Producing the Calf - How Much Does It Really Cost?

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Introduction

During the most recent down cattle cycle, article after article stressed the importance of becoming a "low-cost, efficient producer of a quality product." To stay in business, cutting expenses is inevitable. Yet, at the same time, low-cost production does not necessarily translate to high profit. High-profit producers judiciously trim expenses rather than indiscriminately cut all costs. Nonetheless, the decision regarding how, when, and where to reduce expenses can prove difficult, especially when few producers can accurately identify their true cost of production. This value, *cost of production*, is the basic determination that must be made by any business if they wish to remain profitable and sustainable.

The Current Situation

Following a harsh winter throughout Florida, which resulted in a large number of thin cows and potential for reduction of 1996 calving rates and 1997 pregnancy rates, feed prices soared to record-high levels; and calf prices dropped concurrently. There was significant liquidation of the cow herd and potential replacements were put in the feedlots. As a result, there should be fewer calves in 1997 and smaller supplies in 1998. Also, in 1997 feed prices have normalized as the result of a large 1996 corn crop (third-largest on record), improved reserve stocks, and large corn plantings projected for 1997 (Cattle–Fax, 1997b). Suddenly, it seems that the cattle market appears favorable and that cow–calf producers can expect profitable marketings ahead.

When times are tough, producers wish to critically analyze their costs and evaluate options to minimize losses. For example, interest in utilization of various by-product feeds such as broiler litter greatly increased as feed prices escalated during the summer of 1996. On the other hand, when costs of various production inputs and marketings are favorable, such cost analyses seem to lose their significance to the average producer. Historically, however, the cow–calf business is a break-even proposition (Cattle–Fax, 1997b). Using average market values for production and sale of product from 1958 to 1986, Sell et al. (1988) calculated an average annual return of only $.78 per cow per year for traditional cow–calf operations selling offspring at weaning. Thus, regardless of the current situation and market outlook, it is imperative that producers critically analyze their production costs so they can maximize profit in the good years, which will hopefully help sustain those operations through the lean years. Now, what is your cost of production, and how is the money being spent? You may be surprised.

The Profit Formula

In any business, cash flow is calculated as the income received less the expenses paid by that operation for a given period of time, and these values are generated annually for tax accounting purposes. Although raised replacements do not contribute to cash flow, they represent an important economic asset to the herd, and their value should be credited to the cow herd from which they were produced on an annual basis to legitimately evaluate profit and losses of the operation. Thus, *profit* differs from cash flow, and may be calculated on a per-exposed-cow basis as follows (Gutierrez, 1995):

PROFIT = [({% calf crop $*$ weaning weight} $*$ price) + ({% cull livestock sales $*$ weight} $*$ price)] – expenses/cow.

Standardized performance analysis (SPA) guidelines require that all productive and financial measures be calculated and analyzed based on the number of exposed cows in the herd so that values are comparable across operations.

Calculating Costs of Production

During the 1970s and 1980s, many producers strove to maximize weaning weights based upon the assumption that increased profits would follow. A heavier calf has greater value and should return more dollars to the producer. However, producers have since recognized that added weaning weight has an economic cost often associated with increased maintenance and reduced reproductive performance. Hughes (1996c) reported that a statistical analysis of North Dakota's 1994 Integrated Resource Management (IRM) cooperator herds revealed that only 20% of the herd-to-herd variation in unit cost of producing a hundredweight of calf could be explained by differences in weaning weights. Strohbehn (1995) analyzed 686 Beef Cow Business Records over a 7-year period and discovered that annual return to labor and management was more highly correlated to input costs such as feed, operating expenses, depreciation, taxes, insurance, and capital than to production measures such as percent calf crop or weaning weights. Today, producers must focus on their cost of production associated with a given level of production and expected return.

