapiro, Brorsen, and Doster, farmer characteristics such as education and experience could have enhanced allocative efficiency and could be positively related to adoption of new technologies. Since experimentation may decrease with age and experience, these factors could be negatively related to adoption of new technology. These researchers cited considerable evidence that education may have enhanced allocative ability and efficiency in the instability caused by the introduction of new technology. Since the farmers knew less about the distribution of returns associated with new technology, subjective beliefs about the profitability and risk were expected to be important factors in the decision-making regarding the innovation. An individual's perceptions of return distributions have not yet been studied in a developed country.

Shapiro, Brorsen, and Doster conducted an adoption study where the objective of the farmers was assumed to be utility maximization. One reason for a farmer to adopt a new technology may have been to reduce risk through diversification. The researchers found that off-farm income could be negatively related to the adoption of a new technology because it could substitute for other diversification strategies. Off-farm employment could also take time away from farming that may be needed to achieve the degree of timeliness that would make adoption profitable. Conclusions made by Shapiro,

Brorsen, and Doster were consistent with other researchers in that differences in the perception of the new technology may be more important than differences in risk preferences when trying to determine the behavior of farmers.

According to Jarvis, "computer technology is different from production technologies" (p. 1389). Many agricultural technologies previously studied have been capital assets such as machinery or variable inputs such as growth implants and often required few management changes. However, adoption of computer use and software may require new skills leading to high learning costs. The success of computer use within a business depends on the human capital of the manager while the success of production technology is fundamental in the innovation (Jarvis). Further, Batte, Jones, and Schnitkey indicated that many older farmers have a "shorter time horizon to recapture learning costs"(p. 938); thus computer technologies may not be judged to be profitable. Additionally, those farmers spending above average amounts on farm information expenditures (subscriptions, consulting feed, and computer software) could be more likely to own computers according to Batte, Jones, and Schnitkey. The researchers asserted that such a result may indicate that increased expenditures for information are associated with a willingness to add computer technology to the farm's information system.

Computer adoption rates vary with operator and business characteristics. Batte, Jones, and Schnitkey findings were consistent with previous research in that the rate of adoption for computer use was inversely related to farmer age and positively related to higher education and larger business size. These same researchers concluded that with a natural turnover in farm operators, computer adoption would likely accelerate. Also,

Jarvis indicated that a positive relationship exists between the number of peers using computers as well as of producer's children experience with computers. Both could offer insight into possible enhancement of computer usage. Jarvis further concluded that in times of increasing complexity in farm management, computer adoption may reflect producers' attempts to better incorporate and apply information to their operations. However, computers and their intangible values are not observable, thus "the difficulties in quantifying microcomputer costs and benefits make the relative advantage of computer adoption difficult to ascertain" (Jarvis. p. 1393).

CHAPTER III

METHODS AND PROCEDURES

Methods

Qualitative Research Strategies

Generally speaking, qualitative research is concerned with how the world is interpreted, understood, experienced, or produced. Emphasis is placed on "holistic" forms of analysis and explanation, aiming to produce rounded understandings on the basis of contextual detailed data. Qualitative research strategies differ, each interpreting the elements in a complex, perhaps multi-layered, environment. In applying the strategies, differences occur between the means of collecting and analyzing empirical evidence. Each version of qualitative analysis has its own advantages and disadvantages (Mason, 1997). The purpose for conducting a research study can be categorized into the following types: exploratory, descriptive, or explanatory. Exploratory research is investigative in nature. A descriptive study is one that seeks to illustrate and characterize a specific situation. Explanatory research seeks to explain a situation or phenomenon, perhaps using a causal relationship (Yin, 1994).

"A common misconception is that the various research strategies should be arrayed hierarchically" (Yin, 1994, p.3). At one time it was believed that case studies

could only be used for the exploratory phase of an investigation, that surveys and histories were suitable for the descriptive phase, and that experiments were the only appropriate means of performing explanatory or causal inquiries. Just as experiments with an exploratory motive have always existed, some of the most notable case studies have been descriptive and explanatory (Yin, 1994).

According to Yin (1994), a more appropriate view of these strategies is that each strategy can be used for multiple purposes. Each specific research strategy (experiments, survey, archival analysis, history, case study) can be used for all three types-exploratory, descriptive, or explanatory. Yin (1994) stated that the strategies are distinguished not by the hierarchy but instead the following three conditions:

a) "the type of research question posed,

b) the extent of control an investigator has over the actual behavioral events, and

c) the degree of focus on contemporary as opposed to historical events" (Yin, 1994, p.4).

Each strategy possesses distinguishing characteristics; however, large areas of overlap occur among them. Specifically, when choosing a research strategy, the intent is to avoid selecting a "misfit", which may occur when you are planning to use one strategy yet another is really more advantageous (Yin, 1994).

When "how" or "why" questions are posed, the research tends to be more explanatory in nature. Case studies, histories, and experiments are more likely to be used as the preferred research strategies because such "questions deal with operational links needing to be traced over time, rather than mere frequencies or incidence" (Yin, 1994, p.

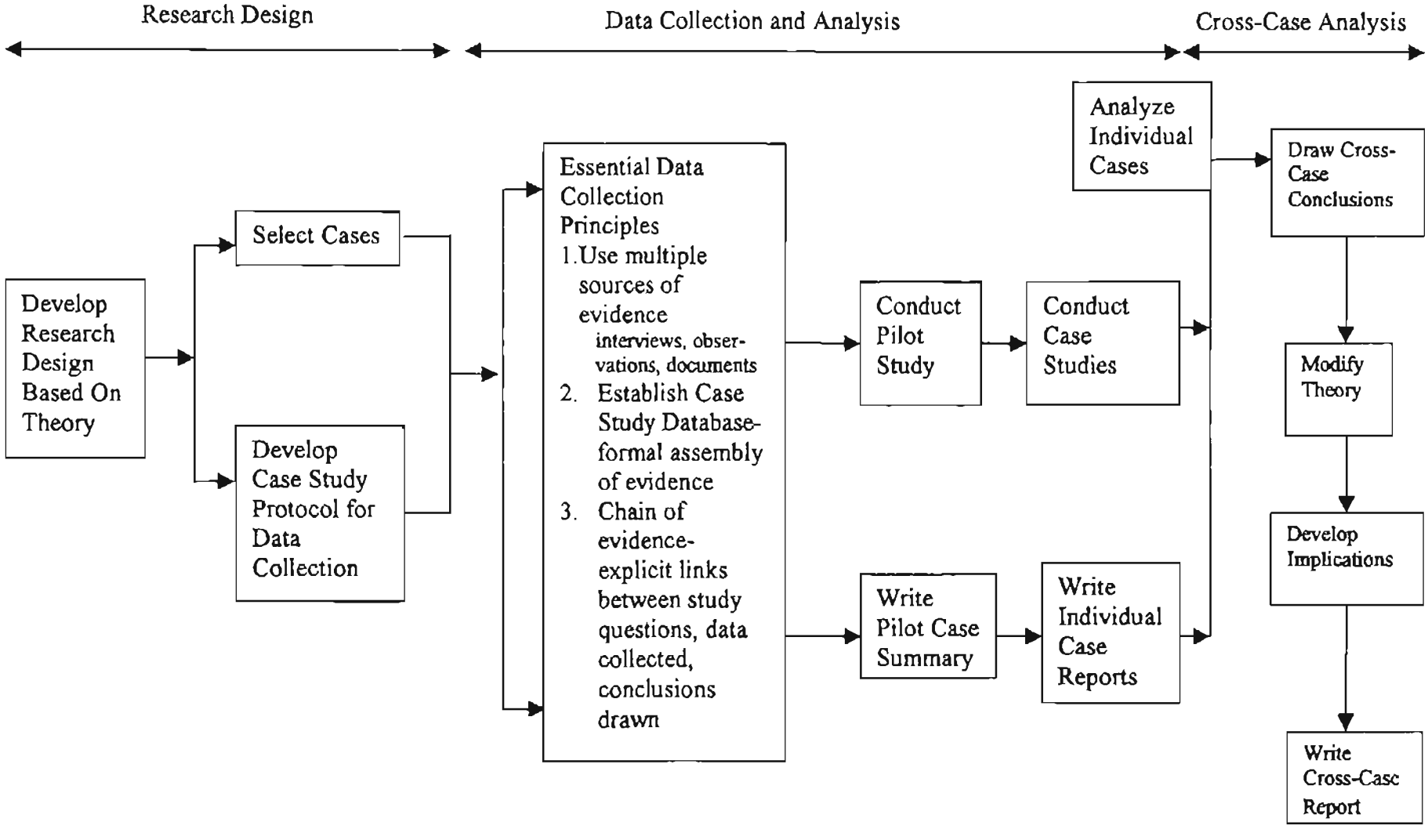
6). Some situations are such that a specific strategy has a distinct advantage while it should be noted that the various strategies are not considered mutually exclusive.

Generally, case studies are the preferred research strategy when "how" or "why" questions are posed and there is a contemporary set of events over which the investigator has no or little control (Yin, 1994). Case studies are increasingly used as a research tool. As a research strategy, the case study is used in many situations, including organizational and management studies; city and regional planning research; and policy, political science, and public administration research. As a research endeavor, the case study contributes uniquely to our knowledge of individual, organizational, social, and political phenomena. When compared to other research strategies such as experiments, archival analysis, or histories, the unique strength of the case study is its ability to deal with a full variety of evidence such as documents, artifacts, interviews, and observation- beyond what may be available in the conventional historical study (Yin, 1994).

The essence of a case study is that it tries to illuminate a decision or set of decisions: why they were made, how they were implemented, and with what result. According to Yin (1994), a case study is an "empirical inquiry that:

- investigates a contemporary phenomenon within its real-life context, especially when
- the boundaries between phenomenon and context are not clearly evident; and in which
- multiple sources of evidence are used and as a result
- benefits from the prior development of theoretical propositions" (p. 13).

Figure 1. Organizational Chart of Case Study Method



Source: adapted from Yin

The case study method is used in a situation where the contextual conditions are believed to be highly pertinent to the specific phenomenon of study. In real-life situations, phenomenon and context are not always distinguishable. An experiment, for instance deliberately disassociates a phenomenon from its context, so that attention is focused on a few variables (typically, the context is "controlled" by the laboratory experiment) (Yin, 1994).

Case Study Research

The case study method as a research strategy is an all-encompassing method. It is neither a data collection tactic nor merely a design feature but a comprehensive research strategy. The case study has been a common research strategy in psychology, sociology, political science, business, social work, and planning. Case studies are also "found in economics, in which the structure of a given industry, or the economy of a city or region, may be investigated by using case study design. In all of these situations, the distinctive need for case studies arises out of the desire to understand complex social phenomena" (Yin, 1994, p. 3).

As stated previously, Yin categorizes the specific types of case study research as exploratory, descriptive, or explanatory. The exploratory type of case study is aimed at defining the questions of a subsequent study or at determining the feasibility of the desired research procedures. A descriptive case study presents a complete description of a phenomenon within its context. An explanatory case study presents data bearing on cause-effect relationships, explaining which causes produced which effects (Yin, 1993).

"Perhaps the greatest concern against the case study as a research strategy has been over the lack of rigor of case study research. Too many times the case study investigator has been sloppy and has allowed equivocal evidence or biased views to influence the direction of the findings and conclusions" (Yin, 1994, p. 9). Additionally, Yin (1994) states "the possibility also exists that people have confused case study teaching with case study research" (p. 10). In teaching, case study materials can be intentionally changed to better illustrate a particular point more effectively. In case studies materials for research, any deliberate alteration of evidence is strictly forbidden.

Case studies present another concern and that is they provide little basis for scientific generalization. A frequently asked question is "How can you generalize from a single case study?" According to Yin (1994), the answer is not simple; "however, consider that the same question had been asked about an experiment... scientific facts are rarely based on single experiments; rather they are usually based on a multiple set of experiments that have replicated the same phenomenon under different conditions" (Yin, 1994, p. 10). This concept can also be applied to multiple case studies; yet, a different approach of appropriate research designs is required (Yin, 1994). In short, case studies, like experiments, are generalizable to theoretical propositions and not to populations. The case study, like the experiment, does not represent a "sample," and the investigator's objective is to develop and prove theories through analytic generalization and not to enumerate frequencies as with statistical generalization (Yin, 1994).

Specifically, the case study design for this thesis is both exploratory and descriptive in nature. The exploratory portion will investigate the specific management practices of each producer. The descriptive portion will consist of a complete description

of each operation to offer insight to and help gain a better understanding of each operation. Further, particular attention will be given to conduct a rigorous study by remaining unbiased and non-influential to the subjects (producers) during the interview process. As multiple experiments are used to replicate the same occurrence under different conditions, multiple case studies will be used to document the same phenomenon with a variety of cases (different cow-calf operations). The cases were specifically selected for such differentiating characteristics in an effort to predict similar results or produce contrary results but for predictable reasons.

Case Study Design

The research design of a case study is the logical sequence that connects the empirical data to a study's initial research questions, and ultimately to its conclusions. The design may be thought of as a "blueprint" for the research, addressing the following:

- What questions should be studied?
- What data are relevant?
- What data should be collected?
- How should the results be analyzed?

For case studies, Yin (1994) reports five components of a research design that are especially important. These components are "a study's questions, its propositions, if any, its unit(s) of analysis, the logic linking the data to the propositions, and the criteria for interpreting the findings" (p. 20). The study questions should be clearly identified and the propositions should reflect answers to the study questions. As a general guide, the unit of analysis is defined by the way the initial research question has been defined. The

units of analysis for a study will differ depending on the primary research question and thus require different research designs and data collection strategies for each project. Once the units of analysis are established, the limits of the data collection and analysis are determined (Yin, 1994).

Linking the data to propositions and criteria for interpreting the findings are the components that represent the data analysis steps in the case study research. A research design should lay the foundation for such analysis. When linking the data to propositions, one approach is the idea of "pattern-matching", whereby several pieces of information from the same case may be related to some theoretical proposition. Ultimately, the research design should indicate what data will be collected and tell what is to be done after the collection, as indicated by logic linking the data to the propositions and the criteria for interpreting the findings.

The characteristics of the research design serve as a background when selecting the specific designs for case studies. Case studies can either be single or multiple case design as well as being either holistic or embedded (Yin, 1994). Holistic design is the use of a single unit of analysis, while embedded design is when an individual case study may involve more than one unit of analysis. Embedded design occurs when, within a single case, attention is given to a sub-unit or various sub-units. The potential pitfall that may occur with an embedded case is when the case study focuses on the sub-unit level; the analyst may fail to return to the larger unit of analysis (Yin, 1994). It is important to maintain that the original phenomenon remains the target of the study.

A primary distinction in designing case studies is between single and multiple case designs. The design (single or multiple) for the case studies should be decided prior

to data collection. Rationale for the use of single case designs include cases that are representative of a critical case to test a well-formulated theory, an extreme or unique case or a revelatory case when an investigator has an opportunity to research a phenomenon previously inaccessible to scientific investigation.

Quality of Research Design

The quality of any research design can be judged according to a set of logical tests. The tests commonly used to establish the quality of empirical research are construct validity, internal validity, external validity, and reliability (Yin, 1994). Case study tactics are recommended for dealing with each of these tests.

The first test, construct validity, is establishing correct operational measures for the concepts being studied. The case study tactic recommended for this test is to use multiple sources of evidence, establish a chain of evidence, and have key informants review draft case study reports. For this research project the recommended steps were taken to satisfy the construct validity test. Multiple sources of evidence were gathered including an interview with participants, direct observation by the IRM specialists, participant observation, as well as production and financial information used to incorporate into the SPA. A chain of evidence was prepared, compiled, and maintained for each producer. This information was stored with the lead investigator. Following each meeting with each producer, the information collected was catalogued in a case study summary. This summary was then routed to each investigator and interview participant to review for accuracy and further comment. Then the summary was

forwarded to the producer for additional comment or correction. The corrections were made and the summaries redistributed.

The second test is the internal validity test. The internal validity test is establishing a causal relationship, whereby certain conditions are shown to lead to other conditions, as distinguished from spurious relationships. The preferred case study tactics for the internal validity test are to perform pattern-matching, explanation-building, and time-series analysis. This test is used for explanatory or causal studies only. Since this study is determined to be descriptive and exploratory in nature, this test is not applicable.

The third test, external validity, is to establish the domain to which a study's findings can be generalized. The use of replication logic in multiple case studies is the selected tactic for this test. In the analysis phase of this study, replication logic was used to evaluate the case studies. The cases were selected so that the researchers could predict similar results to develop robust conclusions.

The final test is the reliability test, which demonstrates the operations of a study, such that the data collection procedures can be repeated, with the same results. The specific tactic for this test is to use a case study protocol and develop a case study database. The case study protocol was thoroughly developed by all the investigators participating in this research project. The guidelines and procedures for the protocol are included in the survey instrument. The case study protocol used in the research is provided in Appendix C. A case study database was developed to organize and document the data collected. A database was compiled for each producer in the study. Computerized files, copies of tax records, hand written notes from on-farm visits/phone

conversations, and SPA data constitute the type of information included in the case study database.

Preparation for Data Collection

Many people are drawn to the case study strategy because they believe it is "easy." The perception is that the case study strategy can be mastered without much difficulty or having to learn a minimal set of technical procedures. In actuality, the demands of a case study investigator are greater than some other research strategies. According to Yin (1994), this is because the data collection procedures associated with case studies are not routinized.

Commonly required skills for researchers include the ability to:

- "Ask good questions and interpret the answers. Research is about asking good questions and not necessarily answers.
- Be a good listener and not be trapped by their own ideologies or preconceptions. Listen for information 'between the lines.'
- Be adaptive and flexible so that newly encountered situations can be seen as opportunities, not threats.
- Have a firm grasp of the issues being studied, so that relevant events and information can be reduced to manageable portions.
- Be unbiased by preconceived notions, including those derived from theory, and sensitive and responsive to contradictory evidence" (Yin, 1994, p. 56).

Preparation for doing a case study includes prior skills of the investigator, the training and preparation for the specific case study, the development of a case study

protocol, and the conduct of a pilot case study. To help prepare the case study investigator to do a high quality case study, training sessions should be planned, a case study protocol developed and refined, and a pilot study conducted.

According to Yin (1994), the case study protocol contains the instrument as well as the procedures and general rules that should be followed in using the instrument. Often case studies are criticized for lacking a rigorous interviewing instrument and the protocol is a major tactic in increasing the reliability of case study research. The intent of the protocol is to guide the investigator in carrying out the case study.

According to Yin (1994), the three essential data collection principles in doing case studies include:

- Multiple sources of evidence- evidence from two or more sources , but converging on the same set of facts or findings
- A case study database- a formal assembly of evidence distinct from the final case study report
- A chain of evidence-explicit links between the questions asked, the data collected, and the conclusions drawn.

These overriding principles are important to any data collection effort in doing case studies. The incorporation of these principles into a case study investigation will increase the quality of the study (Yin, 1994.)

Data Collection Procedures

Evidence from case studies may come from multiple sources of information. The evidence may come from sources such as documents, archival records, interviews, direct

observation, participant observation, and physical artifacts. According to Yin (1994), no single source of evidence has a complete advantage over all the others; contrarily, the various sources are very complementary to each other. A good case study will use as many sources as possible. However, not all sources of evidence will be relevant for all types of case studies. The use of each of these sources calls for slightly different skills and methodological procedures.

Documentary information is likely to be relevant in every case study. This type of information can take many forms including written reports of events, administrative documents (progress reports and other internal documents), other formal studies or evaluations of the same "site", and other articles appearing in mass media. Documents play an important role in the data collection, providing a basis of information and providing specific details about the organization. Archival records include such evidence as service records, organizational records, maps, charts, lists, survey data, and personal records. Interviews are one of the most important sources of case study information. Most commonly, case study interviews are of the open-ended nature, in which case the investigator gives the opportunity for the respondent to express opinions about various events (Yin, 1994). By making a field visit to the case study site, the opportunity for direct observations is created. Assuming that the phenomena of interest have not been purely historical, some relevant behaviors or environmental conditions will be available for observation. Participant observation is a special mode of observation in which the investigator participates in events with the interviewee. Physical artifacts are the final source of evidence used in case studies. Such evidence can include a technological

device, tool, or instrument or some other physical evidence. Such artifacts may be collected or observed as part of a field visit (Yin, 1994).

Data Collection Principles

According to Yin (1994), the principles for data collection will assist in assuring that the benefits from the six sources of evidence can be maximized. The first principle is to use multiple sources of evidence. Triangulation is known as the rationale for using multiple sources of evidence (Yin, 1994). One of the strengths of case study data collection is the opportunity to use many different sources of evidence. The need to use multiple sources in case studies is more necessary than in other research strategies. For example, experiments are limited to the measurement and recording of actual behavior in the laboratory and generally do not include the systematic use of survey or verbal information. It is not to say that an experiment could not be modified to incorporate the use of another source; however, such a modification of the traditional study does alter the fact that the case study inherently deals with a wide variety of evidence, whereas the other strategies do not. The use of multiple sources of evidence allows the investigator to address a broader range of historical, attitudinal, and behavioral issues. Thus any finding or conclusion in a case study is likely to be much more convincing and accurate if it is based on several different sources of information, following a corroboratory mode. With triangulation, the potential problems of construct validity can also be addressed. The multiple sources of evidence essentially provide multiple measures of the same phenomenon.

Field Procedures

In terms of case studies, proper field procedures for data collection are essential. As previously stated, case studies are studies of events within their real-life contexts. The investigator must integrate real world events with the needs of the data collection plan and not attempt to control the environment (Yin, 1994).

Doing case studies involves a different situation than that of a laboratory experiment or survey questionnaire. For case studies, interviewing key persons is dependent on the interviewee's schedule and availability. The nature of the case study interview is much more open-ended when compared with other research strategies (Yin, 1994). Additionally, the interviewee may not necessarily cooperate fully in answering the questions. Similarly, in making observations of real-life activities, the investigator is intruding into the world of the subject being studied rather than the reverse. Under such conditions, the investigator as well as the behavior of the subject may be constrained. Such constraints of the investigator during data collection leads to the need to have well-planned field procedures to better "cope" with the constraints of behaviors and guidelines presented in an interview.

The field procedures of the protocol emphasize the major tasks in collecting data. Some of these include:

- Gaining access to key organizations or interviewees
- Having sufficient resources while in the field
- Developing a procedure of calling for assistance and guidance, if needed from other case study investigators

- Making a clear schedule for the data collection activities that are expected to be completed within specified periods of time
- Providing for unanticipated events, including changes in the availability of the interviewees and changes in the attitude or mood of the case study investigator (Yin, 1994).

Pilot Case Study

The final preparation for data collection is the conduct of a pilot study. The pilot study serves as a "dress rehearsal" and to help the investigators refine their data collection plans, in terms of both the content of data to be collected and the procedures to be followed. The nature of the pilot study is to provide insight into both the substantive and methodological issues to eventually develop a satisfactory procedure for the formal data collection plan.

Data Analysis

"Data analysis consists of examining, categorizing, tabulating, or otherwise recombining the evidence to address the initial propositions of a study" (Yin, 1994, p. 102). Additionally Yin (1994), indicated analyzing case study data is especially difficult because the strategies and techniques have not been well defined in the past. Nevertheless, each investigation should begin with a general analytic strategy of yielding priorities for what to analyze and the reasons why.

In terms of general analytic strategies, the most preferred strategy is to rely on the theoretical propositions that led to the case study. The original objectives and design of the case study presumably were based on such propositions, which in turn reflected a set of research questions, literature review, and new insights. The priorities would have shaped the data collection plan and therefore have given priorities to the relevant analytic strategies. The proposition helps to focus the attention on certain data and organize the entire case study and to define alternative explanations to be examined. Theoretical propositions about causal relations with answers to "how" and "why" questions can be very useful in guiding case study analysis. Yin (1994) suggests that a good test of the data one might cite is to act as if there were only five minutes to defend a proposition in a case study.

The other general analytic strategy used is to develop a descriptive framework for organizing the case study. This strategy is less preferable than the use of theoretical propositions but serves as an alternative when theoretical propositions are absent (Yin, 1994). When the original purpose of the case study is descriptive in nature, the descriptive framework helps to organize the case study analysis.

The best preparation for conducting case study analysis is to have a general analytic strategy. Within such a strategy, four dominant analytic techniques can be used: pattern-matching, explanation-building, time-series analysis, and program logic models Other analytic strategies have been identified and are more situation specific (Yin, 1994).

Dominant Modes of Analysis

Pattern-Matching

One of the most desirable strategies for case study analysis is pattern-matching logic. This logic compares an empirically based pattern with a predicted one or with several alternative predictions (Yin, 1994). If the patterns coincide, the results can help a case study strengthen its internal validity. If the case study is explanatory in nature, the patterns may be related to the dependent or the independent variables of the study (or both). If the case study is descriptive in nature, pattern-matching is still relevant so long as the predicted pattern of specific variables is defined prior to data collection (Yin, 1994).

According to Yin (1994), a rival explanation is a type of pattern-matching specifically for independent variables. In such a situation, several cases may be known to have had a certain type of outcome, and the investigation has focused on how and why this outcome occurred in each case. This analysis requires the development of rival theoretical propositions. The important characteristic of these rival explanations is that each involves a pattern of independent variables that is mutually exclusive. This means that the presence of certain independent variables (predicted by one explanation) precludes the presence of other independent variables (predicted by the rival explanation). The independent variables may involve several or many different types of characteristics or events, each assessed with different measures and instruments (Yin, 1994). The concern of case study analysis, however, is with the overall pattern of the results and the degree to which a pattern matches the predicted one.

Yin (1994) explains the same logic applied to the rival explanation can be applied to simpler patterns. In the simplest case, there may only be two different variables. Pattern-matching is possible as long as a different pattern has been stipulated for these two variables. The fewer the variables, the more dramatic the different patterns will have to be to allow any comparisons of their differences. The role of the general analytic strategy would be to determine the best ways of contrasting any differences as sharply as possible and to develop theoretically significant explanations for the different outcomes.

Explanation-Building

According to Yin (1994), explanation-building is another commonly used analytic strategy, and specifically is a special type of pattern-matching. The purpose of explanation-building is to analyze the case study by building an explanation about the case. Generally, this procedure is more difficult and usually is mainly relevant to explanatory case studies.

"To 'explain' a phenomenon is to stipulate a set of causal links about it. These links are similar to the independent variables in the rival explanation of the pattern-matching technique" (Yin, 1994, p. 110). In most studies, the links may be complex and difficult to measure in a precise manner. According to Yin, "in most existing cases explanation-building has occurred in the narrative form. Because narratives are not precise, the stronger case studies have explanations that reflect some theoretically significant propositions" (p.110-111). Such causal links may reflect critical insights into the propositions.

The explanation-building process has not been well-documented in operational terms. One important characteristic is that the final explanation is a result of a series of iterations. "The iterations are the following:

- making an initial theoretical statement or an initial proposition
- comparing the findings of an initial case against such a statement or proposition
- again revising the statement or proposition
- comparing other details of the case against the revision
- again revising the statement of the proposition
- comparing the revision to the facts of a second, third, or more cases
- repeating the process as many times as needed" (Yin, 1994, p. 111).

Yin (1994) said that the final explanation may not have been fully stipulated at the beginning of a study and therefore differs in this respect from pattern-matching. Rather, the case study evidence is examined, theoretical positions are revised, and the evidence is examined once again from a new perspective, in this iterative mode.

The gradual building of an explanation is similar to the process for refining a set of ideas, in which an important aspect is again to entertain other plausible or rival explanations (Yin, 1994). As before, the objective is to show how these explanations can be built, given the actual set of case study events. If this approach is applied to multiple-case studies, the result of the explanation-building process is also the creation of cross-case analysis, not simply an analysis of each individual case (Yin, 1994).

Some areas of explanation-building leave a margin for error. Yin (1994) advised that an investigator should be forewarned that this approach to case study analysis could

be unpredictable and stressful. As the iterative process progresses, an investigator may slowly begin to drift away from the original topic of interest. Constant reference to the original purpose of the inquiry and the possible alternative explanations may help to reduce this potential problem. Other safeguards include the use of a case study protocol (indicating what data is to be collected), the establishment of a case study database for each case (formally storing the entire array of data that were collected, available for inspection by a third party), and developing a chain of evidence (Yin, 1994).

Problem Logic Model

Problem logic model is another dominant mode of analysis used in analyzing case studies. This method actually combines two other analysis strategies, pattern-matching and time-series analysis. Specifically, problem logic analysis "deliberately stipulates a complex chain of events (pattern) over time (time series), covering these independent and dependent variables" (Yin, 1994 p. 118). According to Yin (1994), this strategy can be used in a variety of research frameworks; however, a key component must be the proven existence of repeated cause and effect sequences of events and these events must all link together.

Quality of Analysis

According to Yin (1994), to insure the analysis is of the highest quality, there are four underlying principles. First, the analysis should show that all the relevant evidence was considered. The analytic strategies, including the development of rival hypotheses,

must be exhaustive. The analysis should show how all available evidence was sought and the interpretations should account for all this evidence. Second, the analysis should include all rival interpretations. If an alternative explanation is presented by regarding the findings of a case, then that alternative should be converted into a rival. This rival can be questioned in terms of finding evidence to address the specific rival. If there is not evidence, then perhaps the rival can be restated as a loose end to be investigated in future studies. Third, the analysis should address the most significant aspect of the case study. Fourth, the investigator should bring prior knowledge to the case study. The strong preference in this instance is to have analyzed similar issues in the past and to be aware of current thinking and debates about the case study topic (Yin, 1994).

