Making the cowherd more efficient and profitable by 2036: where do we focus our efforts for the biggest impact?

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Introduction

The future of the beef industry is encouraging. Recent years have yielded exceptional prices that have allowed unprecedented profits, especially for the cow-calf sector of the beef supply chain. At the same time, great advancements in production and genetic technologies have improved the production potential of cow-calf enterprises. The future holds expectations for continued global population growth and rising demand for protein. As a result, the beef industry's outlook for the next 20 years is bullish. The biology of beef production will not change, but there are numerous external factors to which cow-calf producers must adapt to remain profitable. In general, the challenges ahead are not new. A growing population with evolving social norms and interests in agriculture, increasing costs of production, labor challenges, and an uncontrollable pattern of precipitation would have topped the list of concerns for beef producers 20 years ago, and still do today.

This paper will take an over-the-shoulder look back in time to identify important changes and challenges the beef industry has dealt with over the past twenty years. Recent history will be used to illuminate factors of importance for the cow-calf sector in the future. Even though the prevalence and magnitude of external factors affecting the beef industry will remain largely unpredictable, there are enough trends to speculate where cow-calf managers should focus their efforts to maintain or improve efficiency and profitability through 2036.

Looking Back

Financial. Revenues and expenses have changed greatly over the past few decades. According to CattleFax (Troy Applehans, personal communication), weekly 550-pound calf price from 1988 to 1995 averaged $90/cwt, and increased to $165/cwt from 2008 to 2015 – an 88% increase. However, when adjusted for inflation the difference is only 18%. The influence of the cattle cycle does marginalize the value of prices between any two points in time, but considering that each value is an 8-year average, the influence of the cycle is lessened. Surely calf prices of 2014 and 2015 were exceptional, such that even without an improvement in performance, commercial cow-calf enterprises have been highly profitable.

The revenue portion of the profit equation is primarily a function of weaning rate and weights, calf price, and cull cow value, whereas the expense component is much more complicated. Figure 1 shows that over half of the expenses for a cow-calf enterprise can be categorized as depreciation, labor, or feed. Other expenses like repairs and maintenance, fertilizer, fuel, leases, and veterinary services are important when taken together, but independently are less important. In general, business expenses are influenced by broader economic factors like minimum wage, and the costs of energy, grains, and land. These external factors have also changed over time, and in some cases the change was dramatic. Figure 2 illustrates the relative change in corn, oil, land value, and minimum wage over the past 20 years. Each of these is important because they strongly influence major cost categories in a cow-calf enterprise. Table 1 shows the actual average prices for the same commodities and costs. The magnitude of inflation adjusted increase in oil and land values is remarkable, 284% and 134%, respectively. So remarkable that the more moderate increases of 9% for labor and 24% for feed appears less significant. However, when considering the proportional contribution of feed and labor to the total cow calf budget these smaller increases may be equally impactful.

Performance. Since the mid 1990s, the beef industry has embraced technology like never before. The seedstock sector has led the charge to develop improved data-driven tools for genetic selection. For example, residual feed intake as a measure of efficiency is now relatively common, and genomically-enhanced expected progeny differences (EPD) are available to the industry. Use of genetic tools for selection has yielded measurable gains in performance, particularly in the easily quantified growth traits. The average reported 205-day adjusted weaning weight of bulls and heifers entered in the American Angus Association in 1995 and 2015 are 581 and 638 pounds, respectively, indicating a 2.9-pound average annual increase. Data from the American-International Charolais Association shows a 31-pound increase in adjusted weaning weight over the same time period. It is safe to assume that the same upward trend in weaning weight is also evident in most other major breed associations. There are many other traits that must be considered to quantify overall genetic improvement, but in general, performance advancement has occurred in the seedstock sector.

On the other hand, translation of seedstock improvement to the commercial cow-calf operation performance is not as apparent. Availability of information documenting performance changes within the cow-calf sector over the past two decades is limited; however, Standardized Performance Analysis (SPA) data does shed some light. Table

2 shows Southwest SPA summary production date from 1993-1995 compared to 2013-2015 for ranches in Texas, Oklahoma, and New Mexico. Interestingly, during this time period when seedstock weaning weights were increasing, no change was evident among the commercial operations in the SPA dataset. In fact, there was essentially no change in reproductive performance or pounds of calf weaned per cow exposed. Table 3 demonstrates that this is also true in the northern plains region. Given the resources and climate, it is not surprising performance is higher on average among North Dakota cow-calf operations than those in the southwest, but it is interesting that over the past 20 years in these separate regions productivity per cow has not increased in parallel with clear growth trait advancement in the seedstock sector.