A typical cow–calf operation is diverse and composed of several different enterprises. In business, a large corporation may segregate itself into several profit centers based upon the primary activities of business within that organization. Each profit center is expected to stand on its own merit, producing its own profit or loss statement. Thus, executives can make educated decisions regarding the management of the total business because they have an accurate account of where the money is being spent and profits made. In a similar fashion, the typical cow–calf operation could be divided into a beef-cow profit center, a forage profit center, and a pasture profit center (Hughes, 1996c). If one retained ownership, then a feedlot or retained-ownership profit center would also be included. Using such methodology, pasture grazing should be priced to the beef-cow profit center at the current pasture rental rate for the area, and the pasture profit center credited with that same pasture rent as income. Likewise, home-grown forages fed to the beef cows should be priced into the beef-cow profit center at the going market price (opportunity costs), and the forage profit center credited with the market value of the forage fed. Expenses associated with either pasture establishment and maintenance or forage production would be expended against the pasture and forage profit centers, respectively, not the beef-cow profit center. Using such methodology, one can accurately determine where profits and losses occur in the total operation. The SPA analysis is based on such enterprise accounting (NCBA, 1993). States such as North Dakota (Hughes, 1996c), and Iowa and Illinois (Strohbehn et al., 1996), however, currently employ greater utilization of the profit-center methodology into their customized SPA analysis programs.

So that production and economic information is comparable, SPA guidelines require that all information be calculated based on the number of exposed females in the herd. Females identified to be culled before the breeding season are not considered exposed. The number of exposed females, however, should be adjusted for bred/exposed females purchased or sold, but it is not allowable to subtract open cows or cows that died, aborted, or were culled due to poor-performing calves. Such poor-performing cows economically weaken an operation and must be accountable.

For all expenses, financial and economic values are generated using SPA. Financial values for the various expenses represent a producer's direct

"out-of-pocket" costs and are taken directly from the income statement. The economic analysis accounts for the opportunity cost of resources used in production of the commodity, in addition to expenses in the financial analysis. Land opportunity cost, for example, is the estimated rental rate that would be paid for land under an equivalent production system (NCBA, 1993). For your information, selected individual formulas used in the financial and economic SPA calculations are shown in Table 1.

Feed costs represent the greatest single cost factor associated with the cow–calf enterprise, often exceeding 50% of the total costs, and are highly correlated to overall profitability. The SPA program currently used in Florida segregates feed costs into two categories: raised/purchased feed costs and grazing costs. For the financial analysis, the actual accounting production costs are used to determine raised/purchased feed costs. However, for the economic analysis, the opportunity cost or potential net sale value of the commodity is used to "price" the raised/purchased feed. The financial grazing costs include such items as the actual lease expenses paid, real estate mortgage interest payments, depreciation and maintenance of improvements, and property taxes. The economic grazing costs basically represent your potential leasing costs for the land. Thus, the economic analysis of feed costs represents utilization of the profit-center methodology of accounting.

Total operating costs represent total feed costs plus any additional direct and indirect operating costs. *Direct expenses* are directly related to the production of a certain commodity (McGrann et al., 1995). Examples of direct expenses include seed and fertilizer for the forage or pasture profit centers and feed, veterinary expenses, and semen or AI supplies for the beef-cow profit center. *Indirect expenses* are items that may not be directly related to the production of a certain commodity but are still considered expense items, such as property taxes, utilities and office supplies (McGrann et al., 1995). Additionally, for greater accuracy, operational expenses should include non-cash expenses such as depreciation. When calculating depreciation, it is important to reflect upon actual usage of a particular piece of equipment, appropriately charging each enterprise. For example, do not charge the cow herd for something that is used for forage production because then the expense will be realized as a

Table 1. Standardized performance analysis formulas, per breeding cow[a]

Raised/Purchased Feed Cost	[(purchased feed + feed production expenses + accrual feed inventory adjustments + accrual adjustments for feed payable + machinery, equipment, and other expenses associated with raised-feed production) / number of breeding cows]
Grazing Cost	[(grazing related expenses + machinery, equipment, and other expenses for grazing land maintenance + real estate costs) / number of breeding cows]
Total Operating Costs	[(total direct operating costs + total indirect operating costs) / number of breeding cows]
Financing Expense (financial)	[(actual interest paid on real estate and non–real estate debt + accrued interest expenses) / number of breeding cows]
Financing Expense (economic)	[(actual interest paid + actual interest on non–real estate capital + {3-month treasury bill rate of return * all non–real estate equity capital based on market valuation}) / number of breeding cows]

[a]NCBA, 1993: Guidelines for Production and Financial Performance Analysis for the Cow–Calf Producers: Cow–Calf SPA.

portion of your raised-feed costs. Likewise, it is important not to overcharge the cow herd for something that may be used partially for family entertainment. It is simply important that we accurately reflect the expenses incurred by a given enterprise, not allowing any enterprise to subsidize another.

