

Economics Will Determine the Method of Beef Production

E.T. Bartlett and C. Wayne Cook

Cost per pound of production and the price received for the product are major factors that determine profitability of a beef production enterprise. Between 1976 and 1981, feed costs increased as much as 40% (Statistical Reporting Service, USDA, December 1981), and the differential between good and choice quality beef carcasses varied from 2 cents to as much as 10 cents. Beef producers have production alternatives as to when to put animals on feed and as to what degree of finish the animals should attain. Comparing cost per pound of production of various segments of the production process at different feed cost levels and different grade price differentials shows trade-offs between the degree of finish and profitability.

Procedure

Costs of producing beef have been analyzed at the Akron Experiment Station in eastern Colorado since 1976. Breeds of animals in the trials were Hereford, Hereford + Angus, and European crosses. While various forage and feeding regimes were used, only those that consisted of cow-calf pairs and weaned steers that were grazed on native range year-long with minimum supplementation during the winter are discussed. Approximately one-third of the steers were slaughtered directly off range at 18 months of age. Another one-third of the steers was fed for 66 days on a high concentrate ration before being slaughtered, and the remaining one-third was fed an additional 31 days (total of 97 days) before being slaughtered.

Average costs of red meat production were determined by calculating the total costs of each treatment and dividing this by the total pounds of meat produced. Costs included all variable production costs from birth to slaughter.

Results

The actual production costs per pound of retail beef for the various treatments is best presented by viewing each segment of production separately. All costs were adjusted to the 1976 level as a base. First the average production from just grazing range was 404 pounds of trimmed retail beef per carcass at a total cost of \$340 or \$0.84 per pound of retail beef (Table 1). The total production from lot feeding similar animals an additional 66 days was 556 pounds of retail beef per carcass at a total cost of \$453. Carrying animals an additional 31 days (97 days total) in the feedlot produced a total of 597 pounds of retail beef at a total cost of \$509. Average costs in 1976 ranged from \$0.81 to \$0.85 per pound among the various treatments. However, it must be noted that animals from

the 3 treatments had different meat quality that would bring different prices. From 1976 to 1981 it was observed that price differential between choice and good quality varied from 1 to 8 cents per pound of carcass meat (Cooperative Extension Service, USDA, July 1982), and standard grade as found to be approximately 6 to 8 cents below good grade.

Marginal Production Costs

Marginal cost considerations are very important in beef production because of rapidly changing feed costs and meat prices and because they differ materially from the average cost analysis. Marginal costs are the added costs of producing an additional unit of beef. Marginal costs will be used to reflect the average marginal costs for each period of the production process. Average marginal costs were calculated for the range-fed portion of the process, for the first 66 days of lot feeding, and for the last 31 days of lot feeding.

Data in Table 1 show that the cost of producing range-fed beef was 84 cents per pound of trimmed retail meat produced. However, animals that were taken from the range and fed for an additional 66 days produced 152 additional pounds of trimmed retail meat at marginal cost of 74 cents per pound. Animals that were fed an additional 31 days beyond the first 66 days in the feedlot, produced an additional 42 pounds of trimmed retail meat at a marginal cost of \$1.35.

Animals that were fed 97 days were of higher quality grade, but much of the gain during the last 31 days was composed of fat that was trimmed from the carcass and did not substantially contribute to the amount of salable product. Cost of carrying animals that last 31 days on feed was 61% higher than production from grazing range alone and more than 82% higher than marginal costs of production during the 66-day finishing period. However, it must again be noted that quality grades were higher for the animals in the longer feeding period than for animals directly from the range or in the shorter feeding period.

Net Return Analysis

Net returns were calculated for two sets of feed prices and grade price differentials. If the price spread among quality grades were 10% (choice \$1.10, good \$1.00, and standard \$0.90) and feed costs were to increase 20% above 1976 levels used in the study, range animals which produced an average 404 pounds of retail beef per animal with 3% choice, 47% good and 50% standard would yield 12 pounds of choice, 190 pounds of good, and 202 pounds of standard (Table 1). In this example total return would be \$385 per animal, with costs of production of \$339, resulting in a net return of \$45.61 per animal (Table 2, Case A).