Why has there not been phenotypic change in the commercial cow-calf sector paralleling the seedstock increase in weaning weight? Why has reproductive performance also not improved? These are two very important questions to ponder. It may be that genetic potential for production of the seedstock sector has simply advanced beyond what the environment/resources will allow in these regions. It is possible that the SPA summaries from the southwest and northern plains simply show optimization, and that resources are dictating an upper limit to cost-effective performance.

Looking Forward to 2036

Understanding the changes that have occurred over the past 20 years provides context for identifying where producers should focus their efforts to ensure profitability in the future. The historic data should be viewed holistically in that future efficiencies and profits will not be mutually exclusive efforts to controlling costs and increasing revenues. Instead, success will come from optimizing expenses and performance by building a production system that will yield the lowest unit cost of production for the most valuable calf that can be produced in the operational environment. Excellent genetics exist, and there is opportunity to better utilize advanced genetics across most of the commercial cowherd in the U.S; however, there is greater opportunity for improving efficiency and profit for most operations through management.

Financial. Consider the price data in figure 1 and table 2. If the same trend in prices and inflation over the past 20 years continue for the next 20 years, then prices of oil, corn, ag land, and minimum wage in today's dollars would approximate $307/barrel, $5.77/bushel, $6,786/acre, and $7.90/hour, respectively, in 2036. It is difficult to speculate these trends over 20 years, and seems likely that this extrapolation over-estimates oil, and underestimates corn and especially labor. However, these values are still concerning. Producers should ask themselves if their current cow-calf production system can remain financially successful in such a volatile price environment. Using the same approach to extrapolate the 18% inflation adjusted increased calf prices from the past 20 years equates today's $175/cwt calf price to $206/cwt in 2036. Global population growth will increase food demand and beef price; however, the same influence will elevate the cost of grains and energy. The most successful cow-calf operations in 2036 will employ production systems that minimize labor, purchased feed and depreciation costs to realize the lowest unit cost of production possible.

Independent of the cost of production, calves and cull cows of the most profitable 2036 cowherds will be aggressively marketed. In an effort to gain the highest possible price for the most valuable calves that the efficient production system will allow, successful managers must capitalize on market seasonality when marketing calves and culls, and capture premiums through branded programs that are compatible with the production system.

Performance. The demonstrated lack of performance change in the commercial cow-calf sector over the past 20 years causes one to question how managers should focus their effort in achieving or exceeding animal performance targets in the future. It is likely that for most operations some improvement in both genetics and management will be necessary, but even where good genetics are present such potential will not be realized to the fullest without great management. There is opportunity to improve pregnancy rate and weaning rate, but the marginal cost of higher performance may be prohibitive. In operations that are already well-managed, performance improvement will come in very small increments. However, among operations below 90% pregnancy rate, there may be an opportunity to gain another 5%. The marginal cost for weaning a calf crop greater than 85 to 90% is likely not warranted. This is especially true in extensive range conditions or harsh subtropical environments where a practical upper limit to pregnancy percentage may fall below 90%. In these same environments current genetic potential for milk production and preweaning growth can exceed the resource's ability to support such potential. Managers in these environments must use caution in genetic selection and pursuit of increased animal performance.

Performance gains may be made through long-term selection or strategic inputs to yield small improvements, but managers of the 2036 cowherd should seek high leverage change for greatest impact. The best managed operations do these things already and utilize strategic inputs well. Nevertheless, across the U.S. cowherd there is still opportunity for commodity beef producers to better utilize technologies like calfhood growth-promoting implants

that increase gain and efficiency at a low cost, and properly timed and administered vaccines and anthelmintics that improve health and minimize performance losses.