Case Study Report

The case study report should be included as part of the protocol. This will facilitate the collection of relevant data and will reduce the possibility that a return visit to the case study site will be necessary. The fieldwork likely will lead to large amount of documentary evidence and the case study report will help to catalog the information. This documentation is a large part of the "database" for each case study (Yin, 1994).

Procedures

Institutional Review Board

Federal regulations and Oklahoma State University policy require review and approval of all research studies that involve human subjects before investigators begin

their research. The Oklahoma State University Office of University Research Services and the Institutional Review Board conduct this review to protect the rights and welfare of human subjects involved in biomedical and behavioral research. In compliance with the aforementioned policy, this study received the proper surveillance and was granted permission to continue as project IRB: AG-97-020. A copy of the approval form appears in Appendix A of this document.

Selection of Producers

County, area, and state Cooperative Extension staff jointly selected the cow-calf producers used for the study. The producers represented different size operations, varying production types (commercial, seedstock etc.), stage of operation, management structure, and source of operating capital. Producers from Oklahoma and Alabama were used in the study. Auburn University and Oklahoma State University followed the same protocol, while the other institutions did not collect all information necessary to be used in this study. Seven cooperators from Oklahoma and two producers from Alabama are were used in the study. The producers were sent a letter of introduction providing an overview and purpose of the project. A copy of the introduction letter appears in Appendix B.

Research Propositions

The research design of a case study is the logical sequence that connects the empirical data to the study's initial research questions (objectives), and ultimately to its

conclusions. The propositions (hypotheses) reflect answers to the research questions. Case studies were analyzed according to these propositions. The research questions for this study include:

Objective 1: To determine if producers that use and maintain more extensive production and financial records, as well as use external information, are more likely to generate a profit.

Proposition 1: Producers who use and maintain more extensive financial and production records, as well as use external information, are more likely to generate a profit.

Objective 2: To determine how much producers use research and Extension as a source of external information relative to other sources.

Proposition 2: Producers that more frequently contact Extension and research personnel more readily adopt IRM practices recommended by IRM specialists.

Objective 3: To identify the producers' adoption and use of practices advocated by IRM specialists to improve resource management.

Proposition 3: The more profitable producers are more likely to have relatively high levels of adoption of IRM practices in all areas (animal science, financial

management, forage management, and herd health).

Case Study Protocol

The case study protocol contained the survey instrument as well as the procedures and general rules that were followed while using the instrument. Co-investigators (listed in the Data Collection Procedures section, which follows) developed different sections of the survey instrument to be used in the case study. These include:

- production/reproduction
- forage/nutrition
- environmental/conservation/ waste management
- personal data/goals/opportunities/ resources/financial
- wildlife/other enterprises

The instrument was developed within the first several months of the project by the case study investigators. All co-investigators were involved in compiling the draft protocol and after a pilot interview and discussion, a revised protocol resulted (see Appendix C for complete instrument).

Data Collection Procedures

Members of the OSU committee and other members of the entire research project gathered data. The OSU committee consisted of Dr. Sally (Northcutt) Dolezal, Extension Beef Cattle Breeding Specialist; Dr. Damona Doye, Extension Economist; Dr. John Kirkpatrick, Extension Veterinarian; Dr. Terry Lehenbauer, Extension Veterinarian; Dr.

Larry Redmon, Extension Forage Specialist; Dr. Larry Rice, Extension Veterinarian; and Dr. Glenn Selk, Extension Reproduction Specialist. Dr. Walter Prevatt, Extension Economist at Auburn University, was the lead investigator and responsible for contributing the case study summaries for the Alabama producers. County agriculture Extension agents, area Extension specialists, and all in-state team members were given the opportunity to be involved in each interview but because of scheduling conflicts not all members were present at each interview.

On-farm visits, e-mail, phone, and written correspondence were the means of gathering information needed to accomplish the first objective. One or more interviews were conducted for each case. In the initial interview, primarily descriptive information such as management structure, goals, enterprise mix, and description of the farm information system was collected. Further, the survey instrument was completed and detailed data about the current state of the farm/ranch operation was compiled.

During the second interview a Standardized Performance Analysis (SPA) was completed. A SPA technician and/or a co-investigator assisted in collecting SPA data from producers. SPA data included archival records such as tax forms, livestock, feed, and financial records. For selected producers a financial diagnostic specialist completed a whole farm financial analysis. Due to scheduling conflicts or lack of information, a whole farm financial analysis was not completed for all producers. In the third interview, SPA results were reviewed and discussed. Further data was conducted addressing a list of publications and other sources of information used for farm decisions and new practices or changes implemented since the beginning of the project. Additionally, producers identified critical success factors. Critical success factors are those factors

producers consider necessary to be successful in the cow-calf business as well as the future plans for the operation.

During each interview, direct observations (observation of producer behavior/tendencies, organization of record keeping/office, observation of pastures and cow herd) were made and reported by investigators. Also noted were observations made by producers (participant observation). Data from the survey instrument and notes from interviews were included in a case study summary prepared for each producer.

Factors thought to significantly influence the operation were addressed on a case by case basis. Scheduling on-farm visits was difficult to coordinate with the specialists and the producers. Following the initial visit, two producers were not available for additional meetings; thus, a SPA was not conducted.

During the data collection process, the option of conducting the Myers Briggs Type Indicator was explored. The institution required that the producers obtain their results from a local mental health institution. This was not a practical situation for the producers; therefore, the researchers opted to omit MBTI from the study.

Data Analysis

The management systems of cow-calf producers are described and assessed. A detailed descriptive summary is prepared for each producer in case study form. This allows for easier comparison and contrast across all case studies. With multi-case studies, the pattern-matching technique allows generalizations to be made about variables. In this project, the variables were the management practices that were

considered to be influential in a ranching operation. Generalizations, both successes and problems common across the sample of the case study producers, are identified.

CHAPTER IV

CASE STUDY SUMMARIES

To protect the confidentially of each producers' operation, the participants have been assigned an alias (Producer A, Producer B, etc.). The individuals in each operation are referred to as Operator 1, Operator 2, etc.

Producer A

One on-farm interview was conducted with Producer A. Present at that interview were the farm financial specialist, a reproduction specialist, and a veterinarian as well as an area Extension agronomy specialist and an area Extension livestock specialist.

Current Organization of the Farm Business

Producer A is a cow-calf operation (250 cows) in central Oklahoma that includes a spring-calving commercial herd plus a fall-calving herd that targets the club calf market. The operation includes 2,285 total acres of land (491 acres of cropland and 1,794 acres of pasture). In addition to the cattle, he also produces wheat, rye, a wheat-rye mix,

and lovegrass hay to supplement the herd. The majority of the acreage is rented (73% of the cropland, 79% of the pasture).

Part of the operation was established and managed by the operator's father-in-law. In 1995, his father-in-law semi-retired which allowed the operator to work full-time on the farm. A gradual transition of responsibility and capital shifted to the operator and in 1996 he assumed all management responsibilities after his father in-law's death. He is the sole proprietor of this operation and has no full-time employees.

Evolution of the Farm Business

The producer grew up on a farm and holds a Bachelor of Science degree in Agricultural Education. He was the vocational agriculture instructor at the local high school for five years. He worked with a local veterinarian for fifteen years prior to farming full-time (several years part-time while a vocational agricultural teacher, then full-time). While working as an agricultural instructor, he began renting land and acquiring cattle.

The producer's wife is a school teacher and does not work on the farm. Their son, age 13, shows heifers and club calves and provides assistance on the farm during the summer months.

Production Information

Cattle. Currently the cow herd consists of 250 Chi/Maine-Anjou/Angus cows. Two separate cow herds are maintained: a commercial herd and a club-calf herd. Stockers are often purchased and added to the raised stockers to utilize wheat pasture.

The commercial herd of 125 cows are bred for spring calves. The breeding season is 60-90 days and the bulls are turned in with the cows around the first of May. At weaning, the calves are turned out to wheat pasture and ownership is retained through the stocker phase. Replacement heifers are raised, as are some of the replacement bulls.

The club calf herd of 125 cows is bred for fall calves. When the producer returns from elk hunting, the cows are synchronized and artificially inseminated in late November. Generally, about seventy to eighty percent conceive, while the remainder are bred to Maine-Anjou clean-up bulls. Replacement heifers are raised for this herd as well. Bred heifers are occasionally sold. About 15 percent of the calf crop is sold as show steers and a few bull calves are sold to local breeders. The remainder of the calves are marketed with the commercial calf crop. The calves from this herd are raised on the wheat/rye pasture.

Animal Production/Health. The cattle are observed daily for health abnormalities and are body condition scored by pasture group on an ongoing basis. Very important factors in selecting replacement heifers include dam's udder and temperament as well as the temperament of the heifer. Structural soundness/visual appraisal and breed are also important considerations. Additionally, in the club calf herd, frame score is very important. Similar factors are considered for bull selection plus the reputation of the breeder, scrotal circumference, and weaning/yearling weights. For the club calf herd, physical appearance of the offspring is also extremely important. Factors that are taken into account for culling breeding age females are physical unsoundness (cripple), bad udder, and temperament as well as digestive or respiratory problems, age/thin, poor

calves (cows only), and genetic composition. Open or aborted cows are not tolerated in the commercial herd. In the club calf herd, an open female may be given a second chance. Infertility, performance of offspring, physical unsoundness along with size and temperament are primary reasons to cull a bull. Breeding bulls are semen-tested at the time of purchase and then once each year thereafter, 60 days before the breeding season begins.

Generally, replacement heifers are bred at 12-16 months and weigh 700-750 pounds at the time of breeding. The first calf heifers are separated from the cows before and after calving and calve in a segregated pasture. During calving season, the AI cows and heifers are checked four times per day, while other cows are checked twice a day. All the females (heifers and cows) are given no more than one hour after seeing a water bag before being given assistance. Of the 15 heifers that calved last year, seven needed assistance, six were easy pulls and one was a hard pull delivery. Of the 220 cows that calved last year, only three cows needed any assistance and all were considered easy pulls. Routinely at birth the calves are individually identified, given a scour pill, a vitamin A injection, and a selenium injection. For difficult births, calves are colostrum fed or given a colostrum substitute. Occasionally calves are given a scour vaccine, an injectable antibiotic, or may be castrated at birth.

Cows, bulls, and replacement heifers are vaccinated for Campylobacter. All animals are vaccinated for Leptospira. At four to eight months of age, the calves are vaccinated for respiratory diseases, brucellosis, and a seven-way clostridium. Prior to breeding, replacement heifers are given a vaccine for respiratory diseases. Injections are given intramuscularly, either in the hip (high or low) or the neck. Bull calves are

castrated at 61-120 days of age. At weaning, additional calves are castrated. Growth implants are used in the calves (not including the replacement heifer and bull calves) at 8-12 months of age.

Cattle are treated for external parasites with pour-on and injectable treatments once a year. The cows are dewormed for stomach worms and flukes once per year. The calves are dewormed at weaning for stomach worms and flukes. Less than five percent of the calf crop was affected by respiratory disease at 29-120 days of age and less than two percent was affected when older than 120 days. Of the entire herd, the most common cause of death was due to calving problems. No single factor could be identified as contributing to the greatest economic loss for this operation. Abortion, calving problems, internal parasites, reproductive lapses (early or late), and respiratory problems are each considered to be slight factors contributing to the economic loss of the operation.

Forages. Pasture consists of 1,794 acres of bermuda, lovegrass, plains bluestem and native pasture. Some pastures are grazed year-round; others are rotationally grazed or grazed only in summer or winter. Water sources are adequate for all pastures. Chemicals (Graze-on) are used for weed control.

The majority of the lovegrass-bermuda is rotationally grazed and then harvested as hay. The lovegrass is well suited to the sandy soil type, which is prevalent on the majority of the farm. Some maton rye and vetch is used as cover on the marginal land and is also harvested as hay. The primary purpose of the hay is to supplement the cattle with the surplus sold.

Wheat, rye, and a wheat-rye mix are the primary crops produced. Soil tests are performed once every three years on the cropland with the exception of 45 acres. Commercial fertilizer is used to fertilize the cropland. The crops are grazed from November to March and then are harvested. The average yield on harvested wheat acreage is approximately 20 bushels per acre. Glean and 2-4-D are used for weed control.

Supplemental Feeding. From November through March, the spring-calving commercial cow herd is supplemented with lovegrass-millet hay. All the hay fed to the cattle is raised. Along with the hay, from October to March a supplement is fed from sacks to the cows. Levels of supplemental feed vary with the cow's condition. The cows are fed two pounds per head per day throughout the feeding period. The club calf herd is grazed on wheat pasture. This herd is supplemented during October and November with a 20 percent protein cube. Both herds are given a complete mineral in loose form.

Farm Management Information System

A manual financial record keeping system is maintained. Approximately six to eight hours per month are spent keeping farm financial records. Typically two to three hours per month are spent analyzing farm financial records. A separate bank account is not maintained for the farm business. The depreciation schedule is complete and up to date. For the Crop/Forage record keeping system, records are kept either on a field level or on a total enterprise basis. Field records of fertilizer used, herbicides applied, and insecticides/fungicides applied (when needed) are maintained. Crop data are kept on

calendars and in pocket notebooks. For the livestock record keeping system, individual cow records are not maintained but the cows are "mentally tagged." Receipts serve as records of feed fed to animals.

Goals

The producer finds working with the cattle in all aspects of the operation to be most enjoyable, while he would like to spend less time producing low-priced wheat. The long-term plan for this operation is to maintain a profitable business and perhaps allow for the possibility that his son will enter the operation in ten years.

Critical Success Factors

The perceived strength of this operation is the club calf herd and the artificial insemination program. The producer would like to improve the nutrient value of forages and increase the wheat yield. He understands the importance of forage testing and plans to implement such practices.

Producer B

One on-farm interview was conducted with Producer B. Present at that interview were the farm financial specialist, forage specialist, two veterinarians, and the research assistant. Operator 1 and Operator 2 were present at the interview, participating in equal parts throughout the interview.

Current Organization of the Farm Business

Producer B is a commercial cow-calf operation (80 cows) located in central Oklahoma, owned and operated by a husband and wife, Operator 1 and Operator 2. The operation includes 1,760 total acres of land (46 acres of cropland and 1,714 acres of pasture and rangeland). The majority of the land is leased (91%). They raise hay to supplement the herd. A trip to all ranch sites is a 15-20 mile loop. Operator 1 and Operator 2 have been raising cattle for the past seven years.

Evolution of the Farm Business

Both operators work full-time for a construction company. For the past seven to eight years they have run cattle on leased land. In 1994, one-quarter of a section was purchased. The operation has been continually growing. They would like to sustain the herd size at approximately 100 cows while they continue to work off-farm.

Production Information

Cattle. The operators have been increasing the number of cows since 1994, and currently have about 80 breeding females. The females are commercial crossbred cows (primarily an Angus base), and the herd bulls are Angus, Limousin and Chi-Angus. The average mature cow weight is approximately 1,050 pounds. About 20percent of the calf crop is kept as replacement heifers. Steer calves are sold at weaning to the auction (OKC West).

Animal Production/Health. Some important factors considered when purchasing or selecting replacement heifers include birth weight and growth trait EPDs plus structural soundness/visual appraisal and weaning weight/yearling weight. In bull selection, similar factors plus breed are very important. Very important factors in culling heifers or cows include pregnancy status (open or aborted), calving injury, physical unsoundness (cripple), digestive or respiratory problem, bad udder, or bad eyes. Infertility in the bulls is intolerable. Other important reasons to cull a bull are age/bad teeth, bad eyes, disease, performance of offspring, physical unsoundness (injury/lame), or temperament. Breeding bulls are semen tested at the time of purchase.

Generally, replacement heifers are bred at 12-16 months of age and weigh a minimum of 750 pounds at breeding. The first-calf heifers are separated from the cows before calving and calve in a segregated pasture. After calving, the heifers and cows are run together. Cows are checked once per day during calving season and the heifers are checked twice per day. The cows are given one to two hours, after seeing a water bag, before being given calving assistance while the heifers are given three to four hours before assistance is given. Of the 12 heifers that calved last year, only 1 heifer needed assistance, it was considered a "hard-pull" delivery. Of the 78 cows that calved, only one birth was assisted by a veterinarian.

Calves (when 4-8 months old) and replacement heifers (prior to breeding) are vaccinated for brucellosis. At two to four months of age calves are vaccinated with a 10-way. Prior to the breeding season, cows and replacement heifers are vaccinated for Leptospira. Injections are given intramuscularly in the hip. Bull calves are castrated using emasculation at 120-180 days of age. Ear tags and a pour-on application is used to

treat external parasites. Cows are dewormed twice a year for stomach worms and once a year for flukes. Calves are dewormed for stomach worms at weaning.

Of the entire herd, 8 of the 175 total head died, with the most common cause of death being calving problems (losing calves) and unknown conditions. The single factor that contributes to the greatest economic loss for this operation is thought to be calving problems, which is considered moderately costly to the operation. Abortion and reproductive shortcomings (cows being open or calving late) are thought to be slightly costly.

Forages. The crops include 10 acres of fescue and 36 acres of hay (two pastures). The hay is a prairie grass/sudan mix. All the fields are fertilized in the spring and again in the fall with a commercial fertilizer. In one hay field, "stickers" are a problem and herbicides are used to control this weed. The cattle graze all fields from October to March. Typically, three cuttings of hay are baled per year.

The remaining 1,714 acres are split into 5 pastures. The acreage is categorized by primary forage: 114 acres of bermuda and 1600 acres of native grass. The bermuda pasture is fertilized in the spring with a commercial fertilizer. Water sources are adequate for all pastures. The pastures are grazed year round using continuous and rotational stocking. The current grazing system is used due to the fencing of the fields. Herbicides are used to control the weeds in the bermuda pasture only. The stocking rate is one cow per ten acres. All pastures contain some brush and weeds, which is a recognized problem. The large parcels of land and the lack of roads make burning too risky.

Supplemental Feeding. From November through March, the entire herd is supplemented with hay (prairie, sudan and millet) and a commercial supplement of 15-25percent protein with fiber. All hay fed is raised and is not tested for crude protein content. Levels of supplemental feed vary according to the weather, closeness to calving, and forage conditions. The amount of supplemental feed remains relatively constant throughout the feeding period. The heifers and bulls are given two pounds of supplement per head per day and one bale of hay every other day. The cows are fed one pound of supplement per head per day and two round bales twice a week (for each field of cows). In addition to the feed supplement, the entire herd is given free choice of salt and trace minerals.

Farm Management Information System

In addition to an accountant, a manual record keeping system is used to keep the financial records. Operator 2 is primarily responsible for keeping these records. Receipt and expense data are entered once a month. A separate bank account is not maintained for the farm business. A depreciation schedule is complete and up-to-date. Crop or forage records are not kept either on a field level or on a total enterprise basis. Individual cow records are not kept; however, Operator 2 would like to individually identify the cows and begin to track their production information.

Goals

Operator 2 would like to individually identify all the cows by ear tag and freeze brand. Additionally, she would like to convert to a computerized record-keeping system to track the production records, as well as the financial records. Other plans are to continue to expand the bermuda grass acreage. The futures market is an additional area of interest. The long-term plan is to make this operation a full-time job. There is a possibility for their daughter to enter the operation in the next five to ten years.

Producer C

Two on-farm interviews were conducted with Producer C. Present at the first interview were the farm financial specialist, an beef cattle breeding specialist, a veterinarian, the forage specialist, and the research assistant as well as the county Extension agent. Operator 1 and Operator 2 are equal partners in the cow-calf enterprise; however, in the initial interview, Operator 2 responded to the majority of the questions. Operator 1 had limited participation in the interview as he was attending to calving heifers. For the second interview, the research assistant as well as a SPA technician and a financial diagnostic specialist were present.

Current Organization of the Farm Business

Producer C is a commercial cow-calf operation (460 cows) in southwestern Oklahoma, operated by husband and wife, Operator 1 and Operator 2. The operation includes 5,305 total acres of land (285 acres of cropland and 5,020 acres of pasture). In

addition to the cattle, they also produce wheat and bluestem grass hay to supplement the herd. All (100%) of the cropland is owned while the majority (88.6%) of the pasture is rented. Two separate ranches constitute the rented land. The Ranch I consists of 2,200 acres and Ranch II includes 2,500 acres. The lease arrangements differ by ranch.

The operation began about fifteen years ago when they married. This sole proprietorship employs one full-time employee. Additionally, one full-time assistant is hired during the winter months. Five other part-time employees are hired when more assistance is needed to wean calves and pregnancy check the cows. The operators are the primary decision-makers for the operation.

Evolution of the Farm Business

Operator 1 was raised on a farm and has always had the desire to continue farming. At the time they met, Operator 2 was working as a FAA Electronic Technician and had no previous exposure to agriculture. As she began to learn about different aspects of farming and ranching, she developed a fondness toward ranching and once married, she moved to southwestern Oklahoma to raise commercial cattle.

Production Information

Cattle. Currently, the cow herd numbers about 315 Brangus females and 200 Hereford cows with Simmental and Santa Gertrudis influence. Brangus bulls are used to service all the females. The bulls are purchased from a variety of breeders ranging from the OBI (Oklahoma Beef, Inc.) Sale to private treaty purchases in Texas.

The cattle are maintained on three separate ranches. The Ranch II holds 240 Brangus cows which is the majority of the spring calving herd. The remainder of the spring calving herd, about 50 cows, calve at an additional ranch. The fall calving herd consists of 170 Hereford cows. The Hereford heifers (about 30 head) are calved in the spring. All the Herefords are maintained at Ranch I.

Currently, the breeding program is designed with a 90-day breeding season and the calves are weaned at nine months of age. Ideally, fall calving begins October fifteenth and weaning occurs around August fifteenth. For the spring herd, calving begins about January fifteenth and weaning occurs around November first. This past year the fall calves were marketed just prior to Christmas and the spring calves were sold three weeks later. At the time the fall and spring calves were marketed, the two groups of calves averaged similar weights so the operators are considering changing to solely a spring calving herd. For the past several years heifer calves were not retained. Bred cows were purchased to maintain herd size.

Animal Production/Health. The cattle are observed daily for health abnormalities and are body condition scored by pasture group on an ongoing basis. Very important factors in selecting replacement heifers include breed, structural soundness, temperament, frame score, weaning weight/yearling weight, and dam's udder. Similar factors are considered in bull selection plus EPD's (birth weight, growth trait, milk, and carcass), scrotal circumference, and reputation of the breeder. The factors that are taken into account for culling breeding age females include pregnancy status, physical unsoundness (cripple), temperament, lost calf/dry cow, calving injury, digestive, or

respiratory problem, bad eye or udder, and age of the female. Infertility, physical unsoundness (injury/lame), disease, and performance of offspring are significant reasons to cull a bull. Breeding bulls are semen tested at purchase and then each year thereafter.

Generally replacement heifers are bred at 12-16 months of age and weigh a minimum of 800 pounds at breeding. The first-calf heifers are separated from the cows before and after calving and calve in a segregated pasture. During calving season, the cows are checked twice a day and heifers are checked about five times per day. The first-calf heifers are given no more than two hours, after seeing a water bag before being given calving assistance. Of the 50 heifers that calved last year, about seven heifers needed assistance. From the seven deliveries, three were considered hard pulls and one required a C-section. Of the 400 cows that calved, only five cows needed assistance and of those five, two were considered hard deliveries. During the calving season, six deliveries were assisted by a veterinarian. All calves are individually identified at birth.

Cows, bulls, and replacement heifers are vaccinated for Campylobacter. All animals are treated for Leptospira. At four to eight months of age, the calves are vaccinated for respiratory diseases, brucellosis, and a seven-way clostridium. Prior to breeding, replacement heifers are given a vaccine for E. Coli and Roto/corona scours. Bull calves are castrated at 61-120 days of age. The majority of the herd is polled; however, if necessary, calves are dehorned at 61-120 days. Growth implants are used in the calves (not including the replacement heifer and bull calves) and placed in their ears between 2-4 months of age and again at 8-12 months.

Less than six percent of the calf crop was affected by conditions such as pinkeye, respiratory disease, scours, or any combination of these factors. Approximately 10 of the

500 total calves were considered "hard-doers." Of the entire herd, 15 of the 500 total head died with the most common cause of death being calving problems. The single factor that contributes to the greatest economic loss for this operation is thought to be reproductive shortcomings, e.g. cows being open or calving late. External parasites and pinkeye are considered moderately costly to the operation.

Forages. The crops include 125 acres of wheat and 160 acres of bluestem and bluestem/bermuda mix. Soil tests have been infrequently performed on the 80 acres of the bluestem/bermuda and have never been performed on the remainder of the acreage including the wheat fields. Commercial fertilizer is used to fertilize the bluestem fields in the spring. The field of strictly bluestem grass is grazed all year. The bluestem/bermuda field is first baled and then grazed from August to March. The wheat fields are fertilized in late summer with commercial fertilizer and then either baled or grazed from November to March.

The remaining 5,020 acres of native grasses are located on three separate ranches. The native grass is grazed year round using rotational stocking; moving cattle from pasture to pasture on a periodic basis. Water sources are adequate for all except a few pastures on Ranch I. Herbicides, mowing, and grazing management are used for weed control.

Supplemental Feed. From December through March, the entire herd is supplemented with hay, either bluestem or sudan and alfalfa for the fall calves. The majority of the hay fed to the cattle is purchased. Both raised and purchased hay is tested

for crude protein content. In addition to the hay, a 39 percent cake is also fed. The hay and cake are usually alternated, feeding hay one day and cake the next. The cake is fed daily when there is a snow cover lasting more than several days. Levels of supplemental feed vary according to weather and cow condition. The amount varies from four pounds per head per day in December to two to three pounds per head per day in March or April. Along with the supplement, the cows are given a complete mineral in loose form.

Farm Management Information System

An accountant maintains the farm financial records. Upon request, financial reports are given to the producer, usually once or twice a year. A separate bank account is maintained for the farm business. The depreciation schedule is complete and up to date. Forage records are maintained either in a field level or on a total enterprise basis. Field records are kept for fertilizer used, herbicides applied, machinery operations performed, and forage yield. A manual livestock record system is maintained. Individual cow records are kept. A paper record system of feed fed to animals is kept on a total farm basis.

Goals

The operators enjoy raising calves and supplying seedstock to local ranchers. Also they are fond of working outdoors, specifically using horses to work the cattle. Both agree they would like to spend less time feeding. Primary short-term goals are to become more efficient and improve pasture management. Fence maintenance is required to improve pasture rotation.

In the year 2000, the leases on both ranches will expire. A decision must be made as to the future of the current operation. Several options have been discussed. One possibility is to completely liquidate the current operation. Another alternative would be to relocate the current cattle herd and/or purchase a ranch if feasible. In the next ten years, outside management assistance may be required or Operator 1 and Operator 2 may choose to withdraw from farming and ranching completely.

Critical Success Factors

The perceived strengths of this operation focus on cattle breeding. Raising good quality calves, which are predominantly Brangus, using registered bulls with appropriate EPD's and staying up-to-date with the current cattle information are some of the contributing success factors.

Producer D

Three on-farm interviews were conducted with Producer D. Present at the first interview were the farm financial specialist, a beef breeding cattle specialist, and the forage specialist, as well as the county Extension educator, an area livestock Extension specialist and an area agronomy Extension specialist. For the second interview, the research assistant, a beef cattle breeding specialist and an area Extension agricultural economist were present. For the third interview, the farm financial specialist and research assistant as well as the area Extension agricultural economist participated. Operator 1 and Operator 2 are partners in the cow-calf enterprise; however, Operator 1 is

the main decision maker and sole manager. Although both Operators were present at all interviews, Operator 1 responded to the questions of the interviewers.

Current Organization of the Farm Business

Producer D is a commercial cow-calf operation (220 cows) located in northwestern Oklahoma, owned and operated by a husband and wife (Operator 1 and Operator 2). The operation includes 3,353 total acres of land, all of which is pasture and range land. A trip to all ranch sites is a 45-mile loop. Most of the land is owned (63%, 2103 acres). For the rented land, cash leases are negotiated yearly.

They have been farming and operating this ranch for 41 years. For this sole proprietorship, Operator 1 is the sole manager and the main source of labor while Operator 2 assists in necessary duties. There are no employees hired for this operation; however, help is traded with the neighbors to work cattle and bale hay.

Evolution of the Farm Business

Operator 1 first owned livestock as a young child, 58 years ago. When he started in the cattle business, he began raising Herefords. In 1972 as part of a lease arrangement, he bought 100 old-fashioned Black Angus cows. Then in 1974, 40 "fancy" Angus heifer calves were purchased from a breeder in South Dakota. Since the Angus calves outweighed the Herefords by approximately 55 pounds at weaning, he began to shift away from Herefords. During this time, Operator 1 would crossbreed one-half of his cow herd. This resulted in a shortage of replacement heifers. In another attempt, he tried retaining some straightbred Charolais heifers; however, the calves weaned at significantly

lower weights. Because of the poorer performance of the Charolais crossbred calves, Operator 1 opted to sustain a primarily straightbred Angus herd. Since that time, all of the replacement females have been raised.

Production Information

Cattle. Currently the herd consists of 220 primarily Angus bred cows and 11 Angus bulls that produce commercial and seedstock calves. The average mature cow weight is approximately 1,225 pounds. This spring calving herd utilizes a 60-day calving interval as Operator 1 enjoys having even-sized calves. The calving season begins around the first of February and ends the first of April. All replacement heifers are raised, with about 20 percent of the calf crop kept as replacements. At weaning, the calves weigh 650 to 700 pounds and are fed for an additional six weeks prior to being sent to the feedlot. Ownership is retained through the feedlot phase.

