

A Systematic Approach to Improve Productivity and Profitability of Beef Cattle Ranches

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Introduction

Small producers of beef cattle are being taken over by large corporations that market the majority of cattle by contracting with feedlots and packers in vertical harmony.¹ To survive and prosper under this transition, the food animal practitioner must adapt to the transformation.² The public's perception of the veterinary medical profession must also change. To facilitate this change, the veterinarian must become a valuable asset to the producer by providing services beyond the scope of traditional veterinary care.

A recent national survey found that livestock producers perceived their veterinarian's knowledge of agribusiness/economics to be 19.4% less than that of producers', and 9% below that of Extension Agents'.³ The traditional veterinary educational process furnishes the new graduate with little training in economics, production, or management. In fact, training in the management of disease, the forte of the veterinary profession, is inadequate at most schools because it overwhelmingly concentrates on individuals rather than populations of animals.

To gain knowledge in agribusiness/economics, the veterinarian must rely upon extensive graduate work or gradually obtain the knowledge over a longer period of time through an "on-the-job" training process. If the veterinarian has the expertise to furnish producers with valuable information, the producers' perception of veterinarians will be favorably altered, and the veterinarian's area of specialization expanded so that the veterinarian can become actively involved in decisions that affect beef cattle production and profitability.

Beef cattle ranches are highly capitalized and historically have a low return on investment. Producers can no longer concentrate their efforts solely on maximizing production without considering the cost of inputs and their effect on profitability. The economic summary submitted to the National Cattlemen's Association in the Humphrey Report advises "reduction of production costs" as the primary method producers can use to survive in today's competitive market place.¹ Consultants who advise producers must not simply make recommendations to improve production without realizing the added expense that may be associated with that recommendation. Producers and consultants must realize that optimal economic production occurs where the added cost incurred through a change in production equals the added return⁴. Good managers understand this concept and use the ranch's resources (land, labor, management, and capital) to select the enterprises that meet the ranch's goals.⁵⁻⁹

Methodology

How do veterinarians identify and correct **all** the factors that limit production and profits in a beef cattle operation? A systematic approach must be used. This paper describes the steps to identify the factors limiting production and profits on beef cattle operations, the methodology to establish and

implement the Ranch Plan, and monitor the financial outcome. The process, depicted in Figure 1, uses the following steps:

- A. Establish ranch goals for production and profit
- B. Establish a data base for the herd
- C. Identify areas of production deficiency
- D. Identify areas of financial deficiency
- E. Identify areas for improvement
- F. Establish the Ranch Plan to reach it's goals of production and profit
- G. Develop a time-table for implementation of the Ranch Plan
- H. Implement and monitor the Ranch Plan
- I. Evaluate improvements in production and profitability

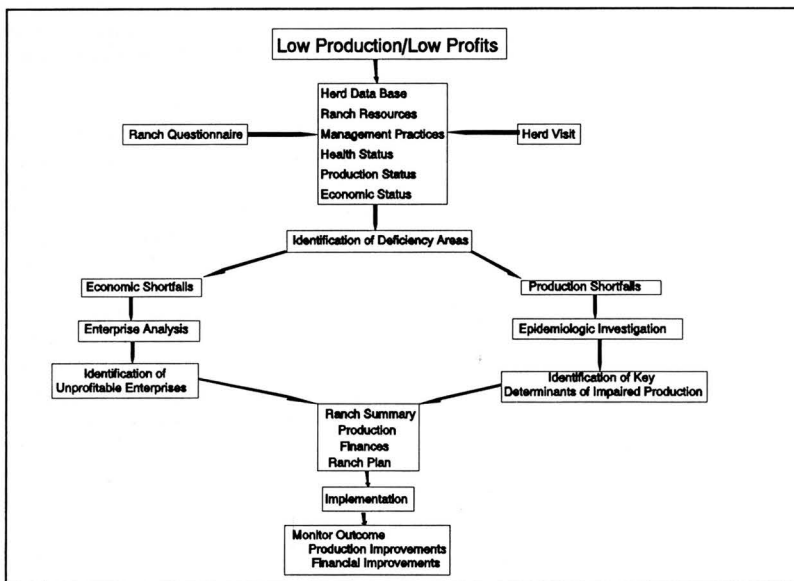


Figure 1 Methodology Flow Chart

1. Establishment of Goals

The investigator must first determine the ranch owner's goals.¹⁰ Is the ranch profit-motivated, is it operated to shelter income from other sources, or is it to fulfill the owner's lifetime dream? Are the owner's goals achievable? What does the owner expect from the veterinarian, and can the veterinarian meet those expectations? Once the goals are established, a set of objectives to meet those goals can be formulated, remembering that the veterinarian must work within the pre-determined constraints of the ranch.