The greatest opportunity and leverage to cost-effective performance improvement may exist at the production system level. Many of the best managed cow-calf operations in the U.S. do a very good job of capitalizing on hybrid vigor, but unfortunately too many continue to overlook this opportunity. Crossbreeding is a management decision that is high leverage because by improving fertility, calf age at weaning, calf weaning weight and cow longevity is enhanced. Greater cow longevity decreases the percentage of replacements needed annually and increases the proportion of forage consumed by producing cows. Ultimately, this can have a big effect on the efficiency of production. This is not a new concept, but somehow crossbreeding remains underutilized. The most efficient and profitable commercial cow-calf operations of 2036 will maximize the benefits of heterosis by being predominately crossbred, and they will utilize terminal sires to the fullest potential within the constraints of meeting replacement female needs. These same characteristics exist today among the most profitable commercial cow-calf operations.

Focusing Efforts for the Biggest Impact

Neither currently nor in the future will producers individually be able to control commodity prices, the price of grazing land, or the compensation rate of adequately skilled labor. Also outside of producer control are the biological limitations to cow performance in any given environment. As world population grows, demand for food and energy will increase as well, elevating both revenues and expenses to the cow-calf operation. Considering the proportional changes in calf prices and expense category indicators over the past 20 years, cow-calf producers should prepare for these trends to be somewhat similar in the future. In order to make the cowherd more efficient and profitable by 2036, producers should focus on high leverage interventions at the production system level. There is no silver bullet to success, but cow-calf producers interested in making improvement will adapt their production system with a focus on optimizing labor, purchased feed, and depreciation in a way that minimizes unit cost of production. Successful operations will employ proven technology with a positive return on investment, diligently market calves and cull cows to their highest value, and manage price risk effectively. Producers should focus on maintaining or improving genetics of the cowherd with reasonable expectations for improved performance and a careful consideration for the marginal value of performance change. Central to the decisions for optimizing performance of the cowherd should be an effort to maintain a high level of heterosis.

The overarching philosophy of management in the future will be of paramount importance to success in the years ahead. The interconnectedness of a cow-calf enterprise to other agriculture and nonagricultural enterprises and activities on farms and ranches will be inescapable. As production systems are adapted to the changing business and social pressures in the years ahead, focus on the habitat, wildlife, and societal views on production methods will be warranted.

Figure 1. Proportional contribution of expense categories for a cow-calf enterprise (2010-2015 Southwest SPA data)

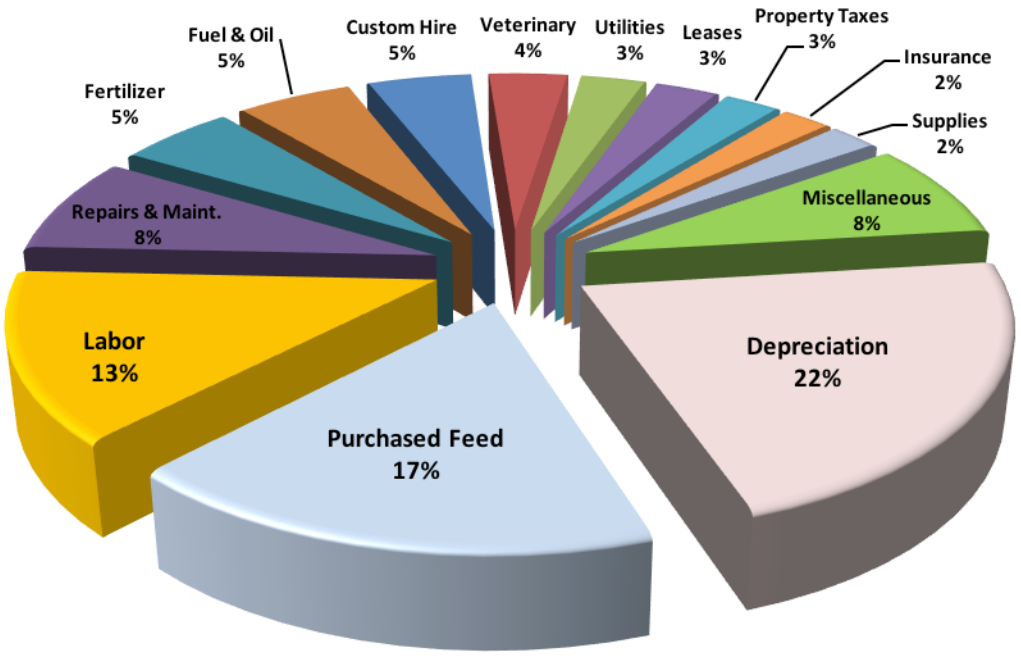

Figure 2. Inflation adjusted 20-year relative price change in corn, oil, ag land, and minimum wage