Each fall about five neighbors purchase a group of 30-40 bulls from a reliable source in Kansas. When selecting bulls, Operator 1 will only purchase bulls with a birth weight EPD lower than 3.0, a yearling weight EPD above 65 and relatively low milk EPD. The resources of the operation are such that heavy milking cows are not optimal; however, given this constraint milk problems have not been evident in the herd. During the breeding season, Operator 1 primarily runs a single sire per pasture, but a few pastures have two bulls with 50 cows. The heifer calves are ear-tagged according to their sire.

Animal Production/Health. Some important factors in purchasing or selecting replacement heifers include growth trait EPDs, weaning/yearling weight, structural soundness/visual appraisal and dam's udder as well as breed, pelvic area, temperament and dam's temperament. Since all replacement heifers are raised, price and reputation of the breeder are not applicable in the selection process. In bull selection, similar factors plus price, reputation of the breeder, scrotal circumference and birth weight are considered important. Very important factors in culling replacement heifers or cows include pregnancy status (open or aborted), poor calves, bad udder, physical unsoundness (cripple), age/thin, dry cow/lost calf and temperament. Performance of offspring, infertility, and temperament are primary reasons to cull a bull, along with disease, age/bad teeth and physical unsoundness. Breeding bulls receive a breeding soundness exam once every two years.

Generally, replacement heifers are bred at 12-16 months of age and weigh a minimum of 800 pounds. The first-calf heifers are separated from the cows before and after calving and calve in segregated calving lots. Cows are checked one or two times per day during calving season and the heifers are checked about seven times per day. The heifers are usually given one to two hours after seeing a water bag before being given assistance. Of the 40 heifers that calved last year, only four needed any type of assistance and they were considered easy pulls. Of the 180 cows that calved, four were easy pulls and no other assistance was necessary.

Replacement heifers and cows are vaccinated against Pasteurella, Leptospira, and Campylobacter when they are pregnancy checked. The first-calf heifers are also vaccinated prior to breeding for Brucellosis and Campylobacter. At four to eight months

old, the calves receive shots for IBR, BVD, PI-3, BRSV and Pasteurella as well as Leptospira. Twice prior to weaning the calves are vaccinated with a 7-way Clostridium. Injections are given in the neck, either subcutaneous or intramuscularly. Bull calves are vaccinated at 61-120 days of age. Growth implants are used in the calves (not including replacement bulls), between two to four months of age. Ear tags are used to treat external parasites. Fly tags have eliminated pink eye problems completely, however; Operator 1 is uncertain as to the effectiveness in fly control. Calves are dewormed at weaning for stomach worms and flukes and the cows are dewormed once a year.

For the 1996 calf crop, the death loss of calves, particularly young calves was very high. The eight percent death loss was attributed to calf scours. These calves were identified with the conditions at 29-120 days of age. In 1997, the cows and first calf heifers were vaccinated for Pasteurella in the fall as a preventative for calf scours. This seemed to curtail the problem. Operator 1 estimates the death loss returned to normal levels of about four to five percent and no calves were lost due to scours. Of the entire herd, twelve head died with the most common cause of death being calving problems. There are no specific factors that contribute significantly to the economic loss of the operation.

Forages. The 3,353 acres are divided into 20 pastures. The acreage is categorized by primary forage as follows: native, 2,651 acres; native mix, 254 acres; old world bluestem, 238 acres; bermuda, 60 acres; and native/bermuda mix, 150 acres. Soil tests are conducted once every two years for all forage acreage other than native pasture.

Ammonium sulfate is added on the bermuda to get a hay crop. They have found it hard to get a good stand of switch grass.

Cedars can be a problem. Operator 1 clips cedar trees while driving around. Some neighbors have burned to control cedars, but Operator 1 hasn't helped with a burn where he felt the break was adequate. To protect his fields, he sometimes mows around the edge and rakes it. They have two pastures that might allow rotational grazing. Costs of fencing, water, impact on breeding program and logistics are being studied.

Supplemental Feeding. From November to May the cows graze native pasture continuously and are fed a combination of hay and protein supplement. Free choice grass hay is available to the cows from February to April. All the hay fed to the cattle is raised. In addition to hay, a commercial 15-25 percent protein is also fed. Levels of supplemental feed vary according to weather, cow condition and closeness to calving. The amount varies from two pounds per head per day in November to five pounds per head per day in May. Along with the supplement, the cows are given a complete mineral in loose form.

Wildlife

Deer, turkey, pheasant, and quail are all harvested on this ranch. There is an overpopulation of deer for the area of the ranch. Family and friends do most of the hunting. The record deer for Woods County was from this operation. Operator 1 is a quail hunter himself and has looked to develop quail habitat that the deer and turkey would not eat. It seems the quail crop is a "boom and bust" depending on the weather. If

the land is disked, the soil is disturbed and weeds come up, attracting quail. One time Operator 1 sprayed for sagebrush and he didn't have a quail crop.

Goals

The primary goal of this operation is to raise calves that will gain fast and efficiently and also hang a superior carcass. The perceived strengths of this operation are the commitment of the owners and the lack of indebtedness. Operator 1 would like to spend less time cutting cedars and doctoring calves for such conditions as scours to more thoroughly enjoy the calving season. The long-term plan for the operation is to have the structure remain similar to the current arrangement. There are no plans for children to enter into the operation as long as Operator 1 and Operator 2 remain healthy.

Farm Management Information System

The accountant maintains the farm business records. Checks are sent to the accountant once every two months. The only summary or reports received from the accountant are a copy of the tax forms filed. They do not receive any summaries of expenses or income throughout the year. The depreciation schedule is complete and up-to-date. A separate bank account is not maintained for the cattle enterprise. In 1986 an estate plan was completed. At year-end, Operator 1 contacts the accountant to see whether he needs to make any purchases for tax purposes.

Individual cow records are maintained. Calving records are kept in a notebook. The amount of feed fed to the animals is recorded on a whole farm basis. The feed records are kept using a paper system. However, Operator 1 believes in "feeding them

like you want and paying whatever it takes." Operator 1 believes that "cowmen need to keep more records" and speculates that they personally need more numbers than they keep.

New Practices Implemented

Over the course of a year, Operator 1 has implemented new practices and made adjustments to the existing practices. In years past, the operators have sold their calf crop using forward contracts three times and lost money each time. They prefer to feed their calves and sell them at a premium. Cull cows and bulls are sold to a packing house in Wellington, Kansas. Operator I estimated that it costs $300 to maintain a cow annually. This year Operator I decided to market his calves through Farmland Industries, Inc. Through this alliance, a premium is paid for cattle meeting specific qualifications (quality grade, yield grade, no non-conformers). Because the calves are uniform, high quality and fast gaining, this marketing strategy works well for this herd. He hopes that the alliance is the way of the future so that "good producers" are rewarded. Operator 1 is beginning to keep more records. Specifically, for the coming year he will start tagging all the calves to track sire and dam information.

Recently, when selecting herd bulls, more attention has been given to the carcass trait EPD's. Emphasis is also placed on balanced numbers, and it is important to not use bulls that are "negative" in any one category. Operator 1 also suggests not sacrificing fertility or getting carried away with any one trait.

One pasture located in the creek bottom was planted with Old World Bluestem. This will be used as part of an intensive grazing system. This pasture will be grazed and

then baled. Thirty-five additional acres of Jose Wheat Grass were planted. Operator 1 doesn't think that cool-season grasses will work well for the entire ranch because of water limitations.

Critical Success Factors

The cow-calf operation is a living as well as a hobby. Operator 1 likes the beef business and feels fortunate to have made a living of it as well. From Operator 1's standpoint, the following factors are considered necessary (or at least very helpful) to be successful in the cow-calf business.

- Oil booms. Two oil booms helped tremendously in lessening the debt load. In his estimation, about one oil well could sustain thirty-four cows.
- Use the available technology. He has used growth implants for many years as an example and estimates that a $0.75 investment per implant yields 30 pounds of gain. Operator 1 believes that the cattle industry only uses about 55 percent of the technology available today.
- Implement a vaccination program. When the cows are pregnancy checked in the fall, he also vaccinates for Pasteurella, Leptospira, and Vibriosis as well as de-worms. Operator 1 considers these vaccinations to be very cheap insurance.
- "Love your wife, forgive your kids, do neither for your cows." Any cows that are found open in the fall are sold. Anything that doesn't wean a calf is also sold. Fertility can not be sacrificed.
- Raise own replacements. Operator 1 maintains his herd quality by raising replacement heifers. He cannot buy comparable quality females.

- Buy good bulls. His criteria: he must like to look at them and the bull must have less than +3 pound birth weight EPD and greater than +66 pound yearling EPD. Operator 1 is currently selecting for smaller frame score bulls. While he studies the Angus sire summary, he asks a neighbor who is considered a "pedigree expert" for references. Operator 1 wants the bulls to be fast gaining and mature smaller.
- Read farm magazines- not reading is a tragedy.

Sources of Information and Uses

The most useful source of information is received from reading farm magazines. Operator 1 finds *Livestock Weekly,* a publication from San Angelo, TX to be the "best" of the magazines he reads. He felt that many Extension meetings focused on practices they have implemented over fifteen years ago, for instance, implants. He estimates that 95 percent of cow-calf producers do not spend enough time reading. Most information regarding forage management and grazing is received from farm magazines. Operator 1 considers other producers to be a good source of information. Help is traded among the neighbors in the area. By trading help, each producer can evaluate the other's operation and if someone is weaning heavier calves then they are able to find out why and how. The local feedlot manager is an additional source of information. He provided helpful advice when deciding whether to market the calves through an alliance. Additionally, another local producer (a "pedigree expert") provides useful facts in the selection of the "right kind" of bulls, providing insight into EPD's and different pedigrees.

Operator 1 is a member of the Board of Directors for the local Soil Conservation Service (now the Natural Resources Conservation Service). Historically, the information provided has been useful. He does not agree with the changes in the focus of the organization to stress water quality and wildlife—he feels that there is still plenty of soil conservation that needs to be done.

Future Plans

Specifically, in terms of future plans, Operator 1 is contemplating placing a scale under the chute to get individual calf weights at weaning. This practice would assist in cow selection because "you would know everything a cow is doing on your place." Additionally, in combination with the carcass data tracked from the alliance, it will allow for evaluation of the calves' performance. He also plans to maintain more extensive cow records.

Producer E

Two on-farm interviews were conducted for Producer E. Present at the first interview were the farm financial specialist, a beef cattle breeding specialist, a veterinarian, the forage specialist, and the research assistant as well as the county Extension agent. For the second interview, the research assistant as well as a SPA technician and a financial diagnostic specialist were present. Operator 1 and Operator 2 are equal partners in the cow-calf enterprise and participated equally in the interviews.

Current Organization of the Farm Business

Producer E is a registered Angus, seedstock cow-calf operation (430 cows) located in southeastern Oklahoma, owned and operated by husband and wife, Operator 1 and Operator 2. The operation includes 2,080 total acres of land (1,870 acres of improved pasture and 210 acres of woods, creeks, and ponds). They produce two different hay crops, a bermuda/fescue/bluestem mix and a sudan/wheat/clover/fescue mix. The hay is raised to supplement the herd. The majority of acreage is owned (75 % of total acreage).

In October 1995, the operators acquired a cattle herd including 430 registered Angus cows as well as the right to continue operating with the herd name. The cows are from a well-known Angus tradition in the state and national circles. Prior to the purchase of this herd, the operators ran 450 commercial crossbred cows as well as 70 registered Angus cows.

This partnership is owned by the operators, along with Operator 2's father. Operator 2's father owns approximately 10 percent of the operation and is not involved in the decision-making process. This partnership employs one full-time employee. This employee assists Operator 1 with feeding, spraying, fertilizing, and some custom work. Operator 1 and Operator 2 are the primary decision-makers of the operation while the full-time employee contributes to some daily decisions.

Evolution of the Farm Business

Operator 1 and Operator 2 have been living in southeastern Oklahoma for the past 15 years. Operator 2 started raising a few cattle as a "hobby" which evolved into a larger

scale operation of 450 commercial crossbred cows and 70 registered Angus females. Operator 2 maintained the cattle while Operator 1 ran a custom spraying operation. In 1995, they liquidated the commercial cattle herd and farm equipment to purchase the well-known herd.

Production Information

Cattle. The cow herd currently includes about 375 mature registered Angus cows and 25 head of commercial Angus females. The average mature cow weight is approximately 1,100 pounds and the average cow age is about seven years old. Replacement heifers are raised. Some bull calves and replacement heifers are sold through private treaty. Producer E owns a membership in OBI (Oklahoma Beef, Inc.); some bull calves are sent to the OBI central bull test station. The remainder of the calves are sold at the auction (OKC) at approximately 750 pounds.

When the herd was purchased, the cows were calving year round. Currently, the intent is to convert the cows to fall and spring calving seasons, with the majority of the cows (2/3 of the herd) calving in the fall.

Animal Production/Health. The factors considered extremely important when purchasing or selecting replacement heifers include breed and structural soundness/visual appraisal. Birth weight, EPDs (birth weight, growth traits, and carcass), reputation of the breeder, temperament, and dam's udder are considered important traits. In bull selection, similar factors plus scrotal circumference, price, and frame score are very important. Pregnancy status, physical unsoundness, poor calves, and digestive or respiratory

problems as well as genetic composition are significant reasons to cull heifers or cows. Infertility, physical unsoundness (injury/lame), or bad disposition is not acceptable in the bulls. The bulls receive a breeding soundness exam once a year prior to the breeding season.

Replacement heifers are bred at 12-19 months of age and weigh a minimum of 750 pounds at breeding. About fifty percent of the cow herd is artificially inseminated. The remaining cows are naturally serviced by thirteen herd bulls. The first-calf heifers are managed separately from the cows before and after calving. The heifers calve in segregated calving lots or special calving pastures separate from the cows. Cows are checked once per day during calving season and the heifers are checked two to four times per day. All the females (heifers and cows) are given no more than one hour after seeing a water bag before being given assistance. Of the 60 heifers that calved last year, only one heifer needed any assistance and it was considered an easy pull. Of the 373 cows that calved, less than four needed assistance and these were considered easy pull deliveries. At birth all calves are weighed and individually identified. For difficult births, calves are fed colostrum or a colostrum substitute, plus given an injectable antibiotic, and a navel dip.

Calves, replacement heifers, cows, and bulls are vaccinated with a seven-way clostridium and against Leptospira. Replacement heifers and cows are vaccinated for Campylobacter. Prior to breeding, the replacement heifers are vaccinated for respiratory diseases. The calves are vaccinated for respiratory diseases and the heifer calves receive a vaccine for brucellosis. Intramuscular or subcutaneous injections are given in the neck or subcutaneous over the rib. Calves not kept as bulls will be castrated when older than

180 days of age. Growth implants are not used in the calves. External parasites are treated by using ear tags (two tags used in one application), pour-on, spray, and with an IGR mineral additive. The cows are dewormed three times per year for stomach worms and twice per year for flukes. The calves are dewormed at weaning for both stomach worms and flukes.

Less than one percent of the calf crop was identified as "poor doers" and another one percent of the calves were identified with respiratory disease at less than 28 days of age. At 29-120 days of age, an additional one percent of the calf crop was identified as poor doers. For each calf identified as a poor doer, the cow is also identified and culled. Of the entire herd, only 19 of 725 total head died, with the most common cause of death being calving problems, predators, and old age. External parasites and reproductive lapses (open/late) are considered to be moderately costly to the operation. Abortion, calving problems, footrot, and internal parasites contribute slightly to the economic loss of the operation.

Forages. The primary forage for this operation includes 1,720 acres of bermuda grass/fescue. A commercial fertilizer is applied to the majority of the forage grass. Cockle burrs are a problem on a portion of the rented land; 2-4-D is used to control the weeds. About 175 acres of the bermuda/fescue is harvested as hay. The chosen method of weed control is to brush hog all the accessible areas. Available water sources are ponds and creeks. Water shortages are a concern, particularly in August. Currently the stocking rate is one cow per five acres and ideally they would like one cow to three acres. Soil tests have not been done recently but are planned soon.

For this past year, about half of the hay was raised and the remainder was purchased off-farm. In a typical year, all hay fed would be raised. The purchased hay is tested for crude protein content; however, the raised hay is not. The hay is harvested to maximize the quality.

Supplemental Feed. The entire herd is supplemented from October through March. The cows are fed hay (prairie, bermuda or fescue) and a grain supplement, as well as grazed on cool season (fescue, clover, ryegrass) and native pastures. The amount of hay varies with weather and forage condition. A commercial grain supplement of 15-25 percent protein is fed. The lactating cows are fed four pounds per head per day, while the dry cows are fed about one pound per head per day in the beginning and increased to three to four pounds per day towards the end of the feeding period. The growing bulls are fed six pounds per head per day in October and increased to ten pounds per head in March, depending on the size of the bulls. The herd bulls are fed supplement from December to March, starting at five pounds and increasing to seven pounds. A complete mineral in loose form is fed to all the cattle.

Goals

The perceived strengths of this operation include the combined success with a previous 450 cow commercial herd and beginning this operation with a quality foundation Angus herd. Additionally, both operators enjoy working with the cattle and using such technologies as artificial insemination. Herd improvements such as

establishing distinct fall and spring calving herds and maintaining more complete herd records are key toward enhancing the progress of the herd.

The operators enjoy working the cattle, calving the cows, and seeing "good cattle do well". Intensifying the grazing program to a completely forage-based feeding program while using less supplemental feed is one goal of the operation. They would like to spend less time paying bills and feeding.

The long term goal of the operation is to raise high quality seedstock, first developing a customer base for private treaty sales, then eventually holding their own production sale. Plans are underway for a sale, December 1997. Additionally, the plan is to increase the cow herd to 500 cows.

Farm Management Information Systems

The current MIS system consists of several components, including a computer. Operator 2, the primary computer operator, has had no formal computer training and is basically self-taught. The computer has been helpful in managing the operation, specifically in financial accounting, herd production record keeping and marketing and price analysis. Financial records are tracked with Quicken® 8.0 for DOS. Accounts are updated once per month. Financial records are analyzed three to four times per year.

Livestock records for the operation are being tracked in the American Angus Association Herd Management Software (AHMS). Upon purchase of the herd, individual performance records were not obtainable. All individual animal information has been extracted from the AHMS and thus herd records are limited to only the animals

that were registered. The crop records are currently being kept by hand in field record books and notes on calendars.

The external information system also helps to support specific management decisions. They subscribe to DTN and find that information the most useful. The veterinarian, tax preparer, county Extension agent and area Extension specialist also provide useful management information.

New Practices Implemented

Over the course of a year, a few adjustments have been made to the operation. To begin with, the full-time employee no longer works for the operation. Several part-time workers have intermittently worked for the operation; however, there are no additional full-time employees working for the operation at this time. In May, while working cattle, Operator 1 broke his collar and since has recovered to resume regular work habits. Last December, the operators held their first Annual Production Sale. This November, a Mature Cow Herd Dispersal will be held in conjunction with the annual production sale. All cows over three years of age will be sold. Finally, recently the operators were notified that a highway would be built through the corral and barn area, so steps are being taken to re-locate the current working area.

Sources of Information and Uses

Both Operators depend on various sources to attain the information used in the farm decisions. The sources of information include:

- Angus Journal

- DTN
- Paint Journal
- Grass Farmer
- *Livestock Weekly*
- Beef Today
- Drovers Journal

Also, valuable information is acquired from other Angus breeders, the National Cattlemen's Beef Association, and the Oklahoma State University Cooperative Extension Service.

Producer F

Three on-farm interviews were conducted with Producer F. Present at the first interview were the farm financial specialist, a veterinarian, a reproduction specialist, and the research assistant. For the second interview, the research assistant and the SPA technician were present. The research assistant conducted the third interview. Operator 1 and Operator 2 are partners in the cow-calf enterprise, however Operator 1 is the main decision-maker and manager of the operation. Both Operators were present at all interviews. Operator 1 responded to most of the questions in the interviews, however, Operator 2 maintains the record keeping system and provided additional input during the interviews.

Current Organization of the Farm Business

Producer F is a commercial cow-calf operation (650 cows) located in northeastern Oklahoma, owned and operated by a husband and wife, Operator 1 and Operator 2, respectively. The operation includes 2,446 total acres of land (419 acres of crop land and 2,027 acres of pasture and range). A trip to all ranch sites is a 102-mile loop. They produce milo and wheat, which is used to supplement the herd. Most cropland (55 %) is owned while most pasture (71%) is rented. The rented land has a variety of lease arrangements; some are as long as 15 years. Operator 1 is continually seeking new land to lease.

The operators have been farming at least part-time for the past thirty-five years. Operator 2 maintains the production and financial records, manages the office, and works in other aspects of the operation on an "as needed" basis. This sole proprietorship has one full-time employee, who assists Operator 1 with the routine tasks such as feeding, fertilizing, and harvesting. Operator 1 is the primary decision-maker; however, both Operator 2 and the Employee contribute to the decision-making process.

Evolution of the Farm Business

Both operators were raised on farms in a small northeastern Oklahoma town. Once married, they moved to town and both worked off-farm. Operator 1 decided to lease some land and run a small cow herd, so he purchased fifty cows from his parents. Another 40 cows (mostly Limousin crosses) were later added. He worked as a manager of a manufacturing plant until he decided to farm full-time in 1986, after 24 years of work in town. The cowherd has been expanding since then to its present size. Once their

children were grown, Operator 2 was employed as the director of a pre-school and worked there ten years. In 1995 she started working for the farming operation.

Their sons, age 33 and age 37, are not expected to come into the operation. After completing his education, the younger son worked on the farm but since his parents were unable to pay a satisfying salary, he took a management position at a woodworking company. The older son, a computer programmer, assists Operator 2 in installing and setting up software to best fit the needs of the operation and helps solve any computer related issue that may arise.

Production Information

Cattle. Operator 1 has been increasing the size of the cow herd since 1986, and currently has about 650 cows. The females are primarily Limousin, with a slight influence of Angus and Hereford while herd bulls are exclusively Limousin. The average mature cow weight is approximately 1,100 pounds. Approximately 25 percent of the calf crop is kept as replacement heifers. The remainder of the calves are retained and fed through the feedlot. Recently, 300 calves were contracted to Laura's Lean Beef®, Lexington, Kentucky, a program specified for red meat yield (high yielding cattle) without the use of hormones, ionophores or antibiotics. This program pays a premium for lean carcasses evaluated by yield grades. The OSU Department of Animal Science collected ultrasonic scan data on steers and heifers. Data were analyzed to determine the appropriate marketing time for the cattle to meet the carcass target specifications of Laura's Lean Beef®. With this program, individual carcass data are collected on each

animal; therefore, it will be beneficial to track the pedigrees of the calves to use as a selection tool.

The stocker enterprise is an area of the operation which Operator 1 thinks could generate additional income. The majority of the stockers are raised calves, although depending on the availability of feed, sometimes he purchases a group to meet the current feed situation (last year 22 were purchased).

Animal Production/Health. The cattle are observed daily for health abnormalities and are body condition scored by pasture groups on an ongoing basis. Very important factors in purchasing or selecting replacement heifers include birth weight, growth traits, and carcass trait EPDs plus price, reputation of the breeder, structural soundness/visual appraisal, temperament, weaning weight/yearling weight, and dam's udder and temperament. In bull selection, similar factors plus breed and hip height are very important. Very important factors in culling heifers or cows include pregnancy status (open or aborted), calving injury, physical unsoundness (cripple), poor calves, digestive problem, respiratory problem, bad udder, age/thin, temperament, genetic composition, and dry cow/lost calf. Infertility in the bulls is intolerable. Breeding bulls are semen tested at the time of purchase and every two years thereafter.

Generally replacement heifers are bred at 12-16 months of age and weigh a minimum of 650 pounds at breeding. Only two percent of the females (the purebred Limousin females that have the potential to produce a breeding bull) are artificially inseminated. The first-calf heifers are separated from the cows before and after calving and calve in a segregated pasture. Cows are checked one to two times per day during

calving season and the heifers are checked two to four times per day. The heifers are usually given less than an hour, after seeing a water bag, before being given calving assistance. Of the 126 heifers that calved last year, only 16 heifers needed any type of assistance and of the 16 assisted, only two of those were considered hard pulls. Of the 500 cows that calved, only five calves were pulled and only two were assisted by a veterinarian. All calves are weighed and individually identified at birth.

Calves, replacement heifers, and bulls are vaccinated for respiratory diseases. Calves are vaccinated for brucellosis. Cows, bulls, and replacement heifers receive shots for Leptospira, and Campylobacter. Calves are given a seven-way clostridium twice prior to weaning. Injections are given in the neck, either intramuscular or subcutaneous. Bull calves are castrated at 61-120 days of age, but not dehorned until 180 days old. Growth implants are not used because the calves are raised specifically for the Laura's Lean Beef program. A variety of treatments for external parasites are used. Calves are dewormed at weaning for stomach worms.

Less than two and one-half percent of the calf crop was affected by conditions such as pinkeye, respiratory disease, scours, or any combination of these factors. Approximately 15 out of 626 total calves were labeled poor doers. Of the entire herd, only 36 of 1500 total head died with the most common cause of death being calving problems. The single factor that contributes to the greatest economic loss for this operation is thought to be reproductive shortcomings, e.g., cows being open or calving late. Calving problems, external parasites, and foot rot are thought to be moderately costly.

Forages. Crops include 230 acres of milo and 189 acres of wheat. Soil tests are performed once every two years for all the acreage. The milo fields are fertilized in the spring with commercial fertilizer and one field is also covered with poultry litter. The cattle graze November to March on the milo stalks. Wheat fields are fertilized in the spring with a commercial fertilizer, grazed by the fall calves, and then harvested.

The remaining 2,027 acres are split into 11 pastures. The acreage is categorized by primary forage as follows: fescue, 300 acres; bermuda, 1,382 acres; and native grasses, 345 acres. These pastures are fertilized in the spring and late summer with a commercial fertilizer and a few selected fields are covered with poultry litter. The poultry litter is available in the winter, usually in March, and is used to top the pastures. Water sources are adequate for all except two of the bermuda pastures and these two fields are baled for hay. The pastures are grazed year round, with the exception that cattle are moved off some fescue to harvest seed and most bermuda (982 acres this year) to bale hay. In addition to grazing, mowing and herbicides are used for weed control.

Supplemental Feeding. Operator 1 is willing to experiment with feeds in developing low-cost rations. Most recently, he used corn gluten. Prior to that, he used wheat mids, which worked extremely well. From December through March, the entire herd is supplemented with hay, either fescue, bermuda, or a fescue-bermuda mix type. About 95 percent of the hay fed is raised. Both the purchased and raised hay is tested for crude protein content (the most recent fescue/bermuda raised hay tested at 11%). Levels of supplemental feed vary according to the weather, cow condition, and forage conditions. Bred heifers and yearling replacement heifers are also fed a supplement of

corn gluten pellets from December to May. The amount varies from four pounds per head per day in the beginning of the feeding period to six pounds per head per day at the end. In addition to the feed supplement, the entire herd is given a complete mineral in the loose form (2-4 oz. per head).

Goals

Operator 1 would like to spend less time working on the farm (particularly driving the tractor and maintaining equipment) to spend more time planning and managing. Improving forage management to reduce winter-feeding is also a goal. More detailed enterprise records are needed to support this goal.

The perceived strengths of this operation are a combination of factors. Operator 1 and Operator 2's farm and non-farm experiences, along with a willingness to learn and study different alternatives plus their work ethic have served them well. Operator 2's willingness to work at maintaining records and organizing the information system and the older son's ability to solve computer problems is an asset as well.

The long-term plan for the structure of the operation is to remain similar to the current arrangement, perhaps on a slightly smaller scale. There are no plans for children to enter into the operation nor does Operator 1 anticipate retiring in the immediate future.

Farm Management Information System

The MIS system in place consists of several interrelated components, including a computer. Both operators learned to use computers through non-farm work experience. A Standardized Performance Analysis (SPA) was completed in summer 1995. This

information was found to be a useful management tool and Operator 1 is interested in completing a multi-enterprise SPA to evaluate each enterprise more individually.

The computer has been helpful in managing the operation, specifically, in financial accounting, budgeting, and ration evaluation. They would like to be able to complete tax computations. Financial records are tracked with Quicken® 6.0. Operator 2 learned about Quicken® through an Oklahoma Cooperative Extension Service (OCES) class several years ago. She is interested in learning to utilize the categories and classes of the system to track separate enterprise records. Accounts are updated frequently (daily to one time per week) and the checks are run two to three times per month. On average, two hours per month are spent analyzing financial records.

Livestock records are being entered in Ranch Master® by Agrisoft. The intent is to be able to track the individual cow data but since this program is still being upgraded, snags in the program are sporadically causing problems. The crop records are currently kept by hand. They are interested in purchasing a crop software program. Finally, the carcass data provided by the packer in the past (and Laura's Lean Beef® in the future) provides data to assist in monitoring the end product.

Sources of Information and Uses

Operator 1 depends on various sources to attain the information used in the cow-calf enterprise. The valuable sources of information are:

- DTN
- *Farm Talk*
- OSU Extension Fact Sheets

- many magazine subscriptions
- Internet

The external information system helps to support specific management decisions. The county Extension agent and area Extension specialists offer useful management information. They subscribe to DTN and find that the Internet provides useful information and services.