Labor should also be included as a part of operating expenses. Paid labor is relatively easy to calculate and allocate; however, what is family labor worth? It is not a legitimate business expense to withdraw funds from any business operation for personal or family use. Still, you and your family must earn a salary as proprietors of your business. Thus, it has been recommended that "family-living withdrawals" equal the necessary salary required to hire a non–family member to provide an equivalent service (NCBA, 1993). In actuality, this represents an "unpaid" expense, but it is an important component of your total operating costs.

Debt load has always been, and will likely remain, the nemesis of the agricultural industry. Loans are often necessary to secure additional land or cattle for expansion, to replace worn machinery and equipment, or simply to purchase feed under extreme climatic or economic conditions. Still, it is vital that debt load be properly managed. Each year, low-return or low-profit producers spend an average of $30 more per cow each year than high-return producers to service a greater debt load of $241 per cow, on a cost basis, based on a summary of the National SPA database in January of 1996 (Cattle–Fax, 1997b). This servicing of debt, or financing cost, represents the actual interest paid on borrowed capital but does not include principle payments. The economic analysis conducted by SPA generates a cost value equivalent to the actual interest paid, plus an opportunity cost that could have been gained had that money been used to purchase an interest-bearing treasury bill. The 3-month treasury bill rate is used as the common base for determining opportunity costs associated with your investment (NCBA, 1993).

A Comparative Analysis of SPA Production Values Related to Production Costs

Comparative analysis is a powerful tool used by many managers astute in business. It allows a producer to identify areas where (s)he can focus management attention in an effort to increase

Table 2. Comparison of selected SPA production measures from across the country

Production Measure	National[a]	FL[b]	IA[c]	MT[d]	NE[e]	TX[f]
Number of herds	388	32	72	31	27	135
Year(s) data were collected	91–96	91–96	93–95	95	91–94	91-94
Pregnancy percentage[g]	90.6	80.5	94.6	93.2	94.4	88.9
Calving percentage[h]	88.3	78.6	87.4	91.4	93.0	—
Weaning percentage[i]	84.1	74.9	82.9	85.4	89.7	83.3
Actual weaning weights	514	480	500	572	512	515
Lb weaned per exposed female[j]	434	361	430	489	460	427

[a]National SPA Report Card; Cattle–Fax; April, 1997.
[b]Florida SPA Report Card; Cattle–Fax; April, 1997.
[c]Strohbehn, 1997.
[d]Griffith, 1997.
[e]Hamilton, 1997 (Great Plains Veterinary Educational Center).
[f]McGrann, 1996.
[g]Pregnancy Percentage = [(number of females exposed diagnosed as pregnant / number of females exposed) $*$ 100].
[h]Calving Percentage = [(number of calves born / number of females exposed) $*$ 100].
[i]Weaning Percentage or Calf Crop = [(number of calves weaned / number of females exposed) $*$ 100].
[j]Pounds weaned per exposed female = (total pounds of calf weaned / total number of females exposed).

profits by increasing revenue and(or) decreasing costs of production. The national and state SPA report cards, which are generated by Cattle–Fax, provide average benchmark values for comparison. If an operation exceeds a given benchmark, that represents an area of potential strength. More importantly, however, is that a comparison will also identify potential weaknesses. Then, a producer can focus his or her management attention and resources in areas that should return the greatest dollar for the least investment. However, as noted by Harlan Hughes (1996b), such comparisons might allow producers to identify weaknesses, but they do not tell producers how to *reduce* those weaknesses. That is the task given you, as manager, and your potential IRM team.