2. Establish a data base for the herd

A compilation of the ranch's resources, managerial practices, current levels of production, and financial status are vitally important to identify the factors limiting production and profitability. This information is frequently obtained through phone calls, meetings with the ranch's owner(s)/manager, or repeated visits to the ranch. However, producers often forget important facts or figures necessary for a comprehensive evaluation, these methods of gathering information never seem to assimilate the information necessary to establish credible base-line information. A Ranch Management Questionnaire (RMQ) should be used to facilitate the accumulation of data about management practices and production for the ranch.¹¹ The RMQ categorizes questions in the following manner:

1. The Ranch's Resources
2. Nutritional Management
3. Breeding Management
4. Calving Management
5. Herd Health Program
6. Production Data
7. Personnel Information
8. Owner's Ideas on Areas of Potential Improvement

The RMQ requests a list of the ranch's resources (i.e. land, labor/personnel, and management). It requests specific information about current management of calving, heifer rearing and replacement programs, reproductive management (calving interval, calving cycle histograms, and management of open cows), and foraging practices (winter and summer grasses used) on the ranch. The questionnaire addresses nutritional management of replacement heifers, 1st and 2nd calf heifers, adult cows and bulls, and includes questions about supplemental feed (hay, cake, range feed, self-limiting feed) and mineral fed throughout the year. The section of the questionnaire that deals with health addresses diseases diagnosed on the ranch, morbidity and mortality of the cows, calves, and bulls, and the strategic vaccination and deworming programs used on each cattle enterprise (livestock group). Pregnancy rates, weaning rates (calves weaned per cow exposed), and weaning weights for each of the cattle enterprises completes the production information required on the survey. The questionnaire has a list of production and financial areas that the owner can rate according to the areas he/she feels need improvement. The veterinarian can use this ranking to assess the owner's goals and concentrate on resolving the problems that impede improvement in each of these areas.

3. Identify Areas of Deficiency in Production and Their Risk Factors

Shortfalls in production are readily identified from the data recorded in the RMQ. Actual production is compared to the ranch's goals. Table 1 lists high, but attainable, production goals for well-managed, cow-calf operations. The production shortfalls that are most commonly identified are classified into the following two major categories:

1. Low weaning rates
Reasons for low weaning weights include low pregnancy rates, excessive abortion rates, and/or excessive calf mortality rates.
2. Low weaning weights
Reasons for low weaning weights include calves underage at weaning (due to extended

Table 1. Production goals for beef cow-calf operations.

PARAMETER	GOAL
WEANING RATES	
Breeding season length	
Cows	63 days
Replacement heifers	42 days
Cows calving first 21 days	63%
Conception rates	
Cows	95%
Replacement heifers	85%
Pregnancy wastage	3%
Dystocia Rates	
Cows	5%
Replacement heifers	15%
Stillbirth rates	2%
Birth to weaning losses	5%
Calf crop (number calves weaned/number cows exposed)	90%
WEANING WEIGHTS	
Average daily gain	2.5 lbs
205-day adjusted weaning weights	50% dam's weight
COW MORTALITY	
Annual losses	1%

calving intervals) and/or low calf growth rates.

The importance of fertility to optimal production is underscored by fertility's involvement in both of the major categories of deficiencies in production.

Protocols for three comprehensive epidemiologic investigations have been developed to identify the risk-factors responsible for low production. These protocols investigate: (1) impaired fertility; (2) excessive calf mortality; and (3) low growth rates. Risk-factors are host, agent, or environmental characteristics that result in disease or in a short fall in production. After the risk-factors of a herd problem are identified, the problem can be controlled by eliminating or altering those risk-factors. Scientific investigations have identified the risk-factors of various beef herd problems. To conduct successful herd investigations, veterinary practitioners must be aware of this information. It is easier to solve herd problems if the investigator visits the herd with the objective of identifying all the active risk-factors, rather than making a visit to the ranch to "see what's happening out there." A combination of two approaches is necessary to solve herd problems of disease and/or decreased production: (1) identification of documented risk-factors; and (2) careful collection of epidemiologic data to identify new risk-factors.