New Practices Implemented

Over the course of a year, new practices have been implemented and adjustments made to the existing practices. A set of calves were marketed through the Laura's Lean Beef program. Another set of calves (300 head) are contracted this year with the same program. From the data obtained from the first crop of calves, Operator 1 adjusted the feeding program. He determined that the calves need to go to the feedlot at a heavier weight (800-850 pounds) instead of the typical weight (600 pounds) in order to receive a "low yield bonus" and more effectively reach the desired carcass specifications.

This year Operator 1 decided to experiment with another alternative feed, grazing corn (not just the stalks, which is typical). The corn is intended to be grazed by the stockers prior to slaughter. The intent is to have the stockers graze the field and then be transported to the slaughterhouse. Operator 1 researched the idea of grazing corn by reading magazines and through different studies found on the Internet.

Additionally, a scale was added to the working corrals. The scale is computerized, allowing the operator to enter weights at the working area and then download the data into a spreadsheet program. Individual calves are identified by ear tag

number. The program retains the previous weight of the calf for an immediate weight comparison. The scale is located under the chute for added convenience. All calves are weighed at weaning and periodically individual calves are weighed for a reference of the gain of a specific group.

Critical Success Factors

According to Operator 1, the factors necessary to be successful in the cow-calf business include

- "Love for that type of work". The operators must love to work with the cows and everything involved in the production process. They must have drive to make a profit in the business.
- Willingness to look for new ideas. Successful operators must be receptive to change and not get caught in the old ways just because "it has always been done in years past." The need to seek different alternatives is a necessity just as he has experimented with different feeds to reduce the cost of production.
- Finding a market to fit your product. He recommends that operators must "know the market they are producing for." The niche marketing of Laura's Lean Beef program has worked well for his specific operation, yet just the same, it might not fit with many of the other niche markets.

Future Plans

In terms of future plans, Operator 1 would like to "better assimilate" the production information currently used in the operation. With the addition of the scale

and having individual calf weights and the data from Laura's Lean Beef, Operator 1 would like to make better use of the current information.

Producer G

Two on-farm interviews were conducted with Producer G. Present at the first interview were the farm financial specialist, a beef cattle breeding specialist, and the research assistant. For the second interview, the research assistant, a beef cattle breeding specialist and the forage specialist were present. Operator 1 and Operator 2 were interviewed separately.

Current Organization of the Farm Business

Operator 1 owns and operates a commercial cow-calf operation (130 cows) located in north central Oklahoma. The operation includes 2,388 total acres of land (1,502 acres of pasture and 886 acres of cropland). Wheat, milo, millet, and hay are produced to supplement the herd. Approximately 42 percent of the pastureland is owned and most of the cropland is leased (76 % of the cropland).

In 1965, Operator 1 began farming and has built his cow herd to include 130 females. As Operator 1 is nearing retirement, he is serving on the Farm Credit Services board of directors, which requires him to travel frequently. Operator 1 has been the sole manager of his operation until 1993, when he hired his son in-law, Operator 2 to manage the operation on a daily basis. In addition to his management responsibility, Operator 2 maintains his own operation.

Operator 2 owns and operates his own commercial cow-calf operation (55 cows). The operation includes 480 total acres of land (228 acres of pasture and 252 acres of cropland). He produces wheat along with prairie and bermuda hay to supplement the herd. Most land is leased (about 68 % of the cropland and 65 % of the pasture). Operator 2 has been building this operation for the past three years.

Aside from Operator 1 and Operator 2 there are no full-time employees for their operations, however, two "neighbor kids" are hired during the summer months.

Evolution of the Farm Business

Operator 1 holds a Bachelor of Science degree in Agricultural Education. He began farming this operation in 1965. His wife works as a homemaker and is not involved in the management of the operation. They have two daughters.

Operator 2 also earned a Bachelor of Science degree in Agricultural Education and taught vocational agriculture at the high school level. In 1993, Operator 2 began farming full-time and also began working for Operator 1. His wife is an elementary school teacher. They are expecting their first child in April 1997.

Production Information

Cattle-Operator 1. Currently Operator 1's cow herd includes 130 Angus/Hereford cows with slight influence of Shorthorn and Limousin. Most of the herd calve in the spring (about 85 % of the cows) and the remainder calve in the fall.

Cattle-Operator 2. Operator 2's cow herd currently consists of 55 mature

females primarily Angus/Hereford with influence of Shorthorn and Brangus. The average mature cow weight is approximately 1,100 pounds. In addition to purchasing cow-calf pairs, replacement heifers are raised. This herd is strictly spring calving. The breeding season is 90-120 days. The calves are retained and sold as yearlings at the OKC auction.

Animal Production/Health. Both herds are managed similarly in terms of animal production and health. For Operator 2, very important factors in selecting replacement heifers include growth trait and milk EPDs, reputation of the breeder, structural soundness, pelvic area, weaning/yearling weights, and dam's udder. Birth weight and carcass EPDs as well as frame score are also important factors. Factors considered when culling breeding age females are pregnancy status (open or aborted), calving injury, physical unsoundness (cripple), poor calves, digestive or respiratory problems, and genetic composition. Also bad udder or eyes, and age/thin are reasons to cull a female. When purchasing a bull, the following characteristics are considered very important: birth weight, breed, EPD's (birth weight, growth trait, milk, and carcass), reputation of breeder, structural soundness/visual appraisal, scrotal circumference and weaning/yearling weights. Additionally, price and temperament are important. Infertility, disease, age/bad teeth, performance of offspring, and physical unsoundness (injury/lame) are reasons to cull a bull. Further, too many offspring in the herd is a lesser reason to cull a bull. Breeding bulls are semen tested at the time of purchase.

Generally, replacement heifers are bred at 12-16 months and weigh at least 800 pounds at the time of breeding. The first calf heifers are separated from the cows before

and after calving and calve in segregated calving lots. During calving season, the heifers are checked three times per day while the cows are checked twice a day. All females (heifers and cows) are given no more than one hour after seeing a water bag before being given assistance. Of the 52 cows that calved last year, no assistance was needed during delivery. At birth, the calves are routinely weighed and individually identified. Occasionally, for a difficult birth, calves are fed colostrum.

Prior to breeding, the replacement heifers are vaccinated for brucellosis. When calves are 2-4 months, they are vaccinated with a 7 way Clostridium and given a booster at 4-8 months. Also at 4-8 months, calves are vaccinated for IBR, BVD, PI-3, BRSV, and Pasteurella. Injections are given either subcutaneous or intramuscularly in the neck. Bull calves are castrated at 120-180 days of age. All calves are dehorned at 61-120 days of age. Growth implants are used in the calves (not including replacement bulls) first at 2-4 months old and then again at 5-8 months of age.

Cattle are treated for external parasites with dust bags or oilers, pour-on (once per year), and spray (three times per year). It is not determined if stomach worms or liver flukes are a problem in the herd. The cows are dewormed for stomach worms and flukes once per year. The calves are dewormed for both stomach worms and flukes at weaning. The calf crop was not affected by any of the following conditions: poor doers, scours, respiratory disease, or pinkeye. Of the entire herd, no animals died in the last year. Reproductive lapses (open/late) provide the greatest economic loss for this operation.

Forages. The pasture consists of 228 acres of bermuda and bluestem with a secondary forage of rye and rye/clover. Some pastures are grazed year-round while the

others are only grazed March-August and May-August. These pastures are soil tested either every two years or once every three to four years. Commercial fertilizer is applied during the spring and late summer. Additionally, one of the pastures is overseed with legumes. The soil fertility is checked annually. For nutritional reasons, rotational stocking and intensive grazing are the grazing systems used in this operation. There are some weed problems and herbicides are applied as a method of weed control. The stocking rate is approximately 4.4 acres per animal unit.

Wheat is produced on about 250 acres. For this land, soil tests are performed once per year. Commercial fertilizer is applied in the fall and spring. Buckwheat and cheat are the species of weeds that are a problem. Herbicides are the chosen method of weed control. One field of wheat (80 acres) is not grazed while the remainder of the wheat is grazed from January through March.

Supplemental Feed. The entire herd is supplemented from November through March. The herd is fed hay (prairie/bermuda) and a grain supplement, as well as grazed on warm season and native pastures. All the hay fed to the cattle is raised. The calves are grazed on cool season pasture. A commercial grain supplement of 15-25 percent protein is fed to the entire herd. For the cows, the amount of hay varies with weather, cow condition, and closeness to calving. Three pounds per head per day of the grain supplement is fed to the cows throughout the feeding period. For the bulls, feed level varies according to weather and bull's condition. Four pounds per head per day of the grain supplement is fed to the bulls for the duration of the feeding period. For calves, the feed level varies according to weather. The calves are supplemented with two pounds per

head per day of the grain. Also, the entire herd is given a complete mineral in loose form and salt.

Farm Management Information Systems

The current information system consists of several components, including a computer. Operator 2, the primary computer operator, has had no formal computer training and is basically self-taught. The computer has been helpful in managing the operation, particularly in financial accounting, tax computation, access to an electronic information service, and to a lesser extent, business planning. Financial records are tracked with Quicken®. Accounts are updated once per month. Financial records are analyzed about fifteen hours per month. The livestock records for the operation are kept in a manual/paper system. Individual cow records are kept. The crop data are in pocket notebooks and notes on calendars.

The external information system also helps to support specific management decisions. The veterinarian, tax preparer, and crop/pest management consultant provide the most useful information. Further, useful information was found from the accountant/financial advisor, cooperative Extension-county educator and specialists, university professors, and the Natural Resource Conservation Service.

Goals

Operator 2 finds working with livestock and growing crops to be the most enjoyable, while he would like to spend less time baling hay. The long-term plan for this

operation is for Operator 2 to gradually take over part of Operator 1's operation, at a rate of about 10 percent per year for five years.

The perceived strengths of this operation include the well-planned breeding system and herd sire selection. Operator 2 would like more cool-season grasses and more crop diversification to improve cash flow. Additionally, he would like to produce better females, perhaps cull more of the poorer producing cows to sell heavier calves.

Producer H

Walt Prevatt, Extension agricultural economist at Auburn University, was the lead investigator for this case. He conducted the interviews, collected the data, and compiled the summary report. Two on-farm visits were conducted with Producer H. Present at both meetings were the regional farm business analyst and the agricultural economist. The first farm visit was used to complete the interview survey instruments. The pre-interview packet was mailed to the operator prior to the farm visit, but it was not completed prior to the visit. The second survey instrument was not completed at the first meeting as the operator felt that he needed more time to think about it. General discussion and a tour of his operation were included in the first meeting. The second survey was completed during the second meeting. In addition, preliminary SPA report was developed and later finalized over the phone and mail. The farm business analyst was very helpful in providing financial information about the farming operation.

Current Organization of the Farm Business

Producer H is a mixed enterprise farm located in west central Alabama owned by a husband and wife, Operator 1 and Operator 2. The enterprises of this operation include cow-calf, hay, soybeans, timber, Moorman's Feed Representative, user fee hunting, and custom planting wildlife plots. The operation includes 1,533 total acres of land (658 acres of crop land and 875 acres of pastureland). The operation is split between three major parcels of land. However, multiple sites are used for cropland (soybeans and hay). Most of the cropland is rented (76 %) while most pastureland is owned (80 %). The rental land used by this operation is leased from family and local land owners.

Operator 1 has been farming on his own for more than 25 years. This operation is organized as a sole proprietorship and has three full-time employees. The full-time employees are involved in all phases of his farming operation. Operator 2 helps with farm activities but also has an off-farm job. This operation is a member of the regional Farm Business Analysis Association, that provides assistance with financial record keeping and decisions. Operator 1 is the primary decision-maker; however, Operator 2 and her father are consulted in the decision-making process. The operators have two children, ages 7 and 3.

Evolution of the Farm Business

Operator 1 was raised on a farm in the Lownesboro area. Since high school, he has been involved in numerous facets of agriculture. He attended two years of college and returned to the farm. He purchased cattle, land, and equipment from his parents and others to get started. He will continue to purchase family owned land in an effort to

minimize federal estate taxes. This operation has been a member of Alabama Farm Business Analysis Association for seven years.

Production Information

Cattle. Operator 1 has been decreasing the size of his cow herd since about 1994 due to the decline in calf prices. He currently has about 230 mature cows. The females are predominantly Brangus and Braford crosses. The average mature cow weight is approximately 1,100 pounds. Bulls are all certified through the Alabama Beef Cattle Improvement Association. Breeds of bulls include Angus, Charolais, Limousin, and Simmental. Generally, approximately 15 percent of the calf crop is kept as replacement heifers. Heifers are bred to calve at two years of age. The remainder of the calves are sold at weaning in late August. His breeding season runs from January 1st through May 25th (calving from about October 13th to March 6th). During 1996-97, he participated in the Alabama Steer Feedout program where he sent three steers to Kansas to be fed for slaughter along with other Alabama cow-calf producers.

Animal Production/Health. The cattle are split into two groups and observed daily. Body condition scores of cows are estimated 50 days prior to calving (September) and average about six for two year olds and mature cows. Very important factors in purchasing or selecting replacement heifers include breed, structural soundness/visual appraisal, temperament, and weaning/yearling weight. Very important reasons for culling breeding age heifers or cows include poor calves, bad udder, bad eyes, age/thin, and temperament. Very important factors in purchasing or selecting bulls include birth

weight, breed, frame score/hip height, price, reputation of breeder, structural soundness/visual appraisal, scrotal circumference, temperament, and weaning/yearling weight. Very important factors in culling bulls include age/bad teeth, bad eyes, disease, infertility, physical unsoundness, and temperament.

Replacement heifers are bred between 12-16 months of age and weigh a minimum of 800 pounds at breeding. No animals are artificially inseminated. All cattle are pregnancy checked in September each year. The first calf heifers are separated from the mature cow herd before and after calving and calve in a special calving pasture. Cows are checked one time per day during calving season and heifers are checked three times per day. Of the fifteen heifers that calved last year, only one heifer needed assistance with delivery (easy pull delivery). None of the mature cows required any delivery assistance.

Cow and replacement heifers receive shots for Leptospira and Vibriosis and are dewormed annually. Calves receive a seven-way Clostridium and are dewormed at between two to four months of age. Shots are administered intramuscularly in the neck. All calves are dehorned at 61-120 days and receive a growth implant at that time. He uses Moorman's mineral feed for external parasite control. He lost five calves to unknown conditions during 1995-96.

Scours and pinkeye did not affect the calf crop. Less than one percent of the calf crop was affected with respiratory disease. Open cows was considered to be very important and the greatest economic loss of the operation.

Forages. Crops include 396 acres of soybeans and 262 acres of hay. Soil tests are performed once every two years. Both crops are fertilized in the spring. The cattle are rotationally grazed year-round on the 875 acres of pastureland. Pastureland is fertilized in the fall and spring. Forage varieties include fescue and dallis grasses. Stocking rates for cattle are about average for the area (4.17 and 3.70 acres/au). Brush/weed control is generally performed once annually with some combination of mechanical and herbicide inputs. Water tanks are available in all pastures and water shortages are rarely a problem.

Supplemental Feeding. Operator 1's winter feeding program consists of supplementing the cow herd for about 140 days (December-April 15th) with hay (bermuda, Johnson, Bahia) at 20 pounds per head per day, 38 percent protein blocks at 0.75 pounds per head per day, and cool season pasture (fescue). All hay is raised and tested for crude protein. The majority of hay is stored outside, no cover. In addition to the supplemental winter feed, the entire herd is given a complete mineral in block form from April through November.

Goals

Operator 1 enjoys being his own boss and working outside. He would like to spend less time with paperwork (government forms, income taxes, payroll, etc.). He would like to make his cow herd more profitable.

Critical Success Factors

Operator 1 would like to improve the reproductive rate of his cow herd. He recognizes he needs to maintain abundant and good quality grasses to improve productivity of his cow herd. The current revisions of the Conservation Reserve Program should result in more cropland and pastureland available for renting at more affordable rates, should he decide to expand the operation.

Farm Management Information Systems

This operation has been a member of the Alabama Farm Business Analysis Association for seven years. Detailed farm production and financial information has been kept for the various enterprises. The farm business analyst meets and works with Operator 1 quarterly. He is also available to help the operators evaluate financial decisions.

Operator 1 enters receipt and expense data into farm records once per month. He typically spends two hours per month keeping financial records and three hours per month analyzing them.

The operators are considering the purchase of a microcomputer for farm production and financial records. However, they are reluctant to adopt another form of record keeping since it may differ from their current method. Key concerns are will the computer pay for itself and do they have the extra time to devote to learning a new system of keeping records.

Observations

The operators are knowledgeable and hard working people. They have developed a diversified farm operation which is not solely dependent on farm products and farm product prices. They have the management skills and financial resources to continue their current enterprises. Expansion of any of their enterprises is possible with improving profit conditions.

Producer I

Walt Prevatt, Extension agricultural economist at Auburn University, was the lead investigator for this case. He conducted the interviews, collected the data, and compiled the summary report. One on-farm visit was conducted with Producer I. The pre-interview survey was mailed prior to the first meeting. Attending the first meeting was Operator I and the agricultural economist, at which time the first survey was completed. The second survey was discussed but not completely finished. Completion of the second survey was accomplished via phone and mail. Since the operator had worked with the agricultural economist before and expressed an interest in completing a SPA, SPA input forms were completed and a preliminary report developed. The SPA was finalized via phone/mail. The Operator's prior banking experience helped make this interview easier to complete.

Current Organization of the Farm Business

Producer I is a cow-calf enterprise located in northwest Alabama, owned and operated by Operator I. The cow-calf enterprise is the sole enterprise of this operation.

The operation includes 589 acres of leased pastureland (539 acres of pasture and 50 acres hay). The land used by this operation is leased from his family.

Operator 1 has been farming on his own for more than twenty years. This operation is organized as a sole proprietorship and has one full-time employee. Operator 1 farmed cotton and grazed stocker cattle prior to entering the cow-calf enterprise. Operator 1 is the primary decision-maker for this enterprise. He has two grown children who have graduated from college and taken professional positions elsewhere.

Evolution of the Farm Business

Operator 1 was raised in a predominantly row-crop area. Since college he has been involved in numerous facets of agriculture (agricultural lender, cotton, stocker cattle, pasture establishment, cow-calf, and others). Operator 1 graduated from Auburn University with a bachelor's degree in finance. He worked as an agricultural lender prior to entering farming. He operates leased land, which is surrounded by row-crops (primarily cotton). Operator 1 established the pastures, built the fences, and working facilities on this leased land. He purchased the cow herd and equipment a little at a time. Operator 1 also owns interest in other non-farm businesses; however; the cow-calf enterprise is his main business.

Production Information

Cattle. Operator 1 has been decreasing the size of the cow herd since 1995 due to a decline in calf prices. He plans to begin increasing the size of his cow herd. He started in 1997 with 267 cows at the beginning of his calving season. The females are

predominantly continental and British-continental crosses. The average mature cow weight is 1,100 pounds. The majority of the bulls are certified through the Alabama Beef Cattle Improvement Association. Breeds of bulls include Angus, Gelbvieh, and Simmental. He raises most of his replacement heifers and they are bred to calve at two years of age. The replacement heifers are bred to calve 30 days before the mature cow herd. Calves are weaned during August and the majority are sold in truck load lots off the farm. His breeding season runs from December 20th through April 20th (calving from about September 13th through February 8th).

Operator 1 is working with others to organize a replacement heifer sale. He would like to sell weaned replacement heifers off the farm and through an organized area auction. His cattle are of good quality and should provide other local cattlemen with a good source of quality weaned replacement heifers.

Animal Production/Health. The cattle are split into three groups and observed daily. Body score condition scores of cows are estimated fifty days prior to calving (August) and range between five and eight for both two year olds and mature cows.

Very important factors in purchasing or selecting replacement heifers include breed, structural soundness/visual appraisal, temperament, weaning weight, dam's udder, and dam's temperament. Very important reasons for culling breeding age heifers and cows include pregnancy status, calving injury, physical unsoundness, poor calves, bad eyes, age/thin, and temperament. Very important factors in purchasing or selecting bulls include birth weight, breed, EPD's (birth weight and growth), structural soundness/visual appraisal, scrotal circumference, temperament, and weaning weight/yearling weight.

Very important factors in culling bulls include age/bad teeth, bad eyes, disease, infertility, performance of offspring, physical unsoundness, and temperament.

Replacement heifers are bred at about sixteen months of age and weigh a minimum of 800 pounds at breeding. No animals are artificially inseminated. The first calf heifers are separated from the mature cow herd before and during calving and calve in a special calving pasture. Cows and bred replacement heifers are checked three times per day during calving season.

Forages. The cattle rotationally graze year round on the 539 acres of pasture land. All improved forages (pasture and hay) are fertilized with commercial fertilizer. Forage varieties include fescue and hybrid bermuda. The stocking rate ranges from 1.25 to 1.6 acres per head depending on the cattle cycle. Brush/weed control is generally performed on an as needed basis with some combination of mechanical and herbicide inputs. Water is available in all pastures and water shortages are rarely a problem.

Supplemental Feeding. Operator 1's winter feeding program consists of supplementing the cow herd for about 90 days (December 25th through March 20th). The feed supplements include a home feed mix (broiler litter/corn screenings) fed at about 30 pounds per head per day and bermuda hay fed free choice. All hay is raised on the farm and baled in large round rolls. The majority of hay is stored outside with no cover. In addition to supplemental feed, cows graze cool-season fescue. Also, a complete mineral is provided April through November.

Goals

Operator 1 enjoys the cow-calf enterprise and is interested in improving the genetic base of his cow herd. He would like to spend less time doing the physical labor tasks in his operation due to rheumatoid arthritis. His financial goals are not written, but he would like to make his cow herd more profitable. He is making plans to sell more of his heifer calves as weaned replacement heifers to local cattlemen.

Critical Success Factors

Operator 1 would like to improve the genetics of his cow herd and their reproductive rate (weaning percent). He does a good job with forage production and usually maintains quality pastures from April through September. Very little pasture land is available for leasing in his area. Hence, opportunities for expansion are limited to the current size of leased acreage.

Farm Management Information Systems

Operator 1 keeps his own cash financial records using Quicken®, Version 8. He uses an accountant to prepare his federal income tax return. Operator 1 enters receipt and expense data into farm records twice per month. He typically spends one hour per month each keeping and analyzing financial records. In addition, Operator 1 keeps herd records on his cow herd for selection and culling decisions.

Observations

Operator 1 is knowledgeable and hard working. He has the management skills and financial resources to continue and expand the cow-calf enterprise. However, expansion is dependent on improving profit conditions.

CHAPTER V

FINDINGS AND ANALYSIS

Introduction

The purpose of this study is to identify and better understand the integrated resource management practices that allow beef cattle producers to efficiently achieve their production and financial goals. In this chapter, the evidence from the case study producers are presented and analyzed.

Overview of Producers

Nine case study producers representing two states were used in the study. Table 1 summarizes the demographic composition of the case study producers. The general geographic location is identified. The herd size is based on the number of cows for each operation at the time the data were collected. A variety of herd sizes are included. The cow-calf operations ranged in size from 80 cows to 700 cows. The herd type refers to the specific classification of production that each operation targets (commercial, seedstock, registered, club calf). Producers were classified into stages that depict the specific phase in the evolution of each cow-calf operation. The researchers defined the stage categories. Stage I is the introductory stage of operation in which the producer is beginning to

Table 1. Overview of Operators

Producer	State	Area of State	Herd Size	Herd Type	Stage of Operation
A	OK	NW	240	Club Calf/ Commercial	Stage I: started farming full-time in 1994
B	OK	North Central	80	Commercial	Stage I: started increasing herd size in 1994, operated current ranch for less than 5 years
C	OK	SW	400	Commercial	Stage II: operating current ranch for 15 years, leases on land expire in 2000, considering liquidation
D	OK	NW	220	Commercial	Stage III: farming full-time for 41 years, will farm as long as health permits, retirement forthcoming
E	OK	SE	430	Seedstock	Stage I: beginning to establish herd, purchased in fall 1995
F	OK	NE	700	Commercial/ Seedstock	Stage II: sustain herd size at current level, began farming full-time in 1986
G	OK	North Central	185	Commercial	Transitional phase: Producer 1 in Stage III currently transferring operation to Producer 2, Stage I, started farming full-time 3 years ago.
H	AL	South Central	230	Commercial	Stage II: operating current operation for more than 25 years, downsizing cow herd due to current calf prices
I	AL	NW	255	Commercial	Stage II: sustained own cow-calf enterprise for more than 20 years, decreased cow herd because of lower calf prices

establish the cow-calf enterprise. Stage II is the intermediate stage in which the producer has developed a viable enterprise but is still looking to improve the operation. Stage III refers to an operation where the producer has an established cow-calf operation and plans no significant changes in the operation. The operation is sustained at a constant level of production and a Stage III operator may be within five to ten years of retirement and assessing different alternatives for the cow-calf enterprise.

Selected Characteristics of Producers

The producers varied in terms of age, educational background, and experience. Selected characteristics of the producers are described in Table 2. The characteristics cited for each operation are those of the primary decision-maker(s). Producers B, C, E, and F have shared decision-making between Operator 1 and Operator 2, respectively. The producers ranged in age from 30 years to 63 years. The difference in age is expected to be explanatory of different debt levels. The highest educational level achieved by the primary decision-maker(s) ranged from high school to a bachelor's degree. Four of nine producers operated the current farm/ranch for more than twenty years. Three producers had been in operation between 11 and 20 years. The expectation of more years of experience operating a specific farm/ranch should result in a lower cost of production. "Cow-calf percentage of Total Farm Gross Revenue" is the cow-calf enterprise gross revenue as a percentage of the total farm gross revenue and was extracted from the SPA data. The cow-calf percentage of gross farm revenue varied from 25% to 100%. If the producer held an off-farm business position then this experience is considered relevant (indicated with "yes"). If the producer held an off-farm business position then it is

expected to lead to a lower cost of production in the long-run due to experience in a business-oriented environment. The majority of the producers did not have off-farm business experience.

Table 2. Selected characteristics of producers

Producer	Age	Education	Years Operated this ranch	Cow-calf Percentage of Gross Farm Revenue	Off-farm Business Experience
A	44	B. S. Ag. Education	20+ years	N/A	No
B*	34 \ 33	N/A	less than 5	N/A	Yes
C*	41 \ 40	High School \ B. S. Secondary Ed.	11-20 years	50%	No
D	63	High School	20+ years	100%	No
E*	42 \ 40	High School \ Some College-Vet Med.	11-20 years	90%	No
F*	57 \ 56	Some college-drafting/ Some college	11-20 years	50%	Yes
G	30	B. S. Ag. Education	less than 5	50%	No
H	46	Some college	20+ years	25%	No
I	52	B. S. Finance	20+ years	100%	Yes

Note: * indicates producers with shared decision-making responsibilities. The first number represents Operator 1; the second number represents Operator 2 as defined in the case study summaries.

Record Keeping Systems

The financial and livestock record keeping systems of the producers is shown in Table 3. The record systems varied widely, from keeping only "mental records" to extensive use of both financial and livestock software. All producers use some type of a

Table 3. Record Keeping Systems by Producer

Producer	Cattle	Financial	Person Responsible for Records	Hours/month analyzing financial records	Crop/Forage
A	manual records- mainly mental notes	mental notes only	Operator 1	3	field records- fertilizer used, herbicides applied, insectides applied
B	manual record system	manual records	Operator 2	1	none
C	manual records- would like to computerize	starting QuickBooks	Operator 2	2	field records-fertilizer used, herbicides applied, machinery operations performed, forage yields
D	manual records	Accountant	Accountant	0	none
E	AHMS (American Angus Assoc. Software), manual record system- extensive, complete	Quicken	Operator 2	3	enterprise records kept; field records- fertilizer, herbicides; crop records- machinery operations performed, forage yield, cost/revenue
F	Ranchmaster, manual system	Quicken- multi-enterprise extensive use	Operator 2	2	field/crop records- fertilizer, manure, herbicides, machinery (crop only), crop and forage yield, cost/revenue
G	manual record system	Quicken	Operator 2	15	crop records- fertilizer, herbicides, insecticides, machinery, crop and forage yield, cost/revenue
H	Record keeping association, manual record system	Record keeping association	Record keeping Association	2	field records-fertilizer, forage yield; crop records- herbicides, insectides, machinery, forage yield, costs/revenue
I	Red Wing, manual record system	Quicken	Operator 1	1	enterprise records kept; field records- fertilizer, herbicides, forage yield, costs/revenue

manual record keeping system for the cattle production records. Three of the nine producers use a computer software program for livestock record keeping such as Ranch Master by Agrisoft, Red Wing, and American Angus Association Software, AHMS, to help manage the cattle production information in addition to a manual system. Five of the nine producers used a general business accounting software such as Quicken® or Quick Books® to maintain their own farm financial records. Two producers maintained strictly a manual based system. One producer was a member of a record keeping association that assists in the maintenance and analysis of financial records. Another producer did not maintain financial records separate from those records kept by the accountant. The hours per month spent analyzing financial records was also reported. Most producers spent between one and three hours per month of financial record analysis, while one producer indicated no time doing so and one producer spending as much as fifteen hours per month analyzing financial records. This figure does not include the time spent maintaining the information.

The crop and forage records kept varied among the producers. Two of the nine producers maintained enterprise records for specific crop/forage. Seven producers kept field records such as fertilizer and herbicide use, machinery operations, annual yield, and cost of production/revenue for forage/crop on a field-level or on a total enterprise basis. Two producers did not maintain any crop/forage records.