When evaluating cost of production per exposed female, we should not forget that the revenue generated by the production of calves to be sold or retained in the herd as replacements is an important component of the profitability equation, and that increased growth and reproductive performance will ultimately decrease your fixed-unit costs of production. Table 2 shows a comparison of selected SPA production measures for the nation, Florida, and four other diverse yet progressive cattle-producing states (Iowa, Montana, Nebraska, and Texas). In the past, it was difficult to compare such parameters, but through the use of SPA, such measures are directly comparable.

Some have said that it is not fair to compare such information across geographic lines. But all businesses producing the same product for the same market compete with one another, so we must analyze comparative values. Producers from across the country each have special problems or concerns associated with production in their geographic region, but at the same time, major advantages also abound within each region. In Florida, due to our climatic conditions, the forage quality is poor compared to other regions across the country, parasitic infections are more severe due to the duration and intensity of our heated summers, and we have recently experienced that supplemental feed can be scarce and expensive. The *Bos indicus*–influenced cattle have been used extensively in the past due to their mothering ability and adaptability to Florida's harsh environmental conditions. However, these cattle exhibit lower reproductive efficiency than most *Bos taurus* cattle.

According to the National SPA database (Cattle–Fax, 1997c) pregnancy rates across the country have averaged 90.6%. In areas of abundant feed resources such as Iowa (Strohbehn, 1997) and Nebraska (Hamilton, personal communication) pregnancy rates have exceeded 94%. Pregnancy rates in Florida (Cattle–Fax, 1997a), however, barely exceed 80%. The pregnancy measure is a good indicator of breeding performance in the herd. If the measure is lower than average, it may indicate that there is inadequate nutrition, inadequate bull-power or fertility, the presence of reproductive diseases, or a mismatch of genetics and environment (NCBA, 1993).

Body condition scores (BCS) can be used to measure the nutritional adequacy of your feeding program. Cows with a BCS of 5–6 should average 90% pregnant. Using average auction market prices of calves during 1991 and 1992, Kunkle et al. (1994) reported that a BCS 5 cow generates $107 more revenue than a BCS 4 cow due to increased pregnancy rate (86 vs 61%) and heavier calf weights. Using average calf value ($76.19/cwt) received by Florida producers from 1991 to 1996 (Table 2; Cattle–Fax, 1997a), the advantage of a BCS 5 cow over a BCS 4 cow was $93 per cow each year. Can you afford the thin cows that do not rebreed?

Additional problems certainly exist that exasperate our reproductive problems. Much of Florida's environment and feed resources will not economically support the large cattle-types raised in

other parts of the country. Producers have recognized this and maintained moderate-sized cow herds in an effort to reduce cow maintenance costs. Maintenance requirements increase as body weight increases, and the mature cow may use 70% of metabolizable energy intake strictly for maintenance (Ferrell and Jenkins, 1987). Reproductive diseases, such as trichinosis, have had a major impact on reproductive performance in the state, and many producers may not even realize that the problem exists within their herds. Such problems must be controlled by use of an effective health program. A survey of cattle producers from across the country conducted by Cattle–Fax (1997b) indicates that the high-return producers spend nearly as much on herd health ($15.36 vs $15.87/cow) as low-return producers. However, the money is probably spent differently. High-return producers likely use more preventive measures than low-return producers.

Other critical production parameters include calving percentage and weaning percentage. Both values are relatively low in Florida (Cattle–Fax, 1997a) compared to other states and the national average (Table 2). Calving percentage provides an indication of breeding performance and gestational management of the cow herd, but the weaning percentage or calf crop should be used as the primary measure of reproductive performance in the cow herd (NCBA, 1993). Still, the inherent decreases that occur between pregnancy, calving, and weaning percentages are no greater in Florida than in other states and across the country. Thus, the 75% Florida calf crop—which is approximately 9 percentage units less than the national average (74.9 vs 84.1%)—is due to the *initial* low pregnancy rates, their possible reasons already discussed. Increased reproductive performance should be a major management emphasis. And it is achievable; some cooperating SPA producers within the state have already produced over 90% calf crops.

A Comparative Analysis of Financial and Economic Values

Although performance measures such as reproductive rates and weaning weights lag as a result of our unique climatic conditions, Florida's environment is the mainstay of our profitable beef cattle industry. (Yes, I said *profitable*.) Although our forages have limited nutritional quality, there is an abundance of year-round grazing potential and inexpensive by-product feeds; and due to the mild winters, facility expense is minimal.