In similar fashion, animals that were fed for 66 days after

Table 1. Average retail meat production, quality grade, and cost of production for three regimens of beef production.

	Regime		
	Range fed and slaughtered 18 mo of age	Range fed plus lot fed for 66 days	Range fed plus lot fed for 97 days
Number of animals	44	20	25
Retail meat per animal	403.6	555.7	597.3
% Quality grade choice	3	16	70
% Quality grade good	47	53	26
% Quality grade stnd.	50	31	4
Cost of added production (\$/lb)	.84	.74	1.35

Table 2. Net return for three regimens of beef production and two cases of prices.

Case A ¹	Regimen		
	Range fed and slaughtered at 18 mo of age	Range fed plus lot fed for 66 days	Range fed plus lot fed for 97 days
\$ of choice grade meat	13.31	97.79	459.91
\$ of good grade meat	189.70	294.50	155.30
\$ of stand grade meat	181.62	155.07	21.51
Total return/carcass	384.63	547.36	636.72
Total cost/carcass	339.02	469.92	535.45
Net return	45.61	77.44	101.27
Case B ²			
\$ of choice grade meat	12.34	90.68	426.46
\$ of good grade meat	189.70	294.50	155.30
\$ of stnd grade meate	197.76	168.85	23.42
Total return/carcass	399.80	554.03	605.18
Total cost/carcass	339.02	488.27	563.17
Net return	60.78	65.76	42.01

¹Case A assumes prices for choice grade of \$1.10/lb, good grade of \$1.00/lb, and standard grade of \$.90/lb, and that feed costs increase 20% over the 1976 level.

²Case B assumes prices for choice grade of \$1.02/lb, good grade of \$1.00/lb, and standard grade of \$.98/lb, and feed costs increase 40% over the 1976 level.

being taken off range produced an additional 152 pounds of retail beef and graded 16% choice, 53% good, and 31% standard. As a result, the total return would be \$547 at a cost of \$470, for a net return of \$77 per animal. Animals that were fed an additional 31 days produced 597 pounds of retail meat that graded 70% choice, 26% good, and only 4% standard. The total income would be \$637 with a cost of \$535, for a net return of \$101 per animal.

As another example to emphasize the importance of variation in the two influencing factors upon net return (Table 2, Case B), it could be assumed that price differential between quality grades were only 2% (choice of \$1.02, good \$1.00, and standard \$0.98) and increased feed costs were 40% above those found in the study at the 1976 level. The production of retail meat would be the same as shown in the first example (Table 1), but the net income would change because of different prices of the various quality grades and the increased feed costs.

The calculated net return in this example for range-fed animals would be \$61 per animal.

Net return from animals that had an additional 66 days' feed would be \$66, and net return from animals fed for 97 days would be \$42 per animal.

Thus, income for the various treatments is determined not only by the total pounds of trimmed retail meat produced,

but also by the amount of the quality grades produced and the price differential among them. The price of the feed used in the fattening ration does, to a large degree, determine the costs of the finish ultimately obtained. Therefore, the decision of choosing the appropriate feeding alternatives can be evaluated somewhat in advance depending upon the objectives for quality grades to be produced and the expected price at the marketplace. It must always be remembered that the marginal cost per pound of product is substantially higher as the finishing period is extended, especially when producing fleshy animals to grade choice or better.

As time passes it is expected that feed grains will become increasingly more expensive and the competition among meat sources will continue to be great. As a result, beef production will become more intensive and a careful analysis of the marginal costs and returns to the product among the various segments of production will become more critical for an overall profitable beef industry.

References

- Cooperative Extension Service, USDA. 1981.** Agricultural Prices. Crop Reporting Board, December. Washington, D.C. 20250.
- Statistical Reporting Service, USDA. 1981.** Agricultural Prices. Crop Reporting Board, December. Washington, D.C. 20250.