External Information

The producers used many different sources of information. Table 4 shows use of external information by producers and the degree of usefulness of each source. From a

Table 4. Use of Agricultural Professionals and Information Services

Source	Source used/year by producer									# producers per source	Usefulness to producer									average usefulness
	A	B	C	D	E	F	G	H	I		A	B	C	D	E	F	G	H	I	
Accountant/financial advisor	0	0	3	0	2	2	1	1	0	6	0	0	5	0	4	3	4	3	0	3.8
Farm record agent	0	0	2	0	2	0	0	2	0	3	0	0	5	0	4	0	0	5	0	4.7
Tax preparer	1	1	3	3	2	2	1	1	1	9	2	4	5	5	5	4	5	2	5	4.1
Livestock management advisor	0	0	2	0	0	0	0	0	0	1	0	0	3	0	0	0	0	0	0	3.0
Crop/pest management consultant	2	0	2	0	0	0	1	0	0	3	4	0	3	0	0	0	5	0	0	4.0
Computer software vendor	0	0	2	0	2	3	0	0	0	2	0	0	3	0	5	0	0	0	0	4.0
Computer hardware vendor	0	0	1	0	0	2	0	0	0	2	0	0	3	0	0	0	0	0	0	3.0
Farm management consultant	0	0	2	0	0	0	0	0	0	1	0	0	4	0	0	0	0	0	0	4.0
Cooperative extension-county agent	0	0	4	0	2	3	1	0	2	6	0	0	4	0	5	4	4	0	1	3.8
Cooperative extension-specialist	4	0	4	0	2	2	1	0	4	6	5	0	4	0	5	4	4	0	5	4.5
University professor	0	0	3	0	0	2	1	0	4	4	0	0	5	0	0	4	4	0	5	4.5
Vocational agriculture instructor	3	0	0	0	0	0	0	0	0	1	5	0	0	0	0	0	0	0	0	5.0
Veterinarian	4	3	4	2	3	2	2	2	0	6	5	4	5	5	5	3	5	4	0	4.5
Natural Resource Consrv. Service	0	0	2	3	1	0	1	2	0	5	0	0	3	5	3	0	4	3	0	3.6
Farm Service Agency (FSA)	0	2	2	0	0	2	2	2	0	5	0	4	3	0	0	3	2	3	0	3.0
State Department of Forestry	0	0	2	0	0	0	0	0	0	1	0	0	3	0	0	0	0	0	0	3.0
State Department of Fish & Game	0	0	0	0	0	0	0	2	0	1	0	0	0	0	0	0	0	2	0	2.0
Other producers	3	0	4	4	2	2	0	3	2	7	4	0	4	5	4	3	0	4	5	4.1
Computer Information Services	0	0	3	0	4	4	0	0	0	3	0	0	5	0	5	4	0	0	0	4.7
Internet	0	0	2	0	0	4	0	0	0	2	0	0	4	0	0	4	0	0	0	4.0
	times the sources were used/year 0= not used 1= used 1 time/year 2= used 2-5 times/year 3= used 6-10 times/year 4= used 10+ times/year										usefulness 1=1 low/slightly 2=2 3=3 moderate 4=4 5=5 highly									

list of 20 sources, producer use varied from 3 sources to 18 (Table 5). For the nine producers, the mean number of sources used annually was 8.3. Means were calculated to establish a reference point among the producers in this study. This information is intended for use with the producers in this study only.

The highest used sources of information were the tax preparer, veterinarian, other producers, and cooperative Extension specialists. All the producers used the tax preparer, with the frequency of use ranging from once per year to six to ten times per year. The usefulness of the tax preparer varied from two (slightly useful) to five (highly useful). The mean usefulness for the tax preparer was 4.0. Eight producers use the veterinarian, the next most used source of information. The veterinarian was used at a frequency that ranged from at least two to five times per year to more than ten times per year. The usefulness of the veterinarian ranged from three (moderately useful) to five (highly useful), with the mean usefulness of a veterinarian to be 4.5. Seven producers used "other producers". The usefulness of "other producers" ranged from three (moderately useful) to five (highly useful), with the mean usefulness of 4.1. Six producers used a cooperative Extension specialist. The cooperative Extension specialist was consistently useful, ranging from four (moderate/highly useful) to five (highly useful) with a mean usefulness of 4.5. Of the agricultural professionals and information services that were most used, the cooperative Extension specialist was found to have the highest usefulness mean.

Sources of information only used by a single producer included livestock management advisor, farm management consultant, vocational agriculture instructor, Department of Forestry, and the State Department of Fish and Game.

The results of this study are consistent with the research by Batte, Jones, and Schnitkey in that the tax preparer, veterinary consultant, and county agent were used by more than 50 percent of the producers. Additionally, the tax preparer and the veterinarian were reported as being quite useful. External information sources indicate that the tax preparer and veterinarian could be a high priority for Extension and research to target with educational programs as these are consistently the most used sources by cow-calf producers.

Table 5. Summary of External Information

	Producers									
Sources/Usefulness	A	B	C	D	E	F	G	H	I	Mean
Number of sources used	6	3	18	4	10	12	9	8	5	8.3
Average usefulness	4.2	4	3.9	5	5	3	4.1	3.3	4	4.0

An analysis was done of the use of external information sources according to each producer's Stage of Operation (Stage I, Stage II, Stage III- refer to Table 1). Producer D was the only Stage III producer. Relative to the producers in the other two stages, the Stage III producer used the fewest sources of information; however, these sources provided the most useful information. This indicated that the experience and insight of the Stage III producer narrowed the range of sources which were most useful. Stage II producers included C, F, H, and I. On average, these producers used the most sources of information; however, these sources provided the producers the least useful information. Use of many sources can be attributed to exploring different alternatives for the operation. Producers A, B, E, and G were Stage I producers. On average, the Stage I producers used less sources of information relative to Stage II, but found those sources to

be more useful than Stage II producers. It is apparent that producers in all stages of operation use a variety of external sources to attain their information.

Research and Extension Use by Producers

The number of producers that used Extension personnel (county agent and specialists) and/or a university professor could be an indication of whether or not Extension personnel have a clear understanding of cow-calf producers' wants, needs, and limitations. In this section the means are calculated to establish a reference point among producers in this study. Due to the small sample size, means are reported for a point of reference only and are not intended to be emphasized in the results. The mean usefulness of each source of research/extension personnel are reported.

Table 6 shows data on the use of research and Extension sources. Five of the nine producers used the services of the county Extension agent, ranging from once per year to more than ten times per year. The usefulness of the county agents ranged from one (low/slightly useful) to five (highly useful). They were moderately useful with a mean usefulness of 3.6 (see Table 4). Six of the nine producers used the services of Extension specialists, ranging from once per year to more than ten times per year. The usefulness of Extension specialists ranged from four (moderate/highly useful) to five (highly useful). Extension specialists were found to be highly useful with a mean usefulness of 4.5 (see Table 4). Four of the nine producers used the services of a university professor, ranging from once per year to more than ten times per year. The usefulness of the university professor ranged from 4 (moderate/highly useful) to 5 (highly useful). Producers rated university professors as highly useful with a mean usefulness of 4.5 (see Table 4).

The usefulness score of Extension specialists and university professors indicated that they were understanding and meeting the needs of those producers seeking their advice by providing the level of expertise sought by producers. Given that the five producers using the county agents were the same as those using the Extension specialists and the university professor, it appeared that expertise beyond the county agents level might have been needed and was valued more highly.

Table 6. Use of research and Extension

	Annual frequency of use			Usefulness		
Producer	county agent	area specialist	university professor	county agent	area Specialist	university professor
A	0	6-10	0	--	5	--
B	0	0	0	--	--	--
C	10+	10+	2-5	4	4	5
D	0	0	0	--	--	--
E	2-5	2-5	0	5	5	--
F	6-10	2-5	2-5	4	4	4
G	1	1	1	4	4	4
H	0	0	0	--	--	--
I	2-5	10+	10+	1	5	5

The frequency of use of external sources is reported in Table 7. As previously stated, the three most used external sources were the tax preparer, veterinarian, and "other producers". All producers used a tax preparer, while eight of the nine producers used a veterinarian. Seven of the producers sought information from "other producers". Five sources of information were only used by one producer, which include livestock

management advisor, farm management consultant, vocational agriculture instructor, State Department of Forestry, and the State Department of Fish and Game. Relative to other sources, the research and Extension personnel were used moderately, neither being the most nor the least used source of external information.

Table 7. Annual Frequency Use of External Sources

Source	# producers using each source
Tax preparer	9
Veterinarian	8
Other producers	7
Cooperative Extension-specialist	6
Accountant/financial advisor	5
Cooperative Extension-county agent	5
Natural Resource Consrv. Service	5
Farm Service Agency (FSA)	5
University professor	4
Farm record agent	3
Crop/pest management consultant	3
Computer Information Services	3
Computer software vendor	2
Computer hardware vendor	2
Internet	2
Livestock management advisor	1
Farm management consultant	1
Vocational agriculture instructor	1
State Department of Forestry	1
State Department of Fish & Game	1

Selected Variables of Production Practices

Selected variables of production practices such as feed costs, and production performance measures are summarized in Table 8. Calf crop percentage is calculated as the number of females carrying calves to full term expressed as a percentage of the

exposed females. The calf crop percentage was extracted from the SPA data. The range of calf crop percentage ranged from slightly above 60 percent to nearly 92 percent. Two of the nine producers had a calf crop percentage greater than 90 percent. The number of pounds weaned per exposed female was the total weight of all weaned calves, including replacement animals, retained ownership calves, and market calves expressed in terms of exposed females. Pounds weaned per exposed female is also taken from the SPA reports. Pounds weaned per exposed female ranged from 327 to 584 pounds. The feed and grazing costs included both raised and purchased feed and the grazing cost for feed fed to all classes of animals within the cow-calf enterprise (breeding cows, bulls, replacement heifers, calves) and figured on a per cow basis. As the feed costs decrease, it is expected that the cost of production will also decrease. Net income per cow is taken from the SPA reports. This is figured by taking the net income for adjusted for taxes and divided by the average value of assets, then figured on a per cow basis. SPA data was not available for producers A, B, and E.

Table 8. Selected Variables of Production Practices

Producer	Calf Crop Percentage	Pounds Weaned/ Exposed Female	Feed & Grazing Costs Per Cow	Net Income Per Cow
A	N/A	N/A	N/A	N/A
B	N/A	N/A	N/A	N/A
C	91 %	584	$348.05	($150.14)
D	81 %	500	$172.42	($12.85)
E	N/A	N/A	N/A	N/A
F	92 %	482	$222.14	$160.32
G	92 %	416	$289.00	($26.21)
H	61 %	327	$284.70	($75.24)
I	61 %	362	$303.24	($196.26)

Computer Use

The use of a computer in business tasks varied among the producers. Table 9 shows the cross-section of computer use by the producers. Four of the nine producers adopted and used a computer in the cow-calf enterprise. All producers who adopted the computer found it to be very useful. The computer either saved the producer's time or provided better information than would be provided by "hand" records.

Table 9. On-Farm Computer Use

Producer	Computer used in various tasks	Usefulness
A	No	--
B	No	--
C	No	--
D	No	--
E	Yes	5
F	Yes	5
G	Yes	5
H	No	--
I	Yes	5
		Usefulness: 1-2=low 3=moderate 4-5=highly

The computer was found to be most useful to all producers in the areas of business accounting, tax computations, and business correspondence. There was more variation among the producers in terms of usefulness for herd record keeping/ ration evaluation, ranging in usefulness from three to five with a mean usefulness of four.

Integrated Resource Management Index

Disciplinary specialists in the areas of animal science, agricultural economics, agronomy, and veterinary medicine evaluated the management practices of the case study cow-calf producers using the information in the interview packet and knowledge of the producer gained from the case study. Using their professional judgement they rated each producers' adoption of recommended management practices within their respective disciplines. An index score based on a scale of 1 to 10, with 1 being the least desirable and 10 being the most desirable, was developed for each discipline. An aggregate index score for each producer was then calculated based on the index scores from each discipline.

Animal Science: The animal science specialist (Dr. S. L. Dolezal) identified seven areas of critical management practices from the Animal Production/ Health section of the interview packet (see Appendix D). The producer was evaluated on the following management practices (Table 10).

1. Body Condition Scoring: This score was based on whether the producer knew how to body condition score their cows and then if they implemented the practice in their operation.
2. Selection of replacement heifers: Factors considered important when purchasing or selecting replacement heifers include birth weight, EPD's, frame score, structural soundness, weaning weight/yearling weight, temperament, dam's udder, and dam's temperament.

3. Culling of breeding females: Factors considered important when culling breeding age heifers or cows include pregnancy status, calving injury, physical unsoundness, poor calves, digestive problems, respiratory problems, bad udder, bad eyes, age/thin, temperament, and dry cow/lost calf.
4. Selection of breeding bulls: Factors considered important when purchasing or selecting a bull include birth weight, EPD's, frame score, structural soundness, reputation of breeder, scrotal circumference, temperament, and weaning weight/yearling weight.
5. Culling of breeding bulls: Factors considered important when culling bulls include infertility, performance of offspring, physical unsoundness, size, temperament, and too many offspring in the herd.
6. Breeding Soundness Evaluation: Bulls should be tested at least once per year.
7. Calving information/difficulty: During the calving season, the management of the cows was evaluated as well as what kind of calving assistance was necessary.

Table 10 shows the index score as determined by the animal science specialist. Many producers indicated the area of "Body Condition Score Cows" to be the most deficient.

Table 10. Animal Science Critical Management Factors

Critical Management Factors	Producers								
	A	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**
1. Body Condition Score cows	0	0	10	0	0	3	0	10	10
2. Replacement heifer selection	7	10	8	10	10	10	10	8	7
3. Factors for culling females	7	10	10	10	10	10	10	10	10
4. Bull selection	5	10	10	10	10	10	10	10	10
5. Factor for culling bulls	10	10	10	10	10	10	10	10	10
6. Breeding Soundness Evaluation	10	6	10	9	10	9	6	4	10
7. Calving information/difficulty	10	9	10	10	10	10	10	10	10
Animal Science Index Score	7.0	7.9	9.7	8.4	8.6	8.9	8.0	8.9	9.6

Financial Management: The farm financial management specialist (Dr. Damona Doye) identified five areas of critical management factors from the following sections of the interview packet: record keeping, computer use, and goals and management (see Appendix D). The critical practices are noted in Table 11.

1. Goals, management, and marketing: Factors considered important included were years the producer worked on a ranch, whether written goals were maintained for the ranch operation or for the family, the importance of profitability in the beef enterprise, and whether marketing strategies went beyond cash at harvest.
2. Farm Financial Record Systems: Factors considered were who keeps the farm business records, the type of financial record system, the method of record keeping, whether enterprise records were maintained, the frequency that receipt and expense data were entered into farm records, amount of time spent analyzing farm financial records, existence of an estate plan and retirement plan, and whether a separate bank account for the farm business (or ability to sort out farm expenses) was maintained.
3. Crop/Forage Record System: Factors viewed favorably were whether the producer maintained crop/forage records such as fertilizer and herbicide use, machinery operations, yield annually either on a field-level or on a total enterprise basis, whether the producer developed cost of production and revenue by enterprise or field, and the number of methods used to record crop data.

4. Livestock Record System: Positive factors included individual breeding animal identification and records kept of feed fed to animals on a total farm basis, on a species basis, on a group level within species, or on an individual animal basis.
5. On-farm Computer Use: Score was based on whether the producer uses the computer in any aspect of the farm business plus the variety of tasks for which it was used.

The Financial Management Index Score was calculated by weighting Goals, Management, and Marketing as well as Crop Records and Livestock Records by twenty percent each, Farm Financial Records by thirty percent and Computer Use, ten percent. Table 11 shows the index score assigned by the farm financial management specialist.

Table 11. Financial Critical Management Factors

Critical Management Factors	Producers								
	A	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**
1. Goals, Management, Marketing	6.5	3.0	5.0	4.0	6.0	6.5	4.0	7.0	7.0
2. Farm Financial Record Systems	1.5	5.0	3.0	2.0	5.5	6.5	8.5	4.5	7.5
3. Crop/Forage Record System	4.0	0.0	4.0	0.0	4.5	8.0	4.5	5.5	4.5
4. Livestock Record System	0.0	0.0	5.0	5.0	5.0	5.0	5.0	9.0	5.0
5. On-Farm Computer Use	0.0	0.0	5.0	0.0	10.0	10.0	10.0	0.0	10.0
Financial Index Score	2.6	2.1	4.2	2.4	5.8	6.9	6.3	5.7	6.6

Forages: The forage specialist (Dr. Larry Redmon) identified four areas of critical management factors from the supplemental feed section, the Pasture and Crop Management, and the hay/rangeland sections of the interview packet. The specialist did not attempt to score all the questions included in the interview packet (see Appendix D

for further detail). Only the questions considered to be pertinent to the overall efficiency of the operation were included in the critical practices, which are noted in Table 12.

1. Overall Assessment of Forage Program: Factors considered important were whether the producer raised their own hay, the percentage of hay that is raised (preferably not all hay is raised), whether the hay is tested for crude protein, whether the producer can identify desirable and undesirable native grasses, forbs, legumes, and woody plants, and whether the producer can identify the key invader plants.
2. Hay Feeding Program: Factors considered important were an overall assessment of the feeding program, hay type (alfalfa, prairie, bermuda, sudan, etc.), the period hay is fed, how the hay is fed (free choice, broken in pasture, free choice with rings or feeders, or limited), and how varying feed levels were determined (weather, cow condition, forage condition, closeness to calving, or other factors).
3. Pasture and Range: Factors considered important were the fertilizer method (commercial fertilizer, poultry litter, swine effluent, other animal wastes, or overseed with legumes), other management practices (specie selection to enhance the overall nutritive value of forage, check soil fertility, or prescribed burns), grazing system (continuous, rotational, or intensive grazing), and method of weed control (herbicides, mowing, grazing management, or prescribed fire).
4. Supplemental feeding program: Factors considered were the period the supplemental feed was fed, the amount of supplemental feed (pounds per head per day), whether the producer had a yearly contract with a feed supplier, how the varying levels of supplement were determined (weather, cow condition, forage

condition, closeness to calving) and the type of mineral fed (salt, trace, sulphur, complete mineral in block form, or complete mineral in loose form).

Table 12 shows the index score as assigned by the agronomy specialist.

Table 12. Forage Critical Management Factors

Critical Management Factors	Producers								
	A	B	C	D	E	F	G	H	I
1. Forage Program	6.2	6.2	6.2	6.2	7.2	4.8	6.2	6.8	2.3
2. Hay	4.6	3.8	5.7	3.4	4.5	6.3	5.7	4.2	6.5
3. Pasture and Range	3.0	2.2	3.4	4.8	1.8	6.0	5.2	4.0	4.0
4. Supplement	4.6	5.0	4.0	5.6	5.4	7.6	7.6	4.0	2.8
Forage Index Score	5.3	5.0	5.7	5.9	5.7	7.2	7.1	5.9	4.9

Herd Health (veterinary medicine): The veterinary specialist (Dr. John Kirkpatrick) identified 26 specific critical management practices from the Animal Production/Health section of the interview packet (see Appendix D). The critical practices are noted in Table 13.

1. Knowledge of Body Condition Scoring: Score was based on whether the producer knew how to body condition score their cows.
2. Body Condition Scoring: Score was based on whether the producer implemented this practice in their operation.
3. Selection of replacement heifers: Factors considered important when purchasing or selecting replacement heifers include birth weight, birth weight EPD, structural soundness, pelvic area, temperament, dam's udder, and dam's temperament.
4. Culling of breeding females: Factors considered important when culling breeding age heifers or cows include pregnancy status, calving injury, physical

unsoundness, poor calves, digestive problems, respiratory problems, bad udder, bad eyes, age/thin, temperament, and dry cow/lost calf.

5. Selection of breeding bulls: Factors considered important when purchasing or selecting a bull include birth weight, birth weight EPD, structural soundness, scrotal circumference, and temperament.
6. Culling of breeding bulls: Factors considered important when culling bulls include age/bad teeth, bad eyes, disease, infertility, performance of offspring, physical unsoundness, and temperament.
7. Breeding Soundness Exam: Bulls should be tested at least once per year.
8. Replacement heifer weight at breeding: Score was based on the minimum weight of replacement heifers at time of breeding.
9. Replacement heifers separate from cows: Score was based on whether the producer keeps the replacement heifers separate from the cows before and after calving.
10. Replacement heifers calve: Score was based on whether the replacement heifers calve separate from cows, determine whether the replacement heifers calve in a box stall, calving lots, special calving pasture, or with the cows.
11. Females observed during calving: Score was based on the number of observations per day the cows and replacement heifers are observed during the calving season.
12. Calving assistance: Score was based on the amount of time the females (cows and replacement heifers) are allowed to labor, after seeing a water bag, before being given calving assistance.

13. Calving information: Score was based on the type of calving assistance necessary to deliver calves throughout the calving season and also assisted by a veterinarian.
14. Calf care following birth: Score was based on the practices that are routinely conducted or conducted for a difficult birth only.
15. Vaccination program: Score was based on the vaccines given to the herd at various intervals throughout the season.
16. Injection site: Score was based on the preference of injection site.
17. Castrating: Score was based on the age that most bull calves are castrated.
18. Dehorning: Score was based on the age that most calves are dehorned.
19. External parasite treatment: Score was based on which method the producer uses to treat external parasites and the frequency of treatment.
20. Stomach worm-problem: Score was based on whether or not stomach worms are a problem in the herd.
21. Liver fluke-problem: Score was based on whether or not liver flukes are a problem in the herd.
22. De-worming Program (Cows): Score was based on the frequency that the producer de-worms cows for stomach worms and liver flukes.
23. De-worming Program (Calves): Score was based on the frequency that the producer de-worms calves for stomach worms and liver flukes.
24. Calf crop conditions: Score was based on the percentage of calf crop at each age interval (birth to 28 days, 29-120 days, 120 days to weaning) that was affected by pinkeye, respiratory disease, scours, or poor doers.

25. Herd deaths: Score was based on the number of animals (calves, yearlings, cows, and bulls) that die annually, of the total herd.

26. Economic loss: Score was based on the factors that have the greatest economic loss for the operation.

Table 13 shows the index score as determined by the veterinarian.

Table 13. Herd Health Critical Management Factors

	Producers								
Critical Management Factors	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**
1. Knowledge of Body Condition Scoring	10	10	10	1	1	10	10	10	10
2. Body Condition Scoring	1	1	9	1	1	8	1	10	10
3. Selection of replacement heifers	5	4	3.75	6	5	6	5.25	2	4
4. Culling of breeding females	7.25	9	10.5	8	9	10.5	9.5	6	8.5
5. Selection of breeding bulls	3	2.25	4.5	5	5	5	5	4.5	5
6. Culling of breeding bulls	4	7	5.25	6	7	7	6	6.5	7
7. Breeding Soundness Exam	10	5	10	2	10	5	10	2	10
8. Heifer weight at breeding	7	7	7	7	8	7	7	7	7
9. Heifers separate from cows	10	5	10	10	10	10	10	10	10
10. Heifers calving place	10	10	10	6	10	10	10	10	10
11. Females observed during calving	10	7	10	10	9	9	9	9	10
12. Calving assistance	8	5	8	6	9	10	10	10	10
13. Calving information	8	9	6	9	10	9	10	10	9
14. Calf care following birth	7	10	7	10	9	9	10	10	10
15. Vaccination program	8	3	5	5	9	9	5	2	6
16. Injection site	1	1	1	10	10	10	10	7	5
17. Castrating	8	2	8	8	9	9	5	9	10
18. Dehorning	10	10	8	10	10	5	9	9	9
19. External parasite treatment	5	7	9	5	10	10	10	8	10
20. Stomach worm problem	10	1	1	1	10	1	1	9	9
21. Liver fluke problem	10	1	1	1	10	10	1	9	9
22. De-worming Program (cows)	6	1	6	6	10	2	6	6	6
23. De-worming Program (calves)	6	1	6	6	6	6	6	9	6
24. Calf crop conditions	9	10	8	7	9	8	10	10	9
25. Herd deaths	9	5	7	7	7	7	10	5	10
26. Economic loss	9	8	8	8	10	6	7	9	9
Herd Health Index Score	7.3	5.4	6.9	6.2	8.2	7.6	7.4	7.7	8.4

Aggregate Index: The aggregate index of critical management factors is a composite of the specific discipline scores to evaluate the adoption of recommended IRM practices by producers. The specialists agreed to the following weights on individual discipline scores: 20 percent animal science, 20 percent farm financial management, 30 percent forage management, and 30 percent veterinary medicine (herd health). The aggregate scores are reported in Table 14 along with a summary of the producers' scores by area.

The Animal Science Index scores ranged from 7.0 to 9.7, with an average of 8.6. The Animal Science Index scores were consistently stronger when compared to the other disciplines. Perhaps, the cow-calf producers are more familiar with cattle production relative to the other disciplines, since that is the business they chose to enter. The Financial Management Index scores ranged from 2.1 to 6.9, with an average of 4.7. The Financial Management scores had the most variation in the range and possessed the lowest average score. This might be explained by the differences in goals and expectations of producers and thus varying time and effort is directed toward the financial management of each operation. The Forages Index scores ranged from 4.9 to 7.2, with an average score of 5.9. Of the four disciplines, the Forages scores were one of the weaker as the average was less than the Overall Index average. As similar to the Financial Management, the Forage management sector of an operation may be neglected in lieu of other "cattle" related activities depending on the goals of each operation. The Herd Health Index scores ranged from 5.5 to 8.4, with an average of 7.2. Similar to Animal Science, the Herd Health discipline had stronger scores.

Table 14. Producer Scores in Critical Management Areas

Producer	Animal Science	Financial Management	Forages	Herd Health	Overall Index
A	7.0	2.6	5.3	7.3	5.7
B	7.9	2.1	5.0	5.5	5.1
C	9.7	4.2	5.7	6.9	6.6
D	8.4	2.4	5.9	6.2	5.8
E	8.6	5.8	5.7	8.2	7.0
F	8.9	6.9	7.2	7.6	7.6
G	8.0	6.3	7.1	7.4	7.2
H	8.9	5.7	5.9	7.7	7.0
I	9.6	6.6	4.9	8.4	7.2
Average	8.6	4.7	5.9	7.2	6.6
Range	7.0-9.7	2.1-6.9	4.9-7.2	5.5-8.4	5.1-7.6
Std Dev.	0.8531	1.9339	0.8187	0.9359	0.8460

Evidence for Individual Case Analysis

Index Ranking of Producers by Discipline

The producers were ranked according to their index score by discipline and also by overall score. The ranking of producers is shown in Table 15, sorted in descending order. Each producer varied in the ranking of each discipline.

Spearman Rank Correlation Analysis

A Spearman Rank Correlation was tested to analyze the relationship in each of the discipline areas – Animal Science, Financial Management, Forages, and Herd Health and

Table 15. Index Ranking of Producers by Discipline

Animal Science	Financial Management	Forages	Herd Health	Overall Index
C	F	F	I	F
I	I	G	E	G, I*
F, H*	G	D	H	E, H*
E	E	H	F	C
D	H	C, E*	G	D
G	C	A	A	A
B	A	B	C	B
A	D	I	D	
	B		B	

Note: * indicates producers were rated the same score

the Overall Index with net income, feed costs, grazing costs, other costs, and total cost of production. The correlation matrix is reported in Table 16. Several relationships were expected from the test. One expected result was that Animal Science and Herd Health indices would be strongly correlated given the specialists in their respective areas evaluated similar information. The Financial Management Index was expected to be correlated with Net Income. The producer's Financial Management Index Score is reflective of the financial and production records maintained by each producer and producers who use and maintain more extensive financial and production records are hypothesized (Chapter 3) to be more likely to generate a profit. The Forages Index was expected to be strongly and negatively correlated with Feed and Grazing Costs. The Forages Index score is indicative of the level of adoption of IRM practices in the forages area and should correspondingly relate to Feed and Grazing Costs. Additionally, it was expected that the Overall Index should be negatively correlated with the cost of production, given that a higher Overall Index Score would indicate more of the

Table 16. Correlation Matrix

	Net Income	Feed Cost	Grazing Cost	Other Costs	Cost of Production	AnSci Index	Financial Index	Forage Index	Herd Health Index	Overall Index
Net Income	1.0000									
	0.0000									
Feed Cost	-0.9429	1.0000								
	0.0048	0.0000								
Grazing Cost	-0.4286	0.3714	1.0000							
	0.3965	0.4685	0.0000							
Other Costs	-0.4857	0.6000	-0.2571	1.0000						
	0.3287	0.2080	0.6228	0.0000						
Cost of Prod.	-0.7714	0.8286	0.2000	0.8286	1.0000					
	0.0724	0.0416	0.7040	0.0416	0.0000					
AnSci Index	-0.1160	-0.1739	0.0000	-0.5218	0.4058	1.0000				
	0.8268	0.7417	1.0000	0.2883	0.4247	0.0000				
Financial Index	0.2571	-0.4857	0.1429	-0.7714	-0.4857	0.6957	1.0000			
	0.6228	0.3287	0.7872	0.0724	0.3287	0.1248	0.0000			
Forages Index	0.8987	-0.8407	-2899.0000	-0.6957	-0.7537	-0.1324	0.4058	1.0000		
	0.0149	0.0361	0.9565	0.1248	0.0835	0.8026	0.4247	0.0000		
Herd Health Index	-0.2571	-0.0286	0.3714	-0.6000	-0.3143	0.9276	0.7143	-0.1160	1.0000	
	0.6228	0.9572	0.4685	0.2080	0.5441	0.0077	0.1108	0.8268	0.0000	
Overall Index	0.1739	-0.3189	0.3189	-0.7537	-0.3479	0.4706	0.9276	0.4412	0.5798	1.0000
	0.7417	0.5379	0.5379	0.0835	0.4993	0.3462	0.0077	0.3812	0.2278	0.0000

recommended practices are adopted by the producer theoretically lowering production costs. Along with this, it was hypothesized in Chapter 3 that the more profitable producers are likely to have relatively high levels of adoption of IRM practices in all areas (animal science, financial management, forage management, and herd health). Thus it is expected that the Overall Index is positively correlated to Net Income.