The three investigative protocols begin with path-model charts that illustrate scientifically documented interrelationships of the risk-factors of impaired fertility in beef herds.¹²⁻³⁴ The risk-factor, path-model charts are useful formats for discussing herd problems with producers. The charts illustrate several principles of disease or production problems: (1) the causes of disease and decreased production are multifactorial; (2) there are many areas for potential managerial deficiencies; (3) infectious agents

are only partially responsible for decreased production; and (4) the only way to determine all the reasons for decreased production is to conduct a comprehensive investigation that evaluates the extent of involvement of all risk-factors in the herd. The investigation protocols are derived from the path-models. A detailed history must be taken and animals and the environment closely examined to determine the influence of each possible risk-factor in the herd. Data from the history and examinations are then assembled and analyzed to yield a listing of the risk-factors responsible for the shortfall in production.

4. Identification of Financial Deficiency Areas

Although beef cattle producers are increasingly aware of the need to become knowledgeable in financial analysis of their businesses, few consultants are capable of offering financial guidance. To influence a firm's financial status, the consultant and decision-maker should use the financial tools (i.e. balance sheet, income statement, and cash-flow statement) and the newly developed software that facilitates the use of these tools to make sound management decisions.³⁵ Because producers use these financial tools to make decisions, the veterinarian must also know how to use them and incorporate financial factors into the decision-making process.

The first step in the financial evaluation is to determine the overall profitability of the ranch. A financial worksheet must be completed by the owners to formulate balance sheets and income statements. Once the balance sheet and income statements are developed, cash-flow statements and reconciliation of owner's equity follow. With this information, an adjusted net-accrual income statement can be developed to assess profitability of the ranch. The most recent year's information is essential, but data from previous years are necessary to detect and evaluate trends of the financial condition and key financial ratios.

The protocol uses a multi-year financial analysis program (FINSUM) developed at Texas A&M University.³⁵ Criteria evaluated are: (1) Liquidity, as measured by the current ratio; (2) Solvency, as measured by the percent ownership; (3) Leverage Situation, as measured by the financial return leverage index; (4) Profitability, as measured by the return on farm assets; (5) Repayment Capacity, as measured by the term debt coverage ratio; (6) Change in Net Worth, as measured by the change in cost basis net worth; (7) Cash Flow, as measured by the cash income minus cash expense; and (8) Efficiency, as measured by the trend in net profit margin. Because changes with these criteria can be used to assess trends over time, historical financial information is necessary.

After the ranch's financial evaluation is complete, income and expenses are allocated to individual groups of cattle and foraging pastures (i.e. enterprises) to perform an enterprise analyses. Through enterprise analyses, the evaluator can determine the profitability of each production unit on the ranch.³⁶ The investigator can then suggest changes in management to improve profitability of the ranch.

The most common economic shortfalls are low net accrual income, return on investment, and economic efficiency. The financial factors that contribute to these shortfalls may be improperly structured loans, over-leveraging, low capitalization, or high depreciation and interest expenses.

5. Identify Areas for Improvement

After the factors limiting production and profitability have been identified and summarized using the above protocols, the evaluator lumps the areas for improving profits into two categories:

1. Improvements in production
2. Reduction of expenses

Production can be increased by improving pregnancy and weaning rates, weaning weights, and reducing abortion and calf mortality rates. Considerable improvements can be made if attention is paid to all the factors affecting each of these areas. Expenses can be reduced by altering managerial practices (i.e. modifying the nutritional supplementation during the winter, shortening the calving interval, improving foraging practices, stringent culling, and by eliminating unnecessary expenses).

