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Beef cattle systems analysis (1986)

R.R. Schalles

Beef Cattle Systems Analysis

R.R. Schalles[1]

Summary

For cattle producers to stay in business, they must apply the business management techniques used by sophisticated non-agricultural enterprises. Among these techniques is systems analysis, in which formulas representing interrelationships between various inputs are built into a computer program. The program simulates expected results, based on available information.

Introduction

During the last few years, it has been difficult to make a profit from beef cattle operations. This trend may continue. To stay in business, producers must use all management techniques at their disposal, such as systems analysis. But systems analysis for beef cattle is difficult because of the complex interactions among the biological and economic characteristics of the business. The simulation program is a library of research intregrated into a complete production system. The linear programming model simultaneously considers all the characteristics of the operation to find optimum combinations to produce maximum profit or minimum cost solution. Presented here are examples generated from a successful computer model of cow herds developed and verified at Colorado State University.

Procedures

A complete record of all biological and economic inputs and outputs under the current system is the first step in these analyses. The biological inputs include the genetic capabilities of the cattle (estimated breeding values and breed means), production capabilities (harvested and grazed forage) of the land resource, feed value of harvested feedstuffs and human inputs. Fixed economic inputs include costs of land, labor, management, taxes, and general farm overhead. Variable costs include feed, breeding fees, veterinary and medicine cost, transportation, marketing, interest on variable items, seasonal labor, yardage, etc. Ownership cost may also be involved.

With the use of the simulation program, biological inputs can be varied to generate new estimates of biological outputs. Thus, a variety of strategies can be examined as a means of maximizing profits.

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[1]The author recently completed a 6-month sabbatical leave at Colorado State University, where he studied computer modeling and systems analysis.

Example 1

This example shows a simulation of the economic potential of starting to breed heifers a month before cows. All other inputs were held constant. Cows were bred during June and July. Results are shown in Table 15.1.

According to the assumption, dystocia and calf death would be slightly higher. However, over-all conception rate would be considerably greater, lowering the need for replacement heifers. That made more high-value heifer calves and fewer low-value cull cows available for sale, resulting in a net return of about $900.

Table 15.1. Comparison of Starting to Breed Heifers a Month before Cows vs the Same Breeding Season as Cows

	Heifer Breeding Season[1]	
Traits	May-July	June-July
Dystocia 2 year olds	25.9%	24.5%
Newborn death - 2 year olds	7.6%	6.1%
% of herd 2 years old	20.5%	22.3%
% of 2 yr. olds pregnant	84.7%	77.8%
Cow herd size (11,660A Ranch)	247 head	244 head
Replacement heifers	59 head	66 head
Total calves weaned	228 head	226 head
Steer calves sold @ 60¢	(114 head) 624 lb	(113 head) 612 lb
Heifer calves sold @ 52¢	(54 head) 563 lb	(47 head) 553 lb
Long ylg. heifers sold @ 40¢	(8 head) 1019 lb	(10 head) 1010 lb
Cull cows sold @ 34¢	(46 head) 1049 lb	(50 head) 1148 lb
Income from sales	$79,721.80	$78,564.92
Expenses	$74,899.00	$74,638.34
Return for labor, mangement and investment	$ 4,822.80	$ 3,926.58
Difference	$896.22	

[1]Cows were bred in June-July.

From these data, the producer must determine if he is willing to provide the extra labor and management for the month longer calving and breeding season for an expected return of $900.

Example 2

An 11,600 acre ranch that was all grass ran 458 head of crossbred cows. Fall pasture was available on the ranch, but protein supplement was necessary during November, December, and January. Corn stocks could be leased at $15 per animal unit month (AUM), which covered the cost of transportation, fencing, water, etc. The price per unit of feed energy was cheaper using the leased corn stocks. However, certain fixed cost are incurred whether the home ranch is used or not. A linear programming model determined that the combination that maximized profit was leasing 662 AUM of corn stocks for 221 head during November, December, and January. The remaining 237 head were kept at the home ranch and supplemented with 4 lbs of a range cube that was 3/4 cottonseed meal and 1/4 milo, at a cost of $140 per ton.

With the aid of a computer and appropriate programs, all of the interrelationships of a cattle operation can be considered and accurate business decisions can be made.

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Why Systems Analysis?

Changing one part of a beef cattle production system affects most of its other parts. Nutrition level effects cull cow weights, reproduction, dystocia, calf survival, replacement heifer rate, etc., all of which influence the profitability of the operation. Alternative uses of labor, land and capital must be considered. But the interrelationships are too complex to handle with paper and pencil. That's where computer modeling comes in.

The heart of systems analysis is the information that goes into it. Commodity futures prices can be used as an estimate for advance pricing. Land carrying capacity, cattle performance data, historical weather data, and financial information must be supplied to the system. For an ongoing operation, that information can best come from a good set of performance and financial records. It's no longer good enough to be a good cattleman. Today's successful operator must be a skillful business man.

Research conducted at land-grant universities like Kansas State is an important input to cattle systems analysis. Much of that research is described in mathmatical form. Because systems analysis is such an essential tool for profitable beef cattle management, Kansas State University is making a concerted thrust in the area.

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