Analysis of the correlation matrix suggests that of the variables tested, four relationships were strongly significant. As expected, the Animal Science and Herd Health Indices are strongly correlated (0.9276). The Forage Index is highly significant to Net Income (0.8987) indicating that forage management practices are influential to the Net Income. The Feed Cost variable has a strong negative and significant relationship with Net Income (-0.9529). Also, the Financial Index and the Overall Index are strongly correlated (0.9276). Due to the difference in standard deviation and variance of the Financial Management Index relative to the other areas of the index, further research is needed to analyze the significance of the Financial Management Index in regards to the Overall Index.

Further analysis of the correlation matrix raised some questions regarding the positive/negative relationship of various correlations. The negative relationship of the Animal Science and Herd Health indices with Net Income is unexpected. Similarly, a negative correlation was expected between the Animal Science Index and Cost of Production, but a positive relationship was indicated (though not statistically significant). It was expected that the Financial Index would be negatively correlated with Grazing Cost as a producer that is more financially minded would theoretically have lower Grazing Cost; however; this relationship tested positive.

Producers' Perceptions of Strengths, Weaknesses, and Goals Identified

The producers identified their strengths and weaknesses as well as identified the long-term goals of their operation. These are noted in Table 17. In some instances, there appeared to be a difference in the producers' perception of their operation when compared with the scores of the IRM specialists. For example, Producer A perceived the "AI program" to be the strength of the operation yet the producer ranked last by Animal Science specialist. Producer C identified their weakness to be pasture management and the Forage specialist evaluated the producer as average, ranking fifth yet the producer ranked seventh in Herd Health.

Cross Case Analysis

An analysis of the original research propositions was conducted. Following are the original research objectives that correspond to the propositions (as stated in Chapter 3).

Objective 1: To determine if producers that use and maintain more extensive production and financial records, as well as use external information, are more likely to generate a profit.

Proposition 1: Producers who use and maintain more extensive financial and production records, as well as use external information, are more likely to generate a profit.

Objective 2: To determine how much producers use research and Extension as a source of external information relative to other sources.

Table 17. Producers' Perceptions of Strengths, Weaknesses, and Goals Identified

Producer	+: Perceived Strengths -: Perceived Weaknesses >: Long-term goal of operation
A	+: AI program in Club Calf herd -: produce low-price wheat, want to improve forages >: maintain profitable business
B	>: make operation full-time job
C	+: cattle production-quality of cattle -: improve pasture management
D	+: lack of indebtedness, commitment to ranching -: weather, markets >: continue same practice while remain healthy, raise fast growing calves
E	+: previous success with similar size commercial herd -: improve forage nutrient value, need to tap into new marketing situation >: raise high quality seedstock, eventually host own production sale
F	+: previous farm & non-farm experiences, willingness to study alternatives, good work ethic
G	+: planned breeding system -: need to produce better females >: gradually transition Operator 1's land to Operator 2 over next 10 years
H	+: good quality grasses, all land is owned -: weeds in pasture, how to perform various management practices and when >: would like to make cow herd more profitable
I	+: more than 20 years experience, >: would like to make more profitable, potentially have a replacement heifer sale to sell more heifers to local cattlemen

Proposition 2: Producers that more frequently contact Extension and research personnel more readily adopt IRM practices recommended by IRM specialists.

Objective 3: To identify the producers' adoption and use of practices advocated by IRM specialists to improve resource management.

Proposition 3: The more profitable producers are more likely to have relatively high levels of adoption of IRM practices in all areas (animal science, financial

management, forage management, and herd health).

Proposition analysis detailed by producer is outlined in Table 18. A cross-case analysis with respect the original propositions follows:

Proposition 1: Producers that the experts rated higher in the Index use and maintain more extensive financial and production records. Also, on average, these producers with the exception of one use more external sources. The profitability of each producer relative to the Financial Index score is inconclusive as the highest scoring producer was the most profitable while the lowest scoring producer was the second most profitable.

Proposition 2: The producers that rated higher in the Index generally use a wide array of research and Extension personnel and use is at a relatively high frequency. The producers with the three highest overall scores used the county agent, an area specialist, and a university professor at least once per year.

Proposition 3: The producers who scored highest in the Overall Index were relatively consistent in all areas. For instance, Producer F scored highest in Financial Management and Forages, ranked third in Animal Science, fourth in Herd Health, and scored highest in the Overall Index. Producer E ranked third in Animal Science and Herd Health, fifth in Financial Management, fourth in Forages, and fourth in the Overall Index.

Table 18. Proposition Analysis by Producer

Producer	Proposition 1:	Proposition 2:	Proposition 3:
A	Financial record system- manual Production record system- cow records are "mental" Hours analyzed financial records- 2-3 Field records kept moderate External sources: 6 Average usefulness: 4.2	Used area specialist 10+ times per year area specialist usefulness: 5 only external source used as much as the area specialist was the veterinarian	Animal Science: rated last Financial Management: ranked eighth of nine Forages: ranked seventh of nine Herd Health: sixth of nine Overall Score: eighth of nine
B	Financial record system- manual Production record system-manual Hours analyzed financial records- n/a External sources: 3 Average usefulness: 4	No extension or research personnel used	Animal Science: rated eighth of nine Financial Management: rated last Forage Management: rated eighth of nine Herd Health: rated last Overall Score: rated last
C	Financial record system- manual, starting Quick Books Production record system-manual Hours analyzed financial records- 8 Field records moderate External sources: 18 Average usefulness: 3.9 Net Income/Cow: $ -150.14	Used the county agent and the area specialist 10+ times per year and a university professor 6-10 times per year. county agent usefulness: 4 area specialist usefulness: 4 univerisity professor usefulness: 5	Animal Science: rated highest Financial Management: rated sixth of nine Forages: rated fifth of nine Herd Health: rated seventh of nine Overall Score: sixth of nine

Table 18. Proposition Analysis by Producer

Producer	Proposition 1:	Proposition 2:	Proposition 3:
D	Financial record system-accountant Production record system- manual Hours analyzed financial records- 0 External sources: 4 Average usefulness: 5 Net Income/Cow: $ -12.85	No extension or research personnel used	Animal Science: rated sixth of nine Financial Management:rated eighth of nine Forages: rated third of nine Herd Health: rated eighth of nine Overall Score: seventh of nine
E	Financial record system-Quicken Production record system-AHMS (American Angus Assoc. Software), manual records-very extensive,complete Hours analyzed financial records- 2-3 Enterprise records are kept Field records/crop records are moderate External sources: 10 Average usefulness: 4.5	Used the county agent and area specialist each 6-10 times per year. county agent usefulness: 5 area specialist usefulness: 5 The other source of information that is used more than the county agent and area specialist was "Computer Information Services." They were used 10+ times per year.	Animal Science: rated fifth of nine Financial Management: rated fourth of nine Forages: rated sixth of nine Herd Health: rated second of nine Overall Score: rated fourth of nine
F	Financial record system- Quicken, multi- enterprise, extensive use Production record system-manual, Ranch Master Hours analyzed financial records- 2 Field records moderate External sources: 9 Average usefulness: 4.1 Net Income/Cow: $ 162.17	Used the county extension agent 6-10 times per year, the area specialist 2-5 times per year, and a university professor 2-5 per year. county agent usefulness: 4 area specialist usefulness: 4 university professor usefulness: 4 The other source of information used more than the county agent were "Computer Information Services" and the Internet	Animal Science: rated third of nine Financial Management: rated first Forages: rated first Herd Health: rated fourth of nine Overall Score: first

Table 18. Proposition Analysis by Producer

Producer	Proposition 1:	Proposition 2:	Proposition 3:
G	Financial record system- Quicken Production record system- manual Hours analyzed financial records-15 Field records moderate External sources: 9 Average usefulness: 4.1 Net Income/Cow: $ -26.21	Used the county agent, the area specialist, university professor once per year county agent usefulness: 4 area specialist usefulness: 4 university professor usefulness: 4	Animal Science: rated seventh of nine Financial Management: rated third of nine Forages: rated second of nine Herd Health: rated fifth of nine Overall Score: tied for second
H	Financial record system- record keeping association Production record system-manual, record keeping association Hours analyzed financial records-3 Field and crop records moderate External sources: 8 Average usefulness: 3.3 Net Income/Cow: $ -75.24	No extension or research personnel used	Animal Science: rated fourth of nine Financial Management: rated fifth of nine Forages: rated fourth of nine Herd Health: rated third of nine Overall Score: rated fifth of nine
I	Financial record system- Quicken Production record system-manual, Red Wing record system Hours analyzed financial records- 1 Enterprise records kept Field and crop records moderate External sources: 5 Average usefulness: 4.2 Net Income/Cow: $ - 196.26	Used the area specialist and university professor 10+ per year while used the county agent 2-5 times per year. county agent usefulness: 1 area specialist usefulness: 5 univerisity professor usefulness: 5 Of all external sources, the area specialist and university professor were most frequently used.	Animal Science: rated second of nine Financial Management: rated second of nine Forages: rated last Herd Health: rated first Overall Score: tied for second

Other observations: The three producers that rated the highest overall use computers as an active part in their record keeping system. Additionally, these operators are varying in their levels of experience and years of operating their current farm/ranch.

Comparing Results with Previous Studies

All of the producers in this study use some type of manual record keeping system to maintain cattle production records. This is consistent with a previous study by Batte, Jones, and Schnitkey that indicated more than 80 percent of cow-calf producers use a manual record systems.

In terms of computer use, the producers found the computer to be most useful in the areas of business accounting, tax computations, and business correspondence. Again agreeing with the study by Batte, Jones, and Schnitkey in that computers are most useful in small and intermediate herds (less than 100 cows and 100-199 cows, respectively) for tax computation, business planning, and crop production. Several studies indicate that the rate of computer adoption is inversely related to farmer age and positively related to higher education and larger business size. Producers E, F, G, and I are the primary computer users. E and F are larger operators while G is the youngest in this study. Also, G and I are more educated, which agrees with previous research.

According to Feder, Just, and Zilberman, a source of off-farm income may affect the rate of adoption by providing a source of cash flow to buffer the risk associated with adoption. This may the case for Producer D, enabling the operator to experiment with new technologies while not jeopardizing the cash flow. This study further explains that off-farm income has been found to be negatively related to technology adoption because

it could substitute for other diversification strategies. Off-farm employment may take time away from the farming enterprise that may be necessary to achieve desired results. This explanation may apply to Producers B, C, and H. Producers B and C maintain off-farm jobs while Producer H is very diversified with on-farm enterprises. These producers are also not the primary computer operators, however; are beginning to integrate computers into their operations.

Rogers discusses differences between earlier and later adopters. One difference is such that earlier adopters have more specialized operations. This holds true for Producers B and H. As previously stated, Producer B is a part-time producer and Producer H is very diversified other on-farm enterprises. Much of the literature cites that education is positively related to the adoption of new technology. In this study, producers varied in their ranking across all categories thus the results are inconclusive. Additionally, research by Batte, Jones, and Schnitkey suggests strong relationships between technology adoption patterns and individual and business characteristics. This is the rationale for questions regarding business characteristics. The producers in this research study were inconsistent with their relationship between technology adoption and business characteristics.

CHAPTER VI

CONCLUSIONS AND RECOMMENDATIONS

Summary

Beef cattle producers face an increasingly competitive environment. Lower calf prices make survival for high-cost producers increasingly difficult. Although cattle prices improve cyclically, in the best price situation, some producers are not breaking even with their current management practices. Generally, livestock producers focus their efforts on the specific area of the operation in which they possess the most expertise. Producers are traditionally more comfortable with the production-oriented aspects of the operation, for instance, specialty areas such as beef breeding and nutrition. Consequently, critical factors in other areas of animal health, reproduction, forage, and financial management may be overlooked.

Integrated Resource Management (IRM) was discussed as well as the tools used in the IRM process such as Standardized Performance Analysis. Relevant literature regarding financial management, preferences in decision-making, farm information systems, and technology adoption were reviewed. Additionally, case study research literature was cited. Nine producers were used in developing case studies for each operation. County, area, and state Cooperative Extension staff jointly selected nine

cooperators, representing different size operations and varying production types (commercial, seedstock) in Oklahoma and Alabama.

The research design of a case study is the logical sequence that connects the empirical data to the study's research objectives. The case study protocol contained the survey instrument and procedures to follow while the instrument was used.

A series of interviews were conducted to gather the data. In the initial interview, detailed data about the current state of the farm operation was compiled, including management structure, goals, enterprise mix, and a description of the farm information system. Also, the survey instrument was completed. During the second interview, a Standardized Performance Analysis (SPA) was completed. In the third interview, SPA results were reviewed and discussed. New practices implemented and the sources of information used for farm decisions were recorded. Additionally, producers identified critical success factors and future plans for their operations.

The management systems of cow-calf producers were described and assessed. In case study form, a detailed summary was prepared for each producer. Case study analysis using the pattern-matching method was used to evaluate the cases.

The primary objective of this study was to better understand the integrated resource management (IRM) practices that allow cow-calf producers to efficiently achieve their production and financial goals. As stated in Chapter 1, the specific objectives of this thesis were:

1. To determine if producers that use and maintain more extensive production and financial records as well as use external information are more likely to generate a profit.

2. To determine how much producers use research and Extension as a source of external information relative to other sources.
3. To evaluate the producers' adoption and use of practices advocated by IRM specialists to improve resource management.

Conclusions

Each case study producer is unique in their circumstances and requires situation specific recommendations due to their differences in their strengths and weaknesses.

Producers use a variety of external sources to attain their information. Producers that scored higher in the Financial Management Index are those producers that use and maintain more extensive financial and production records. The profitability of each producer relative to the Financial Index score is inconclusive. The Forage Index is highly significant to Net Income indicating that forage management practices are influential to profitability.

Based on producers' frequency of use and rating of usefulness of external information sources, research and Extension personnel were used moderately and were moderately useful. These sources were used neither the most nor the least relative to the other sources. The use of external information sources indicate that the tax preparer and veterinarian are a high priority for Extension and research to target with educational programs as these are consistently the most used sources by cow-calf producers.

The IRM index was developed to evaluate the producers' adoption and use of practices advocated by IRM specialists to improve resource management in the areas of Animal Science, Financial Management, Forages, and Herd Health. Producers tended to

score higher in areas of Animal Science and Herd Health. The Animal Science scores ranged from 7.0 to 9.7 with an average score of 8.6. For Herd Health, the scores ranged from 5.5 to 8.4, with an average Herd Health score of 7 2. Additionally, the producers who use computers in their business tasks were also the top ranking producers in the overall index.

Limitations of the Study

Several limitations of this study exist. The first limitation in this study is in regards to data for the analysis. Although efforts were made to collect comparable data from each producer, SPA data was not available for some producers. Not all investigator participants came through with all data necessary to be used in this study. This lack of data did not allow for the full analysis of all the case studies included in the project. Second, an attempt was made to select producers that were representative of cow-calf operations in Oklahoma (and other southern states). However, the case study producers used in this study were considerably larger than the average herd size (less than 50 cows) for the specific region of the United States.

In terms of analysis and comparison of the use of agricultural professionals and information services, a larger sample size is necessary to compare with previous studies and to reach further conclusions. The mean usefulness scores of the external sources were reported mainly as a point of reference among the producers.

Another limitation of this study was consistency in the data collected. The number of interviewers varied for each producer. In one instance, eight project participants were interviewing a particular producer. The situation seemed to intimidate

the producer, thus the answers may be influenced by the circumstances. Additionally, some producers completed the entire interview packet prior to the interviews, while other producers completed the packet in the interview process, which could have also biased some answers in the interview packet. Extension personnel selected the producers thus a bias toward extension may be evident.

Recommendations for Further Study

Based on the conclusions, the following recommendations are made. It is recommended that further study be conducted on the selected critical IRM practices using a larger number of cow-calf producers and a wider range of herd sizes to test if different results will validate the IRM index. The IRM index serves as starting point for further development. The information used in calculating the index needs to be assessed as more information was collected in the interview packet than was used by the specialists in constructing the index. Further, the index needs to be standardized across the disciplines. Additionally, when collecting information from producers, it is recommended to tape record the interviews for later review and reference later in the research. Also, limit the number of interviewers to four people, as not to intimidate the interviewee.

Since the requirement for attaining the Myers Briggs Type Indicator (MBTI) are not practical for most cow-calf operators to attain, it is recommended that research be conducted using the Keirsey Bates Temperament Sorter The Keirsey Bates sorter is based on similar theory as the MBTI; thus it could be used in further studies to evaluate the producer's psychological characteristics.

It is recommended that further study be conducted about the producers' use of external sources (including meetings and other means of receiving external information) to determine the usefulness and also compare with this study.

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APPENDICES

APPENDIX A

INSTITUTIONAL REVIEW BOARD

OKLAHOMA STATE UNIVERSITY
INSTITUTIONAL REVIEW BOARD
HUMAN SUBJECTS REVIEW

Date: 04-30-97 **IRB#:** AG-97-020

Proposal Title: IMPROVING INTEGRATED RESOURCE MANAGEMENT OF BEEF PRODUCERS

Principal Investigator(s): Lisa Tesconi, Damona Doye

Reviewed and Processed as: Expedited

Approval Status Recommended by Reviewer(s): Approved

ALL APPROVALS MAY BE SUBJECT TO REVIEW BY FULL INSTITUTIONAL REVIEW BOARD AT NEXT MEETING, AS WELL AS ARE SUBJECT TO MONITORING AT ANY TIME DURING THE APPROVAL PERIOD.
APPROVAL STATUS PERIOD VALID FOR DATA COLLECTION FOR A ONE CALENDAR YEAR PERIOD AFTER WHICH A CONTINUATION OR RENEWAL REQUEST IS REQUIRED TO BE SUBMITTED FOR BOARD APPROVAL.
ANY MODIFICATIONS TO APPROVED PROJECT MUST ALSO BE SUBMITTED FOR APPROVAL.

Comments, Modifications/Conditions for Approval or Disapproval are as follows:

Signature: _____ Date: May 15, 1997

Chair of Institutional Review Board

cc: Lisa Tesconi

Consent Form: Improving Integrated Resource Management for Beef Producers

I, _____, hereby authorize Lisa Tesconi, research assistant, to conduct the following research.

General Information

This project is an interdisciplinary study to identify significant production and management practices that are critical to the success of family owned cow-calf operations. The different discipline areas to be assessed include forages, business management, cattle production, and animal health. Case studies will be developed from cow-calf producers in Oklahoma.

Information will be collected via on-farm visits and written correspondence. Your cooperation will be needed to develop financial statements, a breeding herd and production management assessment, a written set of goals, an assessment of the status and potential for forage production, soil test results, a review of the marketing program, a cow-calf standardized performance analysis, a Myers-Briggs Type Indicator assessment, and other materials documenting factors that significantly impact the business. An IRM team including an animal scientist, agricultural economist, veterinarian, and agronomist will review the information collected and discuss whether changes in management might be beneficial to the operation. Summaries and an interpretation will be provided when appropriate. It is your decision as to whether you implement any recommendations made.

A detailed summary will be prepared for each producer in case study form. This allows for comparison and contrast across all case studies. Commonalties will be identified from the sample of the case study producers. Specific production and management practices will be classified as to their potential contribution to greater profitability.

Information gathered in the study will be handled by the principal investigator. The actual producer names will not be used in case study reports. Alias names will be assigned to protect the confidentiality of the producers. Individual data (i.e. financial information, production records, forage data) will be added to existing databases, used to calculate statistics and only published in aggregate form.

Purpose

The purpose of this study is to promote the development of management skills and improved production and economic practices of beef producers. Producers will have the opportunity to critically evaluate their operation using a holistic approach. Case studies will be developed to catalog the different management systems and identify critical success factors.

I understand that participation is voluntary, that there is no penalty for refusal to participate, and that I am free to withdraw my consent and participation in this project at any time without penalty after notifying the project director.

I may contact Lisa Tesconi at (405) 744-9984 or Damona Doye at (405) 744-9813. I may also contact Gay Clarkson, Executive Secretary, 305 Whitehurst, Oklahoma State University, Stillwater, OK 74078; (405) 744-5700.

I have read and fully understand the consent form. I sign it freely and voluntarily. A copy has been given to me.

Signed: _____ _____

Signature of subject Date

APPENDIX B

LETTER OF INTRODUCTION

Date

Producer Name
Route 1 Box 23
City, OK 74000

Dear Producer

Sally Northcutt informed me that you may be willing to participate in a three year, three states (Oklahoma, Alabama and Texas) Extension project in integrated resource management (IRM) for beef producers. Here's some information about the project. Project objectives include:

- Develop case studies to document existing production and management practices and identify factors critical to successful cow-calf management.
- Identify technological tools (software, for instance) that efficiently and effectively support farm and ranch decisions and incorporate those tools not ongoing education efforts.
- Build on previous programs to identify research and education needs and continue to increase awareness of integrated resource management concepts.

Your role (should you choose to accept it) would be to serve as a case study. This letter outlines what you can expect from us and what we hope you will continue.

Benefits. During the course of the project, we will provide the following: a complete set of financial statements, a breeding herd and production management assessment, a written set of goals, an assessment of the status and potential for forage production, soil test results (if needed), a review of the marketing program, a cow/calf standardized performance analysis (SPA), a report on leadership and / or learning style preferences and any educational materials that we have developed. *All personal and financial information will remain confidential.* The only cost to you will be the time and energy spent helping us collect the necessary data.

Interview/assessment. We will begin to build your case study through an interview which could take most of a day. We will try to make the data collection process as painless and efficient as possible. I am enclosing some questions which we hope you will begin to complete before our first meeting. This will allow you time to think about your farm/ranch goals and jot down crop and pasture acreage for instance. Several (but not all) of us will visit your ranch when your schedule permits, hopefully within the next 1-2 months. Other Extension specialists involved in the project include: Larry Rice, D.V.M.; Sally Northcutt, breeding beef specialist; Glenn Selk, animal reproduction specialist; Larry Redmon, forage specialist; Terry Bidwell, range specialist; and Lisa Tesconi, graduate student. Area specialists and also the county agricultural agent will be invited to work with us.

In 1997, several additional days will be spent on a herd and forage assessment, cow/calf standardized performance analysis, etc. We know your time is valuable and will try to minimize the amount of time you and your partners or employees spend away from your business. The forage assessment for instance could be done with your permission but would not require you to be present. An IRM team (an animal scientist, ag economist, veterinarian, and agronomist) will review information collected and discuss whether changes in management might benefit the operation. If will be up to you as to whether you implement the recommendations.

Your cooperation would be greatly appreciated. However, should you decide you cannot participate in the project, please let one of us know as soon as possible. I will try to call next week to see if a tentative date for a ranch visit can be scheduled. Finally, if you have any questions, please give one of us a call. We look forward to working with you in the coming years.

Sincerely,

Damona Doye
Extension Economist

APPENDIX C

SURVEY INSTRUMENT

IRM INTERVIEW PACKET
(Advance Mailing)

At any time if you have any questions or feel additional comments are warranted, please note them on these forms.

Ranch Name: _____ Date: _____

FAMILY INFORMATION

Name: _____ Age: _____

Spouse: _____ Age: _____

Children: _____ living at home ☐ Ages: _____

_____ living at home ☐ _____

_____ living at home ☐ _____

Address: _____ Telephone: (work) (___) _____

_____ (home) (___) _____

GOALS AND MANAGEMENT

Which of the following describes your farming/ranching business?

	Number of owners
☐ Sole proprietorship	___
☐ Partnership	___
☐ Corporation	___
☐ Other (Please describe)	___

How many years have you worked on a farm/ranch?

- ☐ Less than 5 years
- ☐ 5-10 years
- ☐ 11-20 years
- ☐ More than 20 years

How many years have you operated this farm/ranch?

- ☐ Less than 5 years
- ☐ 5-10 years
- ☐ 11-20 years
- ☐ More than 20 years

Do you have written goals for your farm/ranch? yes ☐ no ☐ Family? yes ☐ no ☐
If yes, please attach a copy.

How important is it for this beef operation to make a profit?

☐ Very important ☐ Somewhat important ☐ Not important

Describe how goals are communicated between family members and others involved in the operation.

What do you perceive to be the strengths of your farm/ranch operation? Weaknesses?

What management practices, if any, do you think you should change?

Has the size or structure of the operation changed in the past three years? yes ☐ no ☐

If yes, please explain: _____

What kinds of changes, if any, do you anticipate in the operation (e.g. bringing children into the operation, retirement) in one year? Five years? Ten years? _____

Are there any extenuating circumstances (death or disability of key partner, debilitating health problem, divorce) affecting your farm or family recently of which we should be aware? _____

What do you enjoy doing most on the farm/ranch? _____

What would you like to spend less time doing? _____ _____

Please indicate the importance of the following agribusiness environmental factors relative to your operation in the next 1-2 years:

	extremely important	very important	moderately important	somewhat important	not important
Information management	☐	☐	☐	☐	☐
Value-added production (further processing of farm products)	☐	☐	☐	☐	☐
Adoption of new technology	☐	☐	☐	☐	☐
Societal concerns about natural resource issues, environmental regulations	☐	☐	☐	☐	☐
Change in government programs	☐	☐	☐	☐	☐
Increased international trade	☐	☐	☐	☐	☐
Growth to generate additional income	☐	☐	☐	☐	☐
Use of computers	☐	☐	☐	☐	☐
Changes in structure of rural communities	☐	☐	☐	☐	☐
Diversification of enterprises to spread production and income risk	☐	☐	☐	☐	☐
Changes in property rights	☐	☐	☐	☐	☐
Other (please specify)	☐	☐	☐	☐	☐

What managerial changes do you anticipate in response to items which you marked very or extremely important?

_____

_____

_____

_____

_____

What additional modifications do you anticipate in the farm/ranch plan to manage change?

_____

_____

_____

Management and Labor Resource Inventory

	On-farm employment		Custom work		Off-farm employment	
	weeks/year	Avg. hrs/wk	weeks/year	avg. hrs/wk	weeks/year	avg. hrs/wk
You						
Spouse						

Name	Title/Responsibilities	Age	Educ. (Years)	Years Employed	Person days/year[2]	Annual Wages[3]	Involved in Decision Making (Y/N)
Management							
						$	
						$	
						$	
						$	
Permanent Labor							
						$	
						$	
						$	
						$	
Administrative Staff							
						$	
						$	
						$	
						$	
Part Time or Hourly							
						$	
						$	
						$	

[2]For day labor, one person day = 10 hours labor

[3]This should include the full cost (salary or wages, payroll, benefits, etc.)

Livestock Production Inventory

Date of Inventory: _____

	Cows				Replacement Heifers				Bulls					Dates (beginning and ending)			
Herd ID	No	Primary Breed	Mat. Wt. (lbs)	Frame Score	No	Primary Breed	Mat. Wt. (lbs)	Frame Score	No	Primary Breed	Mat. Wt. (lbs)	Frame Score	Type of Production[1]	Breeding Season	Preg. Check	Calving	Weaning
														B:	B:	B:	B:
														E:	E:	E:	E:
														B:	B:	B:	B:
														E:	E:	E:	E:
														B:	B:	B:	B:
														E:	E:	E:	E:
														B:	B:	B:	B:
														E:	E:	E:	E:
														B:	B:	B:	B:
														E:	E:	E:	E:

Other Livestock: **Number**

Stocker steers: _____
Stocker heifers: _____
Mixed stockers: _____
Other: _____ _____

Describe constraints on livestock production (e.g. preference for single breed).

_____

_____

_____

[1]Seedstock (S), commercial (C), both (B).

Land Inventory

Do you have a conservation plan? ☐ yes ☐ no

Do you use a USDA standard soil survey? ☐ yes ☐ no

How much precipitation does the property receive annually? ____ inches

Crop and Feed Acreage

Field ID	Acres	Crop	Average Yield	Amount of Hay Harvested	Frequency of Soil Test[1]	Fertilization Method[2]	When Fertilized?[3]	Other Management Practices[4]	Weed Problems? List Species	Method of Weed Control[5]	Irrigated/ Dryland	Period Grazed (e.g., Nov-Mar)	Rented/ Owned

[1] Never (N), once per year (1), once every two years (2), every 3-4 years (3), infrequently (X).
[2] Commercial fertilizer (CF), poultry litter (P), swine effluent (S), other animal wastes (W), overseed with legumes (O), other (please specify.)
[3] Spring (S), fall (F), late summer (LS)
[4] Specie selection to enhance the overall nutritive value of the forage (S), prescribed burning (B).
[5] None (N), Herbicides (H), Mowing (M), Grazing management (G), Prescribed fire (F), Other (please specify.)