The veterinarian should use a multi-disciplinary approach to provide the producer with a plan to improve profitability.¹⁰ Specialists in nutrition, range and soil science, genetics, economics, and reproduction must be consulted by the veterinarian to provide the producer with the most current information for optimizing the ranch's profitability. The veterinarian's knowledge of disease and preventative medicine, combined with an understanding of how each area contributes to production, makes the veterinarian the ideal coordinator for a comprehensive production management problem. The producer will be more willing to implement recommendations knowing that a broad base of knowledge is used in preparing the Ranch Plan. Figure 2 illustrates how all disciplines are involved.

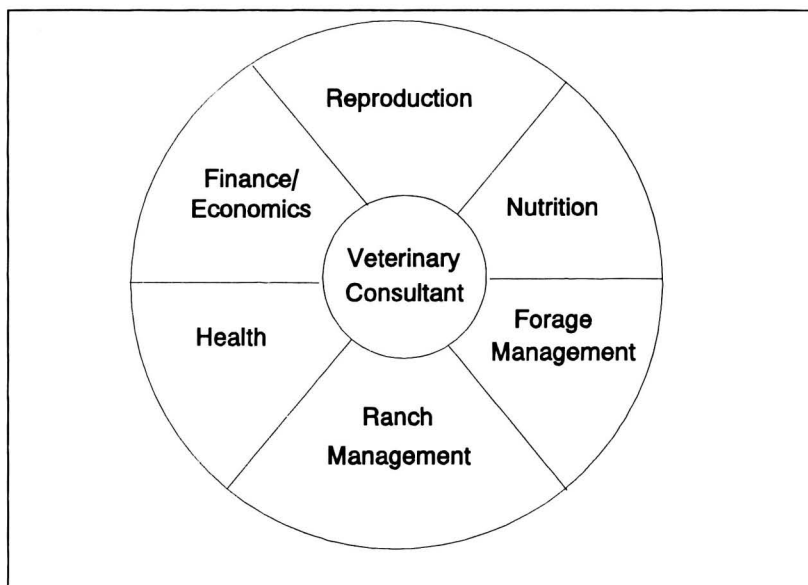


Figure 2 Multi-disciplinary Approach

6. Establish A Ranch Plan

To improve production and profitability, ownership, management, labor, and consultants must agree on a written plan to correct the factors that prevent the ranch from reaching its goals. The Ranch Plan identifies areas where improvements can be made and describes the methods used to achieve the ranch's goals.

Producers are often reluctant to implement management recommendations without a projection of the financial outcome. This becomes a simple task when the enterprise analysis and financial statements have been completed. The analyst needs only to use the enterprise budget templates which were used in completing the enterprise analysis, and execute "what-if" projections. "Worst case", "most-likely", and "optimistic" projections can be presented. These projections can be entered into the income statement and balance sheet to visualize their effect on profitability and ultimately, the ranch's financial condition. Partial budgets are another tool that can be used in a simplified analysis to determine the advantages/disadvantages of a projected practice. Partial budgets simply compare the added costs and returns to the decreased costs and returns to formulate a "cost:benefit" ratio. Realistic projections are a must!

7. Timetable for Implementation

The objectives should be implemented in two phases: (1) short-term (to be accomplished the 1st year) and (2) long-term (to be accomplished in 2 to 5 years). Short-term objectives that affect production are disease control, optimum nutritional supplementation, development of a program for rearing replacement heifers, and intense culling of reproductively inefficient animals. Items such as an ideal calving season, calving cycle, elimination of dual calving seasons, selection of replacement heifers, changes in the genetic base of the livestock, intensive grazing programs, marketing plans, and adjustments in management's perception of good principles of production take considerably longer to implement. Increasing the ranch's profits will take considerably longer if improvements in profitability are solely dependent upon enhanced production.

The financial accomplishments during the first year should include development of the ranch's balance sheets, adjusted net-accrual income statements, and cash-flow statements. With this information, the analyst can provide ownership with managerial accounting records to evaluate actual yearly profits. With these in hand, the analyst may be able to improve the ranch's profits by reducing or eliminating unnecessary expenses, but most improvements will occur through restructuring loans with more favorable interest rates. However, this process takes considerably longer to accomplish.

8. Implementation/Monitoring

Monitoring implementation of the ranch plan is the most difficult part of consultation.¹⁰ Communication between the consultant, owners, and management is vital to success.³⁷⁻³⁹ Reports, both verbal and written, assure complete understanding by all parties of the progress and status of the program. Maintaining interest and enthusiasm requires a concerted effort, but can be accomplished through continual communication.

