

An Alternative Natural Beef Production System: A Differentiation Strategy for California Producers and Packers

by
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This article demonstrates that a natural beef production system that emphasizes grazing on rangeland and irrigated pastures can be more profitable, given current prices, than the conventional production system that emphasizes grain-fed beef. The article recognizes several impediments to widespread adoption of natural production systems but suggests that such systems may provide niche markets in California for both producers and packers.

Beef cattle remain one of California's most important agricultural products, ranking fifth in 2001 at \$1.35 billion in value of production, behind dairy, grapes, nursery products and lettuce. In most countries, beef is produced on pasture, utilizing available forage resources and the ruminants' ability to convert this inedible material to human food. Historically, this was true in the U.S. as well, at least up until World War II. At that time, the development of the feedlot industry led to increased reliance on feed grains to maximize the quantity and quality of beef.

Grain-fed beef production systems are considered more profitable and successful in producing the type of beef quality desired by U.S. consumers. Consumers' preferences generally have been associated with high-marbled steaks, grain-fed flavor and highly tender beef. Moreover, consumers expect beef to have white fat that typically occurs with grain feeding. However, the concepts of environmentally friendly production systems, animal welfare and chemical-free food are rapidly changing the demand for beef. An increasing proportion of the U.S. population is concerned with the use and preservation of natural resources as well as with the human handling and treatment of farm animals. Many consumers are willing to pay higher prices for products that have been produced applying environmentally friendly practices. A study in 2000 found that, out of 1400 survey respondents, 38 percent were willing to pay a 10 percent premium on natural beef while 14 percent would pay a 20 percent premium.

The demand for organic and natural food is growing rapidly, yet market share still remains quite small. In the United States, total retail sales of organic foods rose steadily from about \$1 billion in 1990, to \$3.3 billion in 1996 and up to \$7.8 in 2000. This increase continues the streak of industry growth equal to 20 percent or more annually since 1990.

In this context, a natural beef production system could represent a market differentiation strategy for increasing the profitability of producers. In a market dominated by conventional beef, an early adopter of this production system may experience above-average profit in the short run. Such production systems, based mainly on pastures, rather than on concentrated animal feeding units, would be perceived by consumers to be more environmentally acceptable.

To investigate this potential opportunity, I developed a cost-benefit economic model to evaluate and compare an alternative beef production system (Natural Grazing System—NGS) with a more traditional one (Intensive Production System—IPS).

The Empirical Model

The model contrasts both systems from a profit standpoint, assessing production, cost and revenue functions. The general production information and coefficients used in the development of the model were taken from a prior study which addressed the systems from a production standpoint. The feeding strategy is the main difference between the two systems. Production characteristics of the IPS resemble a finishing operation in California commonly referred as calf-fed production system. Animals are bought from a cow-calf ranch at weaning time (spring), placed in a feedlot facility, and fed for a 6-month period with a corn-based ration until slaughter. On the other hand, animals in the alternative NGS are purchased and placed on irrigated pastures for the summer period, then on native rangelands until May of the following year and finally sent to the feedlot for a 90-day period.

The data used to develop the model were actual production data gathered during a three-year period. This provides a detailed and realistic quantification of the production parameters including live weight production output, initial and final body weight, grazing period, stocking rates, days on feed, average daily gain

Table 1. Performance Coefficients

Parameters		Production System	
		NGS	IPS
Initial body weight	kg/head	238	238
Rangeland grazing phase	days	274	-
Average daily gain	kg/head/day	0.557	-
Irrigated pasture grazing phase	days	122	-
Average daily gain	kg/head/day	0.484	-
Feedlot phase	days	94	188
Average daily gain	kg/head/day	1.55	1.23
Dry matter intake	kg/head/day	11.95	8.19
System throughput rate	%	56	95
Production output	kg/head/year	332.2	445.7

The term “natural” is used throughout the article to refer to a production system that is more “environmentally friendly” relative to those systems where animals spend the majority of the growing and finishing phase in confinement and consuming grain-fed diets. The “natural” term, as it is used here, also differs from the concept of organic beef production which faces more stringent rules as well as governmental and agency regulations.

and dry matter intake. The length of the production period varied between systems, with the purchase-to-slaughter period taking 385 and 650 days in the IPS and NGS, respectively. Production, revenue and cost functions estimated in this analysis account for these differences. The performance data are presented in Table 1.

The cost function addressed all relevant costs that differ among systems, such as purchase price of the feeder, cost of leasing both the rangeland and irrigated pastures, yardage costs, health and implants costs, and price of the ration (Table 2).

Steer price for the IPS is a market price for fat animals from the USDA Livestock Market Information Center. On the other hand, the NGS was allowed to receive a premium price due to its recognition as an environmentally friendly production system.