Pasture and Range

Ranch/ Pasture ID	Acres	Primary Forage[1]	Secondary Forage[1]	Period Grazed (e.g. Nov-Mar)	Amount of Hay Harvested	Frequency of soil Tests[2]	Fertilization Method[3]	When Fertilized[4]	Other Management Practices[5]	Grazing System[6]	Why do you use the current grazing system?[7]	Weed problems? List Species	Weed/Brush Control		Rented/ Owned	Water Source[9]	Water Shortage Problems? (Y/N)	Water Distribution[10]	Stocking Rate (Acres/ AU)
													Method[8]	How Often?					

[1] Bermuda grass, tall fescue, brome grass, clovers, old world bluestem, rye, ryegrass, oats, wheat, native plants including grass, brush, forbs/weeds, other (please specify).

[2] Never (N), once per year (1), once every two years (2), every 3-4 years (3), infrequently (X).

[3] Commercial fertilizer (CF), poultry litter (P), swine effluent (S), other animal wastes (W), overseed with legumes (O), other (specify).

[4] Spring (S), fall (F), late summer (LS)

[5] Specie selection to enhance the overall nutritive value of the forage (S), check soil fertility (F), prescribed burning (B).

[6] Continuous stocking (C), Rotational stocking (livestock are moved from pasture to pasture on a periodic basis) (R), Intensive stocking (more than 6 paddocks) (I), seasonal (stockers), intensive early stocking (stockers).

[7] Convenience (C), Labor (L), Fencing (F), Nutrition (N), Tradition (T), Recommended by expert (R).

[8] None (N), Herbicides (H), Mowing (M), Grazing management (G), Prescribed fire (F), Other (specify)

[9] Pond, creek, tank, windmill, well and pump, natural springs.

[10] Number and location of water sources.

Improving
Integrated Resource Management
Skills of Beef Producers

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IRM ON-FARM INTERVIEW PACKET

Ranch Name: _____ Date: _____

Please draw an organizational chart showing relationships among people involved in management or who provide labor in the operation. Who is responsible for day-to-day operations? How often do decision-makers meet and what is the format for the meetings?

ANIMAL PRODUCTION/HEALTH

Note if there are differences in practices between herds.

1. Do you know how to Body Condition Score your cows? yes ☐ no ☐

2. Do you Body Condition Score your cows? yes ☐ no ☐

If yes, what is the average BCS:

Yearlings_____ When scored: _____

Two year olds_____ When scored: _____

Cows_____ When scored: _____

For cows, specify the period of production when scored:

Period 1: 80 days post calving
Period 2: 125 days pregnant and lactating
Period 3: 110 days mid-gestation
Period 4: 50 days pre-calving

3. Check the relative importance of the following factors in purchasing or selecting replacement heifers:

Factors	Not Applicable	None	Slight	Moderate	Very	Extreme
Birth weight	☐	☐	☐	☐	☐	☐
Breed	☐	☐	☐	☐	☐	☐
Expected Progeny Difference (EPDs)						
Birthweight EPD	☐	☐	☐	☐	☐	☐
Growth trait EPDs	☐	☐	☐	☐	☐	☐
Milk EPD	☐	☐	☐	☐	☐	☐
Carcass EPD	☐	☐	☐	☐	☐	☐
Frame score/Hip height	☐	☐	☐	☐	☐	☐
Price	☐	☐	☐	☐	☐	☐
Reputation of breeder	☐	☐	☐	☐	☐	☐
Structural soundness/visual appraisal	☐	☐	☐	☐	☐	☐
Pelvic area	☐	☐	☐	☐	☐	☐
Temperament	☐	☐	☐	☐	☐	☐
Weaning weight/yearling weight	☐	☐	☐	☐	☐	☐
Dam's udder	☐	☐	☐	☐	☐	☐
Dam's temperament	☐	☐	☐	☐	☐	☐

4. What is the relative importance of the following reasons for culling breeding age heifers or cows.

Factors	Not Applicable	None	Slight	Moderate	Very	Extreme
Pregnancy Status (open or aborted)	☐	☐	☐	☐	☐	☐
Calving Injury	☐	☐	☐	☐	☐	☐
Physical unsoundness (cripple)	☐	☐	☐	☐	☐	☐
Poor calves	☐	☐	☐	☐	☐	☐
Digestive problem	☐	☐	☐	☐	☐	☐
Respiratory problem	☐	☐	☐	☐	☐	☐
Bad udder	☐	☐	☐	☐	☐	☐
Bad eyes	☐	☐	☐	☐	☐	☐
Age/thin	☐	☐	☐	☐	☐	☐
Temperament	☐	☐	☐	☐	☐	☐
Genetic composition	☐	☐	☐	☐	☐	☐
Dry cow/lost calf	☐	☐	☐	☐	☐	☐

5. Check the relative importance of the following factors in purchasing or selecting a bull:

Factors	Not Applicable	None	Slight	Moderate	Very	Extreme
Birth weight	☐	☐	☐	☐	☐	☐
Breed	☐	☐	☐	☐	☐	☐
Expected Progeny Difference (EPDs)						
Birthweight EPD	☐	☐	☐	☐	☐	☐
Growth trait EPDs	☐	☐	☐	☐	☐	☐
Milk EPD	☐	☐	☐	☐	☐	☐
Carcass EPD	☐	☐	☐	☐	☐	☐
Frame score/Hip height	☐	☐	☐	☐	☐	☐
Price	☐	☐	☐	☐	☐	☐
Reputation of breeder	☐	☐	☐	☐	☐	☐
Structural soundness/visual appraisal	☐	☐	☐	☐	☐	☐
Scrotal circumference	☐	☐	☐	☐	☐	☐
Temperament	☐	☐	☐	☐	☐	☐
Weaning weight/yearling weight	☐	☐	☐	☐	☐	☐

6. Check the relative importance of the following factors in culling bulls:

Factors	Not Applicable	None	Slight	Moderate	Very	Extreme
Age/bad teeth	☐	☐	☐	☐	☐	☐
Bad eye(s)	☐	☐	☐	☐	☐	☐
Disease	☐	☐	☐	☐	☐	☐
Infertility	☐	☐	☐	☐	☐	☐
Performance of offspring	☐	☐	☐	☐	☐	☐
Physical unsoundness (injury/lame)	☐	☐	☐	☐	☐	☐
Size	☐	☐	☐	☐	☐	☐
Temperament	☐	☐	☐	☐	☐	☐
Too many offspring in herd	☐	☐	☐	☐	☐	☐

7. Are the breeding bulls semen tested?

☐ yes ☐ no

If yes, when?

☐ At purchase
☐ Once per year
☐ Once every two years

8. What is the average age of replacement heifers at breeding?

☐ 12 - 16 months
☐ 17 - 19 months
☐ 20 - 23 months
☐ 24 or greater

9. What is the minimum weight of heifers at breeding? _____

10. Do you AI? ☐ no

☐ yes % of breeding females _____

11. Are replacement heifers separate from cows?

Before calving: ☐ yes ☐ no

After calving: ☐ yes ☐ no

12. Where do replacement heifers usually calve? *(Check one)*

- ☐ Box stalls
- ☐ Calving lots
- ☐ Special calving pastures
- ☐ With cows

13. How often are females observed during calving season?

	Number of observations per day *(Circle one each)*							
Cows	0	1	2	3	4	5	6	7
Heifers	0	1	2	3	4	5	6	7

14. How long are females allowed to labor, after water bag is seen, before giving calving assistance?

Cows	Heifers
☐ Less than 1 hour	☐ Less than 1 hour
☐ 1-2 hours	☐ 1-2 hours
☐ 3-4 hours	☐ 3-4 hours
☐ More than 5 hours	☐ More than 5 hours

15. Calving information: What kind of calving assistance is necessary to deliver a calf?

a. Total Number of Heifers Calving: _____

How many easy pull deliveries? _____

How many hard pull deliveries? _____

How many C-sections? _____

b. Total Number of Cows Calving: _____

How many easy pull deliveries? _____

How many hard pull deliveries? _____

How many C-sections? _____

c. Number of assisted births attended by a veterinarian? _____

16 Are any of the following performed at birth? *(Check appropriate column.)*

	Routine	Difficult Birth Only
a. dip navel	☐	☐
b. weigh calf	☐	☐
c. individual ID	☐	☐
d. scour pill given	☐	☐
e. Vit A injection	☐	☐
f. Selenium injection	☐	☐
g colostrum fed	☐	☐
h. colostrum substitute fed	☐	☐
i. scour vaccine given	☐	☐
j. injectable antibiotic	☐	☐
k. castration	☐	☐
l. other (please specify)	☐	☐

17. Are any of the following vaccines given at any time during the animal's lifetime? *(Check where applicable.)*

	Calves			*Replacement Heifers*		*Cows*		
Vaccine	*Calves at Birth*	*2-4 mo. calves*	*4-8 mo. calves*	*pre-breeding*	*Preg-nancy check*	*pre-breeding*	*Preg-nancy Check*	*Bulls*
Respiratory								
IBR								
BVD								
PI-3								
BRSV								
Pasteurella								
Hemophilus								
Reproductive								
Bangs								
Leptospira								
Campylobacter (vibriosis)								
Trichomoniasis								
Others								
2 way Clostridium								
4 way Clostridium								
7 way Clostridium								
8 way Clostridium								
E. Coli (scours)								
Roto/corona (scours)								
Salmonella (scours)								
Anaplasmosis								
Pinkeye								

18. Where do you give injections? Rank the applicable choices.

____ intramuscular - high hip
____ intramuscular - low hip
____ intramuscular – shoulder
____ subcutaneous – shoulder
____ intramuscular – neck
____ subcutaneous – neck
____ subcutaneous - ribs

19. At what age do you castrate bull calves? *(Check one)*

☐ 1-30 days
☐ 31-60 days
☐ 61-120 days
☐ 120-180 days
☐ Older than 180 days
☐ Do not castrate bull calves

20. At what age do you dehorn all calves? *(Check one)*

- ☐ 1-30 days
- ☐ 31-60 days
- ☐ 61-120 days
- ☐ 120-180 days
- ☐ Older than 180 days
- ☐ Do not dehorn calves

If you do not dehorn, are your cattle polled?

☐ yes ☐ no

21. Do you use growth implants in your calves ears?

☐ yes ☐ no

If yes, at what ages are implants placed in the ears? *(Check one)*

- ☐ 2-4 months
- ☐ 5-8 months
- ☐ 8-12 months
- ☐ 13-16 months

Some producers re-implant stocker cattle. If you do this, answer the question by putting a 1 at the age of the first implant and a 2 at the age of the second implant etc.

22. Do you use growth implants in replacement bulls? ☐ yes ☐ no

23. Do you use growth implants in replacement heifers? ☐ yes ☐ no

24. How do you treat for external parasites? *(Check all that apply.)*

- ☐ Dust bags or oilers
- ☐ Ear tags
  If yes, how often? ☐ once ☐ twice ☐ three times or more
- ☐ Oral boluses
- ☐ Pour on
  If yes, how often? ☐ once ☐ twice ☐ three times or more
- ☐ Spray
  If yes, how often? ☐ once ☐ twice ☐ three times or more
- ☐ Other (please specify)
- ☐ Do not treat for external parasites

25. Are stomach worms a problem in your herd:

- ☐ yes
- ☐ no
- ☐ don't know

26. Are liver flukes a problem in your herd:

- ☐ yes
- ☐ no
- ☐ don't know

27. How often do you deworm your **cows** for the following: *(Check one in each column.)*

Stomach Worms

- ☐ Once a year
- ☐ Twice a year
- ☐ Three or more times a year
- ☐ Do not deworm cows

Flukes

- ☐ Once a year
- ☐ Twice a year
- ☐ Three or more times a year
- ☐ Do not deworm cows

28 Do you deworm your **calves** for: *(Check one in each column.)*

Stomach Worms	Flukes
☐ While suckling	☐ While suckling
☐ At weaning	☐ At weaning
☐ While suckling and at weaning	☐ While suckling and at weaning
☐ Do not deworm calves	☐ Do not deworm calves

29. Indicate the percentage of your calf crop that have been affected by the following conditions at each age.

	Birth to 28 days	29 days-120	120-weaning
Poor doers	_____	_____	_____
Scours/diarrhea	_____	_____	_____
Respiratory disease	_____	_____	_____
Pinkeye	_____	_____	_____

30. Of your total herd (calves, yearlings, cows, bulls) how many die annually due to the following conditions? *(Please indicate a number for each condition.)*

Number Lost
_____ Abortion
_____ Calving problems
_____ Digestive (scours, bloating)
_____ Parasitism
_____ Poisoning
_____ Predators
_____ Respiratory disease
_____ Unknown
_____ Weather
_____ Old age
_____ Total number lost

31. Rank the following for the greatest economic loss for your operation on an annual basis.

Factors	**Not Applicable**	**None**	**Slight**	**Moderate**	**Very**	**Extreme**
Abortion	☐	☐	☐	☐	☐	☐
Anaplasmosis	☐	☐	☐	☐	☐	☐
Calf scours	☐	☐	☐	☐	☐	☐
Calving problems	☐	☐	☐	☐	☐	☐
External parasites	☐	☐	☐	☐	☐	☐
Footrot	☐	☐	☐	☐	☐	☐
Internal parasites	☐	☐	☐	☐	☐	☐
Pinkeye	☐	☐	☐	☐	☐	☐
Reproductive (open/late)	☐	☐	☐	☐	☐	☐
Respiratory	☐	☐	☐	☐	☐	☐
Other (please specify)	☐	☐	☐	☐	☐	☐

If you feed hay:

Do you: ☐ raise your own hay ☐ purchase hay from off farm?

What percentage of hay is raised? _____

Do you test raised hay you feed for crude protein content? ☐ Yes ☐ No

Do you test purchased hay you feed for crude protein content? ☐ Yes ☐ No

If you raise your own hay, do you:

- ☐ select species to enhance the overall nutritive value of the hay
- ☐ check soil fertility
- ☐ harvest to maximize yield
- ☐ harvest to maximize quality
- ☐ ammoniate the hay
- ☐ make small square bales
- ☐ make large round bales
- ☐ custom cut
- ☐ custom bale

How is your hay stored during the year?

- ☐ On ground, no cover
- ☐ On ground, with cover
- ☐ On gravel, tires or rack, no cover
- ☐ On gravel, tires or rack, with cover
- ☐ In barn
- ☐ Other (please specify):

If you use rangeland:

Can you identify the key **desirable** native grasses, forbs, legumes, and browse on your ranch?

☐ Yes ☐ No ☐ Don't know

Can you identify the key **undesirable** grasses, forbs, legumes, and woody plants on your ranch?

☐ Yes ☐ No ☐ Don't know

Can you identify the key invader plants on your ranch (introduced plants that escape from where they are planted, e.g. sericea lespedeza, tall fescue, Old World bluestem)?

☐ Yes ☐ No ☐ Don't know

Other Income from Land

Do you have other sources of income on land?

- ☐ lease hunting
- ☐ user fee hunting
- ☐ user fee fishing
- ☐ trail riding
- ☐ timber production
- ☐ oil and gas leases
- ☐ other recreational leases (please specify):

If you have recreational leasing, what percentage of your ranch income is derived from recreational leasing? ____

What species of wildlife are harvested? _____

Supplemental Feeding (Hay and Supplements)

On responses below with multiple boxes, check all that apply.

				Hay					Supplement							
Herd	Animal Type[1]	Ranch/ Pasture or Field ID	Feeding Program[2]	Hay Type[3]	Period Fed	How Fed[4]	Lbs/ Head/ Day	Vary feeding levels (Y/N, how?)[5]	Supplement type[6] Beg End	Period Fed	Lbs/ head/ day Beg End	Form[7]	Yearly Contract with feed supplier? (Y/N)	Vary feeding levels (Y/N, how?)[5]	Mineral[8]	How much per head
Jones	Cows	Noble, Ray, East	N,H,S,C	Prairie	Dec-Feb as needed	L	2 big bales every other day	W,Cow, F, CC	CP40 CP40	Dec-Feb	2 3	B	N	W, Cow, F, CC	S & T	

[1] Cows, replacement heifers, bulls, calves.
[2] Dry lot - hay only (DH), hay (H), supplement (S), native pasture (N), warm season pasture (W), cool season pasture (C)
[3] Alfalfa, prairie, bermuda, sudan, other (please specify).
[4] Free choice (F), broken in pasture (B), free choice w/ rings or feeders (R), limit (L).
[5] Weather (W), cow condition (Cow), forage condition (F), close to calving (CC), other (please specify).
[6] Commercial, 15-25% protein, grain (e.g., milo, corn) (C20G); commercial, 15-25% protein, fiber (e.g., soy hulls, wheat mids) (C20F); commercial, 26-35% protein, grain (C30G); commercial, 26-35% protein, fiber (C30F); commercial, 36-45% protein, (C40P); commercial, 36-45%, oilseed meals (C40O); home mix, milo/cottonseed meal (H/CSM); home mix, other (please specify); soybean hulls (S); corn gluten feed (C); wheat mids (W); whole cotton seed (CS); peanut meal (P); poultry litter (PL); by-product mix (specify); other (specify). If producer doesn't know whether commercial mix is grain or fiber based simple indicate C and protein level; e.g., C20.
[7] Sack, bulk
[8] Salt (S), trace (T), sulphur (SU), complete mineral in block form (C-B), complete mineral in loose form (C-L).

Farm Financial Record Systems

1. Do you use or subscribe to a service to keep some (or all) of your farm business records? (include farm business associations, accountants, consultants or other paid services if they enter transactions data, provide summaries, etc. separate from completing tax forms)

   ☐ No ..... Go to question 3
   ☐ Yes

2. Which of the following best describes this service? (Check ONE)
   ☐ Accountant
   ☐ Attorney
   ☐ Record keeping business, bureau, or association
   ☐ Other (please specify)_____

3. Aside from this service, do you keep a farm records workbook, general ledger or use some other method to record the farm's financial activities?

   ☐ No ..... Go to question 10
   ☐ Yes

4. Who is primarily responsible for keeping these records (Check ONE)
   ☐ I am Name: _____
   ☐ Partner in the farming business
   ☐ Spouse or other family member
   ☐ Hired employee
   ☐ Other (Please specify) _____

5. Which of the following best describes your financial record system? (Check ONE)
   ☐ Manual record system
   ☐ Computer-based record system
   ☐ Both manual and computer based components
   ☐ Mail-in records system

6. What method of record keeping are you using now?
   ☐ Cash
   ☐ Accrual

7. Are your financial records based on single or double-entry accounting methods? (Check ONE)
   ☐ Single-entry accounting
   ☐ Double-entry accounting
   ☐ Don't know

8. Do you keep enterprise records?
   ☐ No
   ☐ Yes

9. Did you set up your own account names and/or numbers, or did you use someone else's? (Check ONE)
   ☐ I designed the account structure
   ☐ Someone else designed the account structure

10. If your financial records are computer based, which of the following best describes your system?
- ☐ General business accounting software (e.g., Quicken, Peachtree, Money, Dac-easy)
- ☐ Accounting package designed for farm firms (e.g., Redwing, FBS)
- ☐ Accounts are maintained on an electronic spreadsheet (e.g., Lotus 1-2-3, QuattroPro, Excel)
- ☐ Accounts are maintained using database management software (e.g., dBASE)
- ☐ Mail-in records system
- ☐ Other (please specify) _____

11. How frequently are receipt and expense data entered into your farm records?

_____ times per month _____ times per year

12. Typically, how many hours per month are spent keeping farm financial records?

_____ hours per month _____ hours per year

13. Typically, how many hours per month are spent analyzing farm financial records?

_____ hours per month _____ hours per year

14. Do you prepare your own income tax return? ..... ☐yes ☐no

15. Do you have an estate plan? ..... ☐yes ☐no

If yes, when was it completed? _____

If yes, do your farm partners know the contents? ..... ☐yes ☐no

16. Do you maintain a separate bank account for your farm business? ..... ☐yes ☐no

17. Is your depreciation schedule complete and up-to-date? ..... ☐yes ☐no

Crop/Forage Record System

1. Select all crop information that you record every year either on a field-level (e.g. Smith place, Jones farm etc.) or on a total enterprise (crop) basis?

	Field Records?	Crop Records?
a. Fertilizer used	☐ yes ☐ no	☐ yes ☐ no
b. Manure applied	☐ yes ☐ no	☐ yes ☐ no
c. Herbicides applied	☐ yes ☐ no	☐ yes ☐ no
d. Insecticides or fungicide applied	☐ yes ☐ no	☐ yes ☐ no
e. Machinery operations performed	☐ yes ☐ no	☐ yes ☐ no
f. Crop yield	☐ yes ☐ no	☐ yes ☐ no
g. Forage yield	☐ yes ☐ no	☐ yes ☐ no
h. Costs of production and revenue	☐ yes ☐ no	☐ yes ☐ no
i. Irrigation scheduling/amounts	☐ yes ☐ no	☐ yes ☐ no

2. What methods do you use to record crop data (check ALL that apply)
   - ☐ Notes on calendars
   - ☐ Pocket notebook
   - ☐ Field record book
   - ☐ Computerized crop records program (e.g., Field Manager, CropAudit)
   - ☐ Computer data base of my design
   - ☐ Other (please specify: _____)

3. How often do you test the soils in tillable fields?
   - ☐ Annually
   - ☐ Every 2 years
   - ☐ Every 3-4 years

4. What is your main market crop (e.g., largest sales)? _____

   How do you market this crop? (Check ALL that apply)

Currently	In past	
☐	☐	Cash sales at harvest without storage
☐	☐	Cash sales after storing the crop
☐	☐	Forward cash contract
☐	☐	Hedging using futures market
☐	☐	Hedging using options market
☐	☐	Contract with processor
☐	☐	Feed to livestock
☐	☐	Process and sell as processed product
☐	☐	Other (please specify: _____)

Livestock Record System

1. For beef breeding animals, do you keep individual cow records? ☐ yes ☐ no

2. For beef breeding animals, how do you record and keep information in question 1? (Check ALL that apply)

   a. A manual system on paper ☐
   b. A computer program I designed ☐
   c. A computer program I purchased ☐
   d. A service bureau ☐
   e. Other (please specify: _____) ☐

3. Do you keep records of feed fed to animals? (Check ONE)
   - ☐ No
   - ☐ Yes

   If yes, at what level:
   - ☐ on a total farm basis only
   - ☐ on a species basis only
   - ☐ on a group level within species
   - ☐ on an individual animal basis

   If yes, how are these records kept?
   - ☐ Paper system
   - ☐ Self designed computer program
   - ☐ Purchased computer program
   - ☐ Other: _____

On-Farm Computer Use

1. Do you use a computer in any aspect of your farm business?
   - ☐ No..... Go to "Use of Computerized Information Service" section.
   - ☐ Yes..... Answer the following questions.

2. Which best describes your primary computer system. *Check one.*
   - ☐ Windows operating system
   - ☐ MS-DOS operating system
   - ☐ Other. Please specify:_____

4. In what year did you purchase the computer? 19___

   a. Do you have a MODEM for your computer? ☐ yes ☐ no ☐ don't know
   b. What is the size of your hard disk drive? _____
   c. How much RAM does your computer have? _____ k

5. Who is the primary operator of the computer for business uses? *Check one.*
   Name: _____
   - ☐ Owner
   - ☐ Partner in the farm business
   - ☐ Spouse
   - ☐ Other family member
   - ☐ Employee

6. How did the primary operator learn to use the computer? (Check ONE)
   - ☐ High school classes
   - ☐ College classes
   - ☐ Classes offered by the cooperative extension service
   - ☐ Vo-ag or technical school classes service
   - ☐ Self-taught, no formal training
   - ☐ Other (please specify): _____

7. About how many hours per month is the computer used for farm/ranch use?
   - ☐ Less than 5 hours/month
   - ☐ 5-10 hours/month
   - ☐ 10-20 hours/month
   - ☐ 20-30 hours/month
   - ☐ More than 30 hours/month

8. For which tasks do you use the computer and how helpful is it?

	Is computer used for this task?		Helpfulness in management (Low → High)				
a. Business financial accounting	yes	no	1	2	3	4	5
b. Business planning (budgets, projected cash flow statements, etc.)	yes	no	1	2	3	4	5
c. Tax computation	yes	no	1	2	3	4	5
d. Business correspondence	yes	no	1	2	3	4	5
e. Herd production recordkeeping (e.g., herd health & breeding records)	yes	no	1	2	3	4	5
f. Crop production recordkeeping (e.g., yield & fertilization records)	yes	no	1	2	3	4	5
g. Livestock feeding/ration evaluation	yes	no	1	2	3	4	5
h. Marketing and price analysis (e.g., charting, forecasting, etc.)	yes	no	1	2	3	4	5
i. Access to an electronic information service	yes	no	1	2	3	4	5

9. Please indicate the percentage of time (business use only) that your computer is used for each of the following computer software applications. (If you do not use a software type, enter 0 (zero).)

Percent of time used:

Please specify name of software:

_____ Business accounting (e.g., Quicken, Redwing) _____

_____ Tax computation (e.g., Turbo Tax) _____

_____ Electronic spreadsheet (e.g., Lotus, Excel) _____

_____ Word processing (e.g., Word Perfect, Word) _____

_____ Data base management(e.g., dBASE, Paradox) _____

_____ Market price analysis (e.g., Market Window, PCMarket)_____

_____ Crop recordkeeping (e.g., Field Manager, Cropaudit)_____

_____ Livestock recordkeeping (e.g., Pioneer, Chaps) _____

_____ Livestock feeding/ration evaluation (e.g., Auto NRC)_____

_____ Soil maps, chemical use (e.g., FarmTrac) _____

_____ Other (please specify) _____

100%

10. To what extent do you feel the computer has either saved time or provided better information than "hand" records? (Circle ONE)

Not at all				Very much
1	2	3	4	5

11. How much time passed from when you purchased the computer system until you felt it became useful?

- ☐ Less than 1 month
- ☐ 1-3 months
- ☐ 4 -6 months
- ☐ 7-9 months
- ☐ More than 9 months

Use of Agricultural Professionals and Information Services

During the past two years, which of the following professional services have you used as a source of information and how useful have these been?

	Times the source was used per year (Circle ONE)					Usefulness low				high
Accountant or financial advisor	0	1	2-5	6-10	> 10	1	2	3	4	5
Farm record association agent	0	1	2-5	6-10	> 10	1	2	3	4	5
Tax preparer	0	1	2-5	6-10	> 10	1	2	3	4	5
Livestock management advisor	0	1	2-5	6-10	> 10	1	2	3	4	5
Crop/pest management consultant	0	1	2-5	6-10	> 10	1	2	3	4	5
Computer software vendor/advisor	0	1	2-5	6-10	> 10	1	2	3	4	5
Computer hardware vendor/advisor	0	1	2-5	6-10	> 10	1	2	3	4	5
Farm management consultant	0	1	2-5	6-10	> 10	1	2	3	4	5
Coop. Extension - county agent	0	1	2-5	6-10	> 10	1	2	3	4	5
Coop. Extension - specialist	0	1	2-5	6-10	> 10	1	2	3	4	5
University professor	0	1	2-5	6-10	> 10	1	2	3	4	5
Vocational agriculture teacher	0	1	2-5	6-10	> 10	1	2	3	4	5
Veterinarian	0	1	2-5	6-10	> 10	1	2	3	4	5
Natural Resource Conservation Service	0	1	2-5	6-10	> 10	1	2	3	4	5
Farm Service Agency (FSA)	0	1	2-5	6-10	> 10	1	2	3	4	5
State Dept. of Forestry	0	1	2-5	6-10	> 10	1	2	3	4	5
State Dept. of Fish & Game	0	1	2-5	6-10	> 10	1	2	3	4	5
Other producers	0	1	2-5	6-10	> 10	1	2	3	4	5
Industrialization of Agriculture	0	1	2-5	6-10	> 10	1	2	3	4	5
Computer Information Services (e.g., DTN, Farm Bureau ACRES) (please specify)	0	1	2-5	6-10	> 10	1	2	3	4	5
Internet (e.g., COMPUSERVE, AOL) (please specify)	0	1	2-5	6-10	> 10	1	2	3	4	5
Other: _____	0	1	2-5	6-10	> 10	1	2	3	4	5

APPENDIX D

IRM INDEX DISCIPLINARY COMPONENTS

Animal Science Index

1. Body Condition Scoring-*(Maximum of 10 points)*

Do you know how to Body Condition Score your cows? yes ☐ no ☐

Do you Body Condition Score your cows? yes ☐ no ☐

If yes, what is the average BCS:

Yearlings_____ When scored:

Two year olds_____ When scored:

Cows_____ When scored:

For cows, specify the period of production when scored:

Period 1: 80 days post calving
Period 2: 125 days pregnant and lactating
Period 3: 110 days mid-gestation
Period 4: 50 days pre-calving

2. Selection of replacement females-*(Maximum of 10 points)*

Check the relative importance of the following factors in purchasing or selecting replacement heifers:

Factors	Not Applicable	None	Slight	Moderate	Very	Extreme
Birth weight	☐	☐	☐	☐	☐	☐
Breed	☐	☐	☐	☐	☐	☐
Expected Progeny Difference (EPDs)						
Birthweight EPD	☐	☐	☐	☐	☐	☐
Growth trait EPDs	☐	☐	☐	☐	☐	☐
Milk EPD	☐	☐	☐	☐	☐	☐
Carcass EPD	☐	☐	☐	☐	☐	☐
Frame score/Hip height	☐	☐	☐	☐	☐	☐
Price	☐	☐	☐	☐	☐	☐
Reputation of breeder	☐	☐	☐	☐	☐	☐
Structural soundness/visual appraisal	☐	☐	☐	☐	☐	☐
Pelvic area	☐	☐	☐	☐	☐	☐
Temperament	☐	☐	☐	☐	☐	☐
Weaning weight/yearling weight	☐	☐	☐	☐	☐	☐
Dam's udder	☐	☐	☐	☐	☐	☐
Dam's temperament	☐	☐	☐	☐	☐	☐

3. Culling of breeding females-*(Maximum of 10 points)*

What is the relative importance of the following reasons for culling breeding age heifers or cows.