Establishing familiarity with the operation and collecting the initial data and laboratory samples

requires that the consultant visit the ranch at least twice a month for the first three months. The consultant should expect to spend at least two days at each visit; eventually, however, less time is required. After the first three months, a scheduled monthly visit is sufficient to assess which objectives are being met on time. A checklist for evaluating progress should be completed during each visit and promptly forwarded with a cover letter to management and the owners. If delays in implementation of the Ranch Plan occur, attitudes and/or objectives should be re-evaluated. Cooperation by all parties is vital to the program's success, and if the consultant does not understand a constraint that management may have in implementing a recommended practice, delays will occur. Good communication skills are critical to successful execution of the Ranch Plan.

9. Evaluate Improvements

During the first year, increase in profits are usually minimal, but improvements in some areas of production should be noted. Easily identified and documented improvements are weaning weights, pregnancy rates, and weaning rates. The easiest risk-factors to correct are diseases within the herd and nutritional deficiencies. By identifying the managerial practices that limit profits through an enterprise analysis and by implementing changes, the ranch's profits should increase the following year. After management has established a ranch budget and projected monthly cash flow, further elimination of expenses will also increase profits.

Long-term progress can be made in production and financial returns. Improvements will be noted in total pounds of calves weaned per cow exposed, and weaning and pregnancy rates. Decreasing the yearly expense of maintaining a breeding cow should not only be a long-term objective, but should be included in the short-term evaluation as well.

Summary

The financial burdens of debt and increased expenses have caused ranchers to decrease their use of veterinarians. To offset this problem, the veterinarian must expand the services offered to the producer. Management techniques that increase a ranch's profits can increase income for both producers and veterinary consultants. Through methodical application of the protocols outlined, the veterinarian can provide producers with a systematic approach to optimize use of the ranch's resources to achieve maximum profit. The veterinarian will **then** be classified as an integral part of the management team and broaden their contribution to the beef cattle industry.

References

1. Johnson GE, Conner JM, Josling T, Schmitz A, Schuh GE: Competitive issues in the beef sector: Can beef compete in the 1990's? Humphrey Institute Report No. 1, October 1989.
2. Jordan T, Bechtol DT: The veterinarian's changing role in the beef cattle industry. *Compendium*: 235-239, 1987.
3. Wise JK: US market for food animal veterinary medical services. *JAVMA* 190(12): 1530-1533, 1987.
4. McGrann JM, Rupp G: Economic principles and the cow-calf enterprise. *Agri-Prac* 10(1): 5-8, 1989.
5. Barry PJ, Hopkin JA, Baker CB: Financial management in agriculture: 3rd ed. The Interstate Printers & Publishers, Inc.: 1983.
6. Brigham EF: Financial management theory and practice: Fourth Ed. The Dryden Press, 1985.
7. Calkins PJ, DiPietre DD: Farm business management, Successful Decisions in a Changing Environment: MacMillan Publishing Co., Inc., New York, New York: 1983.
8. Doll JP, Orazen F: Production economics, theory with applications, 2nd ed: John Wiley & Sons, Inc.: 1978.
9. Hedges TR: Farm management decisions: Prentice-Hall, Inc.: 1963.
10. Thomson JU: Veterinary consulting in food animal production, Part 2. *Agri-Pract*: 11(2):17-24, 1990.
11. Toombs RE, Wikse, SE, Field RF, Holland, PS: Ranch management questionnaire: Texas A&M University, College Station, Texas, 1991.
12. Spitzer JC: Influences of nutrition on reproduction in beef cattle, in Morrow DA (ed): *Current Therapy in Theriogenology*, 2nd ed: Philadelphia, WB Saunders CO: 320-341: 1986.
13. Wiltbank JN: Maintenance of a high level of reproductive performance in the beef cow herd: *Vet Clin N Am (Food Anim Pract)* 5:41-57, 1983.
14. Whitman RW, Remenga EE.