To make the economic analysis as widely applicable and realistic as possible, a historical price database (1973-2002) in constant dollars (2002 year-basis) was developed instead of using feeder, steer and corn prices for the particular years of the experiment. Since a clear and consistent price decrease was observed, the average of the last 15 years, rather than the complete series, was considered more likely to resemble current and future price conditions.

Once the model was developed, profit functions were contrasted to find the minimum price premium required by NGS to make both systems equally profitable.

The Outcome

Profit comparison between systems suggested that for the Natural Grazing System to be competitive in terms of profitability, it does not need to receive a price premium. Both systems were found to be equally profitable when the price received by the NGS was 4.1 percent lower than the IPS. Even though live weight production (kg/head) in a per year basis was increased by 34 percent in the IPS, total variable costs were also increased by 52 percent. Among the factors explaining the higher variable costs, ration costs (corn) climbed by 73 percent.

Therefore, these figures suggest that for an average market price scenario, such as the one used in our analysis, the NGS would result in higher net margins per head.

Moreover, the existence of market demand conditions allowing NGS animals to receive a price premium should assure a higher profit in that system. Economic comparisons between organic and conventional beef production systems commonly state that in order for the organic system to be attractive for beef producers it should capture a price premium. This is due to the fact that organic beef production faces increased costs of production such as regulation and certification expenses. However, this did not hold true for the natural grazing system.

These results suggest that the more extensive grazing production system appears to be more cost effective than the system for conventional beef. Such a statement seems paradoxical, given that most ranchers produce conventional beef. I suggest three explanations as to why the natural production system has not been commonplace in California. First, U.S. consumers have been reluctant to eat low-marbled steaks that have grassy flavor and yellow fat—all attributes associated with beef produced under grazing systems. Furthermore, consumers' perceptions toward beef quality in the main U.S. export destinations—Japan and South Korea—have followed the same pattern.

A second aspect is associated with what we may call the “dominant role of beefpackers.” Processing companies have well understood consumers' behavior

and thus have been reluctant to market grass-fed beef, offering no incentives to producers to develop this type of production. Moreover, scale economies have been a driving factor in the beefpacking industry. This trend has been characterized by technological change at the slaughtering and processing level that have sped up, standardized and made the overall process more efficient. Furthermore, the advantages of increasing returns to scale are observed provided that the plant's capacity is fully utilized and a constant flow of homogeneous product is processed. In this context, the grazing systems would supply a different product, and, for any given plant, comprise a small proportion of its total annual slaughter. An increased reliance on weather conditions would also increase supply variability from these systems. The aforementioned factors have and probably will continue to pose a limitation to the development of this type of production system.

A third issue is the fact that even though potentially the NGS could be more profitable, the availability of land at competitive prices may restrict its adoption. Average agricultural real estate land values in California have risen from just \$450/acre in 1970 up to \$2910/acre in 2001.

Thus, the NGS is unlikely to become the dominant production system of California, but it may be developed as a niche marketing strategy. Beef produced under the NGS could be marketed as a specialty targeting two different consumer segments:

- The environmentally concerned population who is willing to buy beef raised under more environmentally friendly conditions.
- Latinos, who account for 34 percent of total California population, are known to be heavy beef eaters and to have positive perceptions of grassy flavor and leaner beef with yellow fat. In this respect, a study in 2000 using an experimental auction market procedure found that San Francisco consumers preferred grass-fed Argentinean type beef.

In summary, the natural grazing system could be a profitable alternative for California ranchers provided

Table 2. Cost and Production Coefficients

Parameters		Production System	
		NGS	IPS
Leasing rangeland pastures	\$/head/day	0.186	-
Rangeland rate	\$/hectare/year	31	-
Stocking rate	hectares/head	2.19	-
Irrigated pasture leasing rate	\$/head/day	0.59	-
Yardage cost	\$/head/day	0.04	0.04
Health and implants costs	\$/head	27.4	19.4
Purchase price of the feeder	\$/kg live weight	2.31	2.31
Price of the ration	\$/kg	0.101	0.101
Price of the corn	\$/kg	0.12	0.12
Price of other supplements	\$/kg	0.027	0.027
Corn in diet	%	80	80
Supplement in diet	%	20	20
Total Variable Costs (TVC)	\$/head/year	457	695

that appropriate programs and marketing agreements are developed with the beefpackers. This may also be a competitive strategy helping smaller beefpacking firms to stay in business.

For additional information on this study, the author recommends the following reading:

Sainz, R. and R. Vernazza. "Alternative Beef Production Systems: Performance and Carcass Traits of Calf-Fed, Short- and Long-Yearling Steers." *Journal of Animal Science*. 2004, No 82: 292-297.

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