Factors	Not Applicable	None	Slight	Moderate	Very	Extreme
Pregnancy Status (open or aborted)	☐	☐	☐	☐	☐	☐
Calving Injury	☐	☐	☐	☐	☐	☐
Physical unsoundness (cripple)	☐	☐	☐	☐	☐	☐
Poor calves	☐	☐	☐	☐	☐	☐
Digestive problem	☐	☐	☐	☐	☐	☐
Respiratory problem	☐	☐	☐	☐	☐	☐

Factors	Not Applicable	None	Slight	Moderate	Very	Extreme
Bad udder	☐	☐	☐	☐	☐	☐
Bad eyes	☐	☐	☐	☐	☐	☐
Age/thin	☐	☐	☐	☐	☐	☐
Temperament	☐	☐	☐	☐	☐	☐
Genetic composition	☐	☐	☐	☐	☐	☐
Dry cow/lost calf	☐	☐	☐	☐	☐	☐

4. Selection of breeding bulls-*(Maximum of 10 points)*

Check the relative importance of the following factors in purchasing or selecting a bull:

Factors	Not Applicable	None	Slight	Moderate	Very	Extreme
Birth weight	☐	☐	☐	☐	☐	☐
Breed	☐	☐	☐	☐	☐	☐
Expected Progeny Difference (EPDs)						
Birthweight EPD	☐	☐	☐	☐	☐	☐
Growth trait EPDs	☐	☐	☐	☐	☐	☐
Milk EPD	☐	☐	☐	☐	☐	☐
Carcass EPD	☐	☐	☐	☐	☐	☐
Frame score/Hip height	☐	☐	☐	☐	☐	☐
Price	☐	☐	☐	☐	☐	☐
Reputation of breeder	☐	☐	☐	☐	☐	☐
Structural soundness/visual appraisal	☐	☐	☐	☐	☐	☐
Scrotal circumference	☐	☐	☐	☐	☐	☐
Temperament	☐	☐	☐	☐	☐	☐
Weaning weight/yearling weight	☐	☐	☐	☐	☐	☐

5. Culling of breeding bulls-*(Maximum of 10 points)*

Check the relative importance of the following factors in culling bulls:

Factors	Not Applicable	None	Slight	Moderate	Very	Extreme
Age/bad teeth	☐	☐	☐	☐	☐	☐
Bad eye(s)	☐	☐	☐	☐	☐	☐
Disease	☐	☐	☐	☐	☐	☐
Infertility	☐	☐	☐	☐	☐	☐
Performance of offspring	☐	☐	☐	☐	☐	☐
Physical unsoundness (injury/lame)	☐	☐	☐	☐	☐	☐
Size	☐	☐	☐	☐	☐	☐
Temperament	☐	☐	☐	☐	☐	☐
Too many offspring in herd	☐	☐	☐	☐	☐	☐

6. Breeding Soundness Exam-*(Maximum of 10 points)*

Are the breeding bulls semen tested?

☐ yes ☐ no

If yes, when? ☐ At purchase ☐ Once per year ☐ Once every two years

7. **Calving Information** -*(Maximum of 10 points)*

Are replacement heifers separate from cows?

Before calving: ☐ yes ☐ no

After calving: ☐ yes ☐ no

Where do replacement heifers usually calve? *(Check one)*

- ☐ Box stalls
- ☐ Calving lots
- ☐ Special calving pastures
- ☐ With cows

How often are females observed during calving season?

	Number of observations per day *(Circle one each)*							
Cows	0	1	2	3	4	5	6	7
Heifers	0	1	2	3	4	5	6	7

How long are females allowed to labor, after water bag is seen, before giving calving assistance?

Cows	Heifers
☐ Less than 1 hour	☐ Less than 1 hour
☐ 1-2 hours	☐ 1-2 hours
☐ 3-4 hours	☐ 3-4 hours
☐ More than 5 hours	☐ More than 5 hours

Calving information: What kind of calving assistance is necessary to deliver a calf?

a. Total Number of Heifers Calving:
   - How many easy pull deliveries?
   - How many hard pull deliveries?
   - How many C-sections?

b. Total Number of Cows Calving:
   - How many easy pull deliveries?
   - How many hard pull deliveries?
   - How many C-sections?

c. Number of assisted births attended by a veterinarian?

Financial Management Index

1. Goals, Management, and Marketing-*(Maximum of 20 points)*

How many years have you worked on a farm/ranch?

0 ☐ Less than 5 years
+3 ☐ 5-10 years
+5 ☐ 11-20 years
+7 ☐ More than 20 years

Do you have written goals for your farm/ranch? Yes (+5) ☐ no☐ Family? yes ☐ (+3) no ☐

How important is it for this beef operation to make a profit?

+5 Very important +3 Somewhat important Not important

2. Farm Financial Record Systems-*(Maximum of 30 points)*

Which, if any, of the following best describes the service you use to keep some (or all) of your farm business records?

+2 ☐ Accountant
+1 ☐ Attorney
+2 ☐ Record keeping business, bureau or association
+3 ☐ I am – Name:
+3 ☐ Partner in the farming business
+3 ☐ Spouse or other family member
+3 ☐ Hired employee
+2 ☐ Other (please specify)

Aside from the services checked above, do you keep a farm records workbook, general ledger, use software or some other method to record the farm's financial activities?

-5 ☐ No

Which of the following best describes your financial records system?

☐ Manual record system
+1 ☐ Computer-based record system
+2 ☐ Both manual and computer-based components
☐ Mail-in records system

What method of record keeping are you using now?

☐ Cash
+2 ☐ Accrual

Do you keep enterprise records?

☐ No
+3 ☐ Yes

How frequently are receipt and expense data entered into your farm records?

_____Times per month _____Times per year
(-5 if annually, +2 if one or more times per month)

Do you have an estate plan? ☐ yes (+3) ☐ no

Do you have a retirement plan (e.g. plan for income after retirement)? ☐ yes (+3) ☐ no

Do you maintain a separate bank account for your farm business, or otherwise separate farm and family expenses in another manner (e.g. through reports in Quicken)? ☐ yes (+3) ☐ no

Is your depreciation schedule complete and up-to-date? ☐ yes (+1) ☐ no

3. Crop/Forage Record System-*(Maximum of 20 points)*

Select all crop information that you record every year either on a field-level (e.g. Smith place, Jones farm etc.) or on a total enterprise (crop) basis?

		Field Records?			Crop Records?	
a. Fertilizer used	+1	☐ yes	☐ no	+1	☐ yes	☐ no
b. Manure applied		☐ yes	☐ no		☐ yes	☐ no
c. Herbicides applied	+1	☐ yes	☐ no	+1	☐ yes	☐ no
d. Insecticides or fungicide applied	+1	☐ yes	☐ no	+1	☐ yes	☐ no
e. Machinery operations performed	+1	☐ yes	☐ no	+1	☐ yes	☐ no
f. Crop yield	+1	☐ yes	☐ no	+1	☐ yes	☐ no
g. Forage yield	+1	☐ yes	☐ no	+1	☐ yes	☐ no
h. Costs of production and revenue	+2	☐ yes	☐ no	+2	☐ yes	☐ no
i Irrigation scheduling/amounts	+1	☐ yes	☐ no	+1	☐ yes	☐ no

How do you market your main crop? (Check all that apply)
(+3 if anything besides cash either currently or in past)

Currently	In past	
☐	☐	Cash sales at harvest without storage
☐	☐	Cash sales after storing the crop
☐	☐	Forward cash contract
☐	☐	Hedging using futures market
☐	☐	Hedging using options market
☐	☐	Contract with processor
☐	☐	Feed to livestock
☐	☐	Process and sell as processed product
☐	☐	Other (please specify: _____)

4. Livestock Record System-*(Maximum of 20 points)*

For breeding animals, do you keep individual cow records? ☐ yes ☐ no
(+5 if yes and using records in making decisions)

Do you keep records of feed fed to animals? (Check ONE)

☐ No

☐ Yes

If yes, at what level:

+5 ☐ on a total farm basis only (could include different types of livestock, but would be OK if only cows)

+5 ☐ on a species basis only (e.g. total for beef, swine, sheep)

+10 ☐ on a group level within species (e.g. fall herd, spring herd, stockers separately)

+10 ☐ on an individual animal basis

5. On-Farm Computer Use-*(Maximum of 10 points)*

Do you use a computer in any aspect of your farm business?

☐ No.....Go to "Use of Computerized Information Service" section.

+5 ☐ Yes .....Answer the following questions.

For which tasks do you use the computer and how helpful is it?
(+3 for three or more, +5 if yes to five or more)

		Is computer used for this task?	
a.	Business financial accounting	yes	no
b.	Business planning (budgets, projected cash flow statements, etc.)	yes	no
c.	Tax computation	yes	no
d.	Business correspondence	yes	no
e.	Herd production recordkeeping (e.g., herd health & breeding records)	yes	no
f.	Crop production recordkeeping (e.g., yield & fertilization records)	yes	no
g.	Livestock feeding/ration evaluation	yes	no
h.	Marketing and price analysis (e.g., charting, forecasting, etc.)	yes	no
i.	Access to an electronic information service	yes	no

Forage Index

Forage index scores listed by areas of critical management factors.

	Producers								
	A	B	C	D	E	F	G	H	I
1. Forage Program									
Raise Hay?	5	5	7	5	5	5	5	5	5
Percentage Hay Raised	1	1	8	1	3	2	1	1	1
Test For Crude Protein	1	1	10	1	5	10	1	5	1
Identify Key Species	10	10	10	10	10	1	10	10	**
Identify Undesirable Species	10	10	1	10	10	1	10	10	**
Identify Invader Species	10	10	1	10	10	10	10	10	**
Total Program	6.2	6.2	6.2	6.2	7.2	4.8	6.2	6.8	2.3
2. Hay									
Feeding Program	**	1	1	3	7	7	5	5	1
Hay Type	2	1	5	5	7	8	5	7	8
Period Fed	4	4	6	7	2	6	4	4	6
How Fed	5	3	6	3	5	7	10	5	10
Pounds Fed/ Head/Day	2	5	7	2	3	7	5	5	10
How Vary Feed Levels	10	10	10	**	10	10	10	**	5
Total Hay	4.6	3.8	5.7	3.4	4.5	6.3	5.7	4.2	6.5
3. Pasture and Range									
Soil Test	1	1	1	7	1	7	5	3	3
Fertilizer Method	3	3	3	7	3	8	5	5	5
Management Practices	5	1	1	3	1	1	5	1	1
Grazing System	5	5	7	3	3	8	10	10	10
Weed Control	1	1	5	4	1	6	1	1	1
Total Pasture And Range	3.0	2.2	3.4	4.8	1.8	6.0	5.2	4.0	4.0
4. Supplemental Feed									
Period Fed	1	1	1	1	1	10	5	3	1
Pounds Fed/ Head/ Day	1	3	2	2	1	7	3	2	1
Yearly Contract	1	1	3	5	5	1	10	1	1
Vary Feed Levels	10	10	**	10	10	10	10	**	1
Minerals	10	10	10	10	10	10	10	10	10
Total Supplemental Feed	4.6	5.0	4.0	5.6	5.4	7.6	7.6	4.0	2.8
Total Points	111.8	109.2	120.2	123.4	126.5	159.2	157	118	93.83
Total Possible	210	220	210	210	220	220	220	200	190
Overall Index	5.3	5.0	5.7	5.9	5.7	7.2	7.1	5.9	4.9

** producer provided incomplete information and the score was adjusted accordingly

According to the forage specialist, "Things such as not soil testing, not testing hay for crude protein, using only hay and supplement for winter feeding programs, only using herbicides for weed control, etc. usually prompted a score of 1. Where their practices would encourage increased efficiency and lower overall costs, the scores were correspondingly higher."

1. **Forage program**

If you feed hay:

Do you: ☐ raise your own hay ☐ purchase hay from off farm?

What percentage of hay is raised?

Do you test raised hay you feed for crude protein content? ☐ Yes ☐ No

Do you test purchased hay you feed for crude protein content? ☐ Yes ☐ No

If you raise your own hay, do you:

- ☐ select species to enhance the overall nutritive value of the hay
- ☐ check soil fertility
- ☐ harvest to maximize yield
- ☐ harvest to maximize quality
- ☐ ammoniate the hay
- ☐ make small square bales
- ☐ make large round bales
- ☐ custom cut
- ☐ custom bale

How is your hay stored during the year?

- ☐ On ground, no cover
- ☐ On ground, with cover
- ☐ On gravel, tires or rack, no cover
- ☐ On gravel, tires or rack, with cover
- ☐ In barn
- ☐ Other (please specify):

If you use rangeland:

Can you identify the key **desirable** native grasses, forbs, legumes, and browse on your ranch?

☐ Yes ☐ No ☐ Don't know

Can you identify the key **undesirable** grasses, forbs, legumes, and woody plants on your ranch?

☐ Yes ☐ No ☐ Don't know

Can you identify the key invader plants on your ranch (introduced plants that escape from where they are planted, e.g. sericea lespedeza, tall fescue, Old World bluestem)?

☐ Yes ☐ No ☐ Don't know

2. **Hay**

See Supplemental Feeding Sheet (page)

3. **Pasture and Range**

See Pasture and Range Sheet (page)
See Land Inventory (page)

4. **Supplemental Feed**

See Supplemental Feeding Sheet (page)

Supplemental Feeding (Hay and Supplements)

On responses below with multiple boxes, check all that apply.

				Hay					Supplement							
Herd	Animal Type[1]	Ranch/ Pasture or Field ID	Feeding Program[2]	Hay Type[3]	Period Fed	How Fed[4]	Lbs/ Head/ Day	Vary feeding levels (Y/N, how?)[5]	Supplement type[6] Beg End	Period Fed	Lbs/ head/ day Beg End	Form[7]	Yearly Contract with feed supplier? (Y/N)	Vary feeding levels (Y/N, how?)[5]	Minerals[8]	How much per head
Jones	Cows	Noble, Ray, East	N,H,S,C	Prairie	Dec-Feb as needed	L	1 big bales every other day	W,Cow, F, CC	CP40 CP40	Dec-Feb	2 3	B	N	W, Cow, F, CC	S & T	

[1] Cows, replacement heifers, bulls, calves.
[2] Dry lot - hay only (DH), hay (H), supplement (S), native pasture (N), warm season pasture (W), cool season pasture (C)
[3] Alfalfa, prairie, bermuda, sudan, other (please specify).
[4] Free choice (F), broken in pasture (B), free choice w/ rings or feeders (R), limit (L).
[5] Weather (W), cow condition (Cow), forage condition (F), close to calving (CC), other (please specify).
[6] Commercial, 15-25% protein, grain (e.g., milo, corn) (C20G); commercial, 15-25% protein, fiber (e.g., soy hulls, wheat mids) (C20F); commercial, 26-35% protein, grain (C30G); commercial, 26-35% protein, fiber (C30F); commercial, 36-45% protein, (C40P); commercial, 36-45%, oilseed meals (C40O); home mix, milo/cottonseed meal (H/CSM); home mix, other (please specify); soybean hulls (S); corn gluten feed (C); wheat mids (W); whole cotton seed (CS); peanut meal (P); poultry litter (PL); by-product mix (specify), other (specify). If producer doesn't know whether commercial mix is grain or fiber based simple indicate C and protein level; e.g., C20
[7] Sack, bulk
[8] Salt (S), trace (T), sulphur (SU), complete mineral in block form (C-B), complete mineral in loose form (C-L).

Pasture and Range

Ranch/ Pasture ID	Acres	Primary Forage[1]	Secondary Forage[1]	Period Grazed (e.g. Nov-Mar)	Amount of Hay Harvested	Frequency of soil Tests[2]	Fertilization Method[3]	When Fertilized[4]	Other Management Practices[5]	Grazing System[6]	Why do you use the current grazing system?[7]	Weed problems/ List Species	Weed/Brush Control		Rented/ Owned	Water Source[9]	Water Shortage Problems? (Y/N)	Water Distribution[10]	Stocking Rate (Acres/ AU)
													Method[8]	How Often					

[1] Bermuda grass, tall fescue, brome grass, clovers, old world bluestem, rye, ryegrass, oats, wheat, native plants including grass, brush, forbs/weeds, other (please specify).
[2] Never (N), once per year (1), once every two years (2), every 3-4 years (3), infrequently (X).
[3] Commercial fertilizer (CF), poultry litter (P), swine effluent (S), other animal wastes (W), overseed with legumes (O), other (specify).
[4] Spring (S), fall (F), late summer (LS)
[5] Specie selection to enhance the overall nutritive value of the forage (S), check soil fertility (F), prescribed burning (B).
[6] Continuous stocking (C), Rotational stocking (livestock are moved from pasture to pasture on a periodic basis) (R), Intensive stocking (more than 6 paddocks) (I), seasonal (stockers), intensive early stocking (stockers).
[7] Convenience (C), Labor (L), Fencing (F), Nutrition (N), Tradition (T), Recommended by expert (R).
[8] None (N), Herbicides (H), Mowing (M), Grazing management (G), Prescribed fire (F)," Other (specify)
[9] Pond, creek, tank, windmill, well and pump, natural springs.
[10] Number and location of water sources.

Land Inventory

Do you have a conservation plan? ☐ yes ☐ no

Do you use a USDA standard soil survey? ☐ yes ☐ no

How much precipitation does the property receive annually? ____ inches

Crop and Feed Acreage

Field ID	Acres	Crop	Average Yield	Amount of Hay Harvested	Frequency of Soil Test[1]	Fertilization Method[2]	When Fertilized?[3]	Other Management Practices[4]	Weed Problems? List Species	Method of Weed Control[5]	Irrigated/ Dryland	Period Grazed (e.g., Nov-Mar)	Rented/ Owned

[1] Never (N), once per year (1), once every two years (2), every 3-4 years (3), infrequently (X).
[2] Commercial fertilizer (CF), poultry litter (P), swine effluent (S), other animal wastes (W), overseed with legumes (O), other (please specify.)
[3] Spring (S), fall (F), late summer (LS)
[4] Specie selection to enhance the overall nutritive value of the forage (S), prescribed burning (B).
[5] None (N), Herbicides (H), Mowing (M), Grazing management (G), Prescribed fire (F), Other (please specify.)

Herd Health Index

Each question- 10 points

1. Do you know how to Body Condition Score your cows? yes ☐ no ☐

2. Do you Body Condition Score your cows? yes ☐ no ☐

   If yes, what is the average BCS:

   Yearlings_____ When scored:

   Two year olds_____ When scored:

   Cows_____ When scored:

   For cows, specify the period of production when scored:

   Period 1: 80 days post calving
   Period 2: 125 days pregnant and lactating
   Period 3: 110 days mid-gestation
   Period 4: 50 days pre-calving

3. Selection of replacement heifers. Check the relative importance of the following factors in purchasing or selecting replacement heifers:

Factors	Not Applicable	None	Slight	Moderate	Very	Extreme
Birth weight	☐	☐	☐	☐	☐	☐
Breed	☐	☐	☐	☐	☐	☐
Expected Progeny Difference (EPDs)						
Birthweight EPD	☐	☐	☐	☐	☐	☐
Growth trait EPDs	☐	☐	☐	☐	☐	☐
Milk EPD	☐	☐	☐	☐	☐	☐
Carcass EPD	☐	☐	☐	☐	☐	☐
Frame score/Hip height	☐	☐	☐	☐	☐	☐
Price	☐	☐	☐	☐	☐	☐
Reputation of breeder	☐	☐	☐	☐	☐	☐
Structural soundness/visual appraisal	☐	☐	☐	☐	☐	☐
Pelvic area	☐	☐	☐	☐	☐	☐
Temperament	☐	☐	☐	☐	☐	☐
Weaning weight/yearling weight	☐	☐	☐	☐	☐	☐
Dam's udder	☐	☐	☐	☐	☐	☐
Dam's temperament	☐	☐	☐	☐	☐	☐

4. Culling of breeding females. What is the relative importance of the following reasons for culling breeding age heifers or cows.

Factors	Not Applicable	None	Slight	Moderate	Very	Extreme
Pregnancy Status (open or aborted)	☐	☐	☐	☐	☐	☐
Calving Injury	☐	☐	☐	☐	☐	☐
Physical unsoundness (cripple)	☐	☐	☐	☐	☐	☐
Poor calves	☐	☐	☐	☐	☐	☐
Digestive problem	☐	☐	☐	☐	☐	☐
Respiratory problem	☐	☐	☐	☐	☐	☐
Bad udder	☐	☐	☐	☐	☐	☐
Bad eyes	☐	☐	☐	☐	☐	☐
Age/thin	☐	☐	☐	☐	☐	☐
Temperament	☐	☐	☐	☐	☐	☐
Genetic composition	☐	☐	☐	☐	☐	☐
Dry cow/lost calf	☐	☐	☐	☐	☐	☐

5. Selection of breeding bulls. Check the relative importance of the following factors in purchasing or selecting a bull:

Factors	Not Applicable	None	Slight	Moderate	Very	Extreme
Birth weight	☐	☐	☐	☐	☐	☐
Breed	☐	☐	☐	☐	☐	☐
Expected Progeny Difference (EPDs)						
Birthweight EPD	☐	☐	☐	☐	☐	☐
Growth trait EPDs	☐	☐	☐	☐	☐	☐
Milk EPD	☐	☐	☐	☐	☐	☐
Carcass EPD	☐	☐	☐	☐	☐	☐
Frame score/Hip height	☐	☐	☐	☐	☐	☐
Price	☐	☐	☐	☐	☐	☐
Reputation of breeder	☐	☐	☐	☐	☐	☐
Structural soundness/visual appraisal	☐	☐	☐	☐	☐	☐
Scrotal circumference	☐	☐	☐	☐	☐	☐
Temperament	☐	☐	☐	☐	☐	☐
Weaning weight/yearling weight	☐	☐	☐	☐	☐	☐

6. Culling of breeding bulls. Check the relative importance of the following factors in culling bulls:

Factors	Not Applicable	None	Slight	Moderate	Very	Extreme
Age/bad teeth	☐	☐	☐	☐	☐	☐
Bad eye(s)	☐	☐	☐	☐	☐	☐
Disease	☐	☐	☐	☐	☐	☐
Infertility	☐	☐	☐	☐	☐	☐
Performance of offspring	☐	☐	☐	☐	☐	☐
Physical unsoundness (injury/lame)	☐	☐	☐	☐	☐	☐
Size	☐	☐	☐	☐	☐	☐
Temperament	☐	☐	☐	☐	☐	☐
Too many offspring in herd	☐	☐	☐	☐	☐	☐

7. Breeding Soundness Exam.
   Are the breeding bulls semen tested?
   ☐ yes ☐ no
   If yes, when?
   ☐ At purchase
   ☐ Once per year
   ☐ Once every two years

8. What is the minimum weight of heifers at breeding?

9. Are replacement heifers separate from cows?
   Before calving: ☐ yes ☐ no
   After calving: ☐ yes ☐ no

10. Where do replacement heifers usually calve? *(Check one)*
    ☐ Box stalls
    ☐ Calving lots
    ☐ Special calving pastures
    ☐ With cows

11. How often are females observed during calving season?

	Number of observations per day *(Circle one each)*							
Cows	0	1	2	3	4	5	6	7
Heifers	0	1	2	3	4	5	6	7

12. How long are females allowed to labor, after water bag is seen, before giving calving assistance?

Cows	Heifers
☐ Less than 1 hour	☐ Less than 1 hour
☐ 1-2 hours	☐ 1-2 hours
☐ 3-4 hours	☐ 3-4 hours
☐ More than 5 hours	☐ More than 5 hours

13. Calving information: What kind of calving assistance is necessary to deliver a calf?

a. Total Number of Heifers Calving:

How many easy pull deliveries?

How many hard pull deliveries?

How many C-sections?

b. Total Number of Cows Calving:

How many easy pull deliveries?

How many hard pull deliveries?

How many C-sections?

c. Number of assisted births attended by a veterinarian?

Are any of the following performed at birth? *(Check appropriate column.)*

	Routine	Difficult Birth Only
a. dip navel	☐	☐
b. weigh calf	☐	☐
c. individual ID	☐	☐
d. scour pill given	☐	☐
e. Vit A injection	☐	☐
f. Selenium injection	☐	☐
g. colostrum fed	☐	☐
h. colostrum substitute fed	☐	☐
i. scour vaccine given	☐	☐
j. injectable antibiotic	☐	☐
k. castration	☐	☐
l. other (please specify)	☐	☐

15. Are any of the following vaccines given at any time during the animal's lifetime? (*Check where applicable.*)

	Calves			*Replacement Heifers*		*Cows*		
Vaccine	*Calves at Birth*	*2-4 mo. calves*	*4-8 mo. calves*	*pre-breeding*	*Preg-nancy check*	*pre-breeding*	*Preg-nancy Check*	*Bulls*
Respiratory								
IBR								
BVD								
PI-3								
BRSV								
Pasteurella								
Hemophilus								
Reproductive								
Bangs								
Leptospira								
Campylobacter (vibriosis)								
Trichomoniasis								
Others								
2 way Clostridium								
4 way Clostridium								
7 way Clostridium								
8 way Clostridium								
E Coli (scours)								
Roto/corona (scours)								
Salmonella (scours)								
Anaplasmosis								
Pinkeye								

16. Where do you give injections? Rank the applicable choices.
    - ____ intramuscular - high hip
    - ____ intramuscular - low hip
    - ____ intramuscular – shoulder
    - ____ subcutaneous – shoulder
    - ____ intramuscular – neck
    - ____ subcutaneous – neck
    - ____ subcutaneous - ribs

17. At what age do you castrate bull calves? *(Check one)*
    - ☐ 1-30 days
    - ☐ 31-60 days
    - ☐ 61-120 days
    - ☐ 120-180 days
    - ☐ Older than 180 days
    - ☐ Do not castrate bull calves

18. At what age do you dehorn all calves? *(Check one)*
    - ☐ 1-30 days
    - ☐ 31-60 days
    - ☐ 61-120 days
    - ☐ 120-180 days
    - ☐ Older than 180 days
    - ☐ Do not dehorn calves

    If you do not dehorn, are your cattle polled?
    ☐ yes ☐ no

19. How do you treat for external parasites? *(Check all that apply.)*
    - ☐ Dust bags or oilers
    - ☐ Ear tags
      If yes, how often? ☐ once ☐ twice ☐ three times or more
    - ☐ Oral boluses
    - ☐ Pour on
      If yes, how often? ☐ once ☐ twice ☐ three times or more
    - ☐ Spray
      If yes, how often? ☐ once ☐ twice ☐ three times or more
    - ☐ Other (please specify)
    - ☐ Do not treat for external parasites

20. Are stomach worms a problem in your herd:
    - ☐ yes
    - ☐ no
    - ☐ don't know

21. Are liver flukes a problem in your herd:
    - ☐ yes
    - ☐ no
    - ☐ don't know

22. How often do you deworm your **cows** for the following: *(Check one in each column.)*

Stomach Worms	Flukes
☐ Once a year	☐ Once a year
☐ Twice a year	☐ Twice a year
☐ Three or more times a year	☐ Three or more times a year
☐ Do not deworm cows	☐ Do not deworm cows

23. Do you deworm your **calves** for: *(Check one in each column.)*

Stomach Worms	Flukes
☐ While suckling	☐ While suckling
☐ At weaning	☐ At weaning
☐ While suckling and at weaning	☐ While suckling and at weaning
☐ Do not deworm calves	☐ Do not deworm calves

24. Indicate the percentage of your calf crop that have been affected by the following conditions at each age.

	Birth to 28 days	29 days-120	120-weaning
Poor doers	_____	_____	
Scours/diarrhea	_____	_____	
Respiratory disease	_____	_____	
Pinkeye	_____	_____	

25. Of your total herd (calves, yearlings, cows, bulls) how many die annually due to the following conditions? *(Please indicate a number for each condition.)*

Number Lost
_____ Abortion
_____ Calving problems
_____ Digestive (scours, bloating)
_____ Parasitism
_____ Poisoning
_____ Predators
_____ Respiratory disease
_____ Unknown
_____ Weather
_____ Old age
_____ Total number lost

26. Rank the following for the greatest economic loss for your operation on an annual basis.

Factors	Not Applicable	None	Slight	Moderate	Very	Extreme
Abortion	☐	☐	☐	☐	☐	☐
Anaplasmosis	☐	☐	☐	☐	☐	☐
Calf scours	☐	☐	☐	☐	☐	☐
Calving problems	☐	☐	☐	☐	☐	☐
External parasites	☐	☐	☐	☐	☐	☐
Footrot	☐	☐	☐	☐	☐	☐
Internal parasites	☐	☐	☐	☐	☐	☐
Pinkeye	☐	☐	☐	☐	☐	☐
Reproductive (open/late)	☐	☐	☐	☐	☐	☐
Respiratory	☐	☐	☐	☐	☐	☐
Other (please specify)	☐	☐	☐	☐	☐	☐

VITA

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Master of Science

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