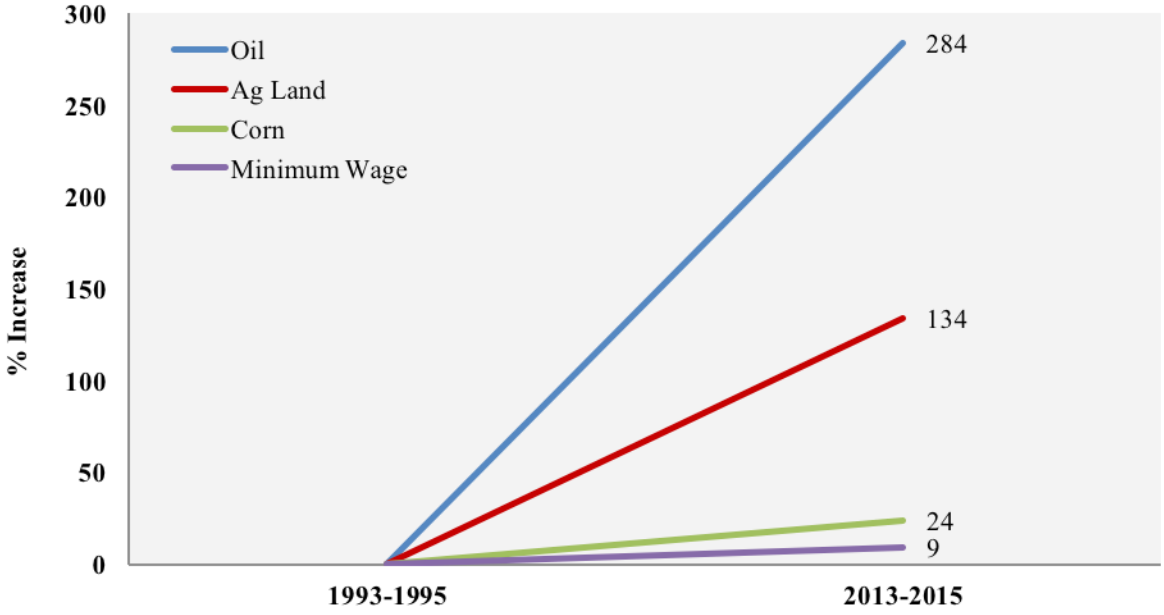

Table 1. Twenty-year price change in corn, oil, ag land, and minimum wage

Item	1993-1995	2013-2015	%[a]
Corn ($/bushel)	2.40	4.65	24
Oil ($/barrel)	18	80	284
Ag Land ($/acre)	793	2900	134
Minimum wage ($/hour)	4.25	7.25	9
Dollar	1.00	1.56	56

[a]Percent change after adjustment for inflation; shown graphically in figure 1

Table 2. Southwest Standardized Performance Analysis (SPA) summaries comparing average cow-calf performance measures separated by 20 years.

Measure	1993-1995[a]	2013-2015[b]
Pregnancy rate/cow exposed (%)	89	90
Weaning rate/cow exposed (%)	84	84
Weaning weight (lb.)	525	525
Lbs. of calf weaned/cow exposed	439	439

[a]64,881 cows
[b]12,291 cows

Table 3. Northern Plains Standardized Performance Analysis (SPA) summaries comparing average cow-calf performance of CHAPs producers separated by 17 years.

Measure	1993-1997[a]	2010-2014[b]
Pregnancy rate/cow exposed (%)	93	94
Weaning rate/cow exposed (%)	89	90
Weaning weight (lb.)	557	554
Lbs. of calf weaned/cow exposed	490	495

[a]111,583 cows; Ringwall and Helmuth, 1998
[b]88,000 cows; www.ag.ndsu.edu/DickensonREC/chaps-software-1