Wiltbank JN: Weight change, condition, and beef cow reproduction (Abstract): *J An Sci* 40:387, 1975. 15. Foreyt WJ: The role of liver fluke in infertility of beef cattle: *Proc 14th Ann Conv AABP* 99-103, 1982. 16. Gibbs HC, Herd RP: Nematodiasis in cattle-importance, species involved, immunity, and resistance: *Vet Clin N Am (Food Anim Pract)* 2:211-224, 1986. 17. Wiltbank JN, Roden WW, Ingalls JE, *et al*: Influence of postpartum energy level on reproductive performance of Hereford cows restricted in energy intake prior to calving: *J An Sci* 23:1049-1053, 1964. 18. Maurer RR, Echterncamp SE: Repeat-breeder females in beef cattle: Influences and causes: *J An Sci* 61:624-636, 1985. 19. Laster DB, Glimp HA, Cundiff LV, *et al*: Factors affecting dystocia and the effect of dystocia on subsequent reproduction in beef cattle: *J An Sci* 36:695-705, 1973. 20. Wiltbank JN: Evaluation of bulls for potential fertility: *Proc Ann Meet Soc Theri* 151-154, 1982. 21. Blockui MA: Observations on group mating of bulls at pasture: *Appl An Ethol* 5:15-34, 1979. 22. Ball L, Cheney JM, Mortimer RG, *et al*: Diagnosis and control of herd fertility in beef cattle: *Proc Ann Meet Soc Therio* 22-31, 1983. 23. Grahn TC, Fahning ML, Zemjanis R: Nature of early reproductive failure caused by bovine viral diarrhea virus: *JAVMA* 185:429-432, 1984. 24. Van Der Maaten MJ, Miller JM, Whetstone CA: Ovarian lesions induced in heifers by intravenous inoculation with modified-live infectious bovine rhinotracheitis virus on the day after breeding: *Am J Vet Res* 46:1966-1999, 1985. 25. McClurkin AW, Coria MF, Cutlip RC: Reproductive performance of apparently healthy cattle persistently affected with bovine viral diarrhea virus: *JAVMA* 174:1116-1119, 1979. 26. Lein DH: Bovine reproductive disorders associated with ureaplasma, mycoplasma *Hemophilus somnus*, and chlamydia. *Proc Ann Meet Soc Therio* :118-131, 1982. 27. Maas J: Relationship between nutrition and reproduction in beef cattle: *Vet Clin N Am (Food Anim Pract)* 3:633-646, 1987. 28. Morrow DA: Phosphorous deficiency and infertility in dairy heifers: *JAVMA* 154:761-768, 1969. 29. Segerson EC, Murray FA, Moxon AC, *et al*: Selenium/vitamin E: Role in fertilization of bovine ova. *J Dairy Sci* 60:1001-1005, 1977. 30. Segerson EC, Libby DW: Ova fertilization and sperm number per fertilized ovum for selenium and vitamin E-treated Charolais cattle. *Therio* 17:333-341, 1982. 31. Putnam MR: Toxicologic problems in food animals affecting reproduction: *Vet Clin N Am (Food Anim Pract)* 5:325-344, 1989. 32. Dunlap SE, Vincent CK: Influence of postbreeding thermal stress on conception rate in beef cattle: *J An Sci* 60:1216-1218, 1971. 33. Meychoeffe DC, Wettermann RP, Coleman SW, Wells ME: Reproductive criteria of beef bulls during and after exposure to increased ambient temperatures: *J An Sci* 60:352-357, 1985. 34. Blood DC, Radostits OM: *Veterinary Medicine: 7th Ed*, Philadelphia, Bailliere Tindall, pp 4, 1984. 35. McGrann JM, Karkosh K, Falconer L, Osborne C: *FINSUM, Texas Agriculture Experiment Station, Texas A&M University, College Station, Texas, 1989.* 36. McGrann JM, Penco, R, Ellis D: Cattle herd growth, forage production and economic and financial projection templates, Texas Agriculture Extension Service, Texas A&M University, College Station, Texas, 1989. 37. Jordan T: The implementation process of production medicine programs: *Bovine Proc* 21:34-37, 1989. 38. Jim GK, Gulchon DT: Implementation of a feedlot medicine program: *Bovine Proc* 21:38-39, 1989. 39. BeVier GW: Swine consultation practice: A telephone and a computer modem. *JAVMA*. 190:2:154-156, 1987.