It comes as no surprise that the cattle business requires a tremendous investment. Nationally, the average cost-basis investment to support a cow–calf enterprise, per breeding cow, is $2019 (Table 3). Florida producers, however, have minimized their cost-basis investment in the cattle industry ($1554) because less equipment is necessary for feeding raised and harvested forages, and there is reduced facility expense compared to producers located farther north. Typically, pasture land used for cattle production in Florida was purchased years earlier when prices were lower. Right or wrong, such operations will more easily sustain themselves year after year, as evidenced by the associated debt load on a cost basis. Nationally, producers have an average debt load of $475/ cow, whereas Florida producers have an average debt of only $110/cow. In the Northern Plains (Hughes, 1996a), producers classified as high-cost had an average debt load of $536 with annual interest and(or) principle payments of $84/cow. The lowest third of their low-cost producers had an average debt of $243/cow with annual interest and(or) principle payments of $47/cow. In contrast, Florida's financial values appear quite favorable. However, using current fair-market valuation of the investments needed to support the cow–calf enterprise, the Florida investment is $5,092/cow, compared to a national average of $3,342/cow. No other state exhibits such a broad

discrepancy between the cost basis and market-value investment. The Florida difference reflects changing demographics and the resulting property values.

High-return or low-cost producers minimize utilization of raised/purchased feeds, which are predominantly fed during winter. National average raised/purchased-feed costs, per cow, were $116 (Table 3). But Florida producers spent only $70/cow, indicating that our grazing programs were adequate to match the nutritional needs of our cows at their given level(s) of production. McGrann et al. (1996) ranked cow–calf producers' SPA performance measures by net income quartiles. The top 25% spent $84 on raised/purchased feeds and financially returned $203; the lowest 25% spent $143 and financially returned a loss of $119 per cow.

Due to the low cost of raised/purchased feeds, one might expect Florida producers to have high

Table 3. Comparison of selected SPA financial and economic measures from across the country

Financial or Economic Measure	National[a]	FL[b]	IA[c]	MT[d]	NE[e]	TX[f]
Number of herds	388	32	72	31	27	135
Years data were collected	91–96	91–96	93–95	95	91–94	91–94
Investment cost/breeding cow						
Total investment (CB[g])	2019	1554	1650	1737	1556	2459
Return on assets, % (CB[g])	4.7	1.2	(1.0)	1.6	10.1	3.7
Total investment (MV[h])	3342	5092	2343	3379	2467	3450
Return on assets, % (MV[h])	3.1	.4	(5.5)	1.2	6.1	2.5
Debt load (CBg)	475	110	N/A	N/A	N/A	N/A
Financial costs/breeding cow[j]						
Raised/purchased feed costs	116	70	123	103	125	81
Grazing costs	86	80	91	84	77	85
Total operating costs	360	285	323	341	347	N/A
Financing expense	50	8	8	52	38	N/A
Total pre-tax ranch costs	410	293	331	393	385	394
Economic costs/breeding cow[j]						
Raised/purchased feed costs	N/A	67	139	126	139	86
Grazing costs	N/A	125	106	91	117	119
Total operating costs	N/A	329	396	397	402	N/A
Financing expense	N/A	53	8	69	95	N/A
Total pre-tax ranch costs	N/A	383	404	466	497	487
Pay–weight average prices						
Calves, $/cwt	N/A	76.19	76.12	63.35	96.25	85.04
Cull cows, $/cwt	N/A	42.93	47.33	N/A	N/A	N/A
Net income before taxes						
Financial income/cow	29	50	(20)	(35)	95	21
Economic income/cow	N/A	(39)	N/A	(108)	(17)	(72)

[a]National SPA Report Card; Cattle–Fax; April, 1997.
[b]Florida SPA Report Card; Cattle–Fax; April, 1997.
[c]Strohbehn, 1997.
[d]Griffith, 1997.
[e]Hamilton, 1997 (Great Plains Veterinary Educational Center; personal communication).
[f]McGrann, 1996.
[g]CB = Cost basis;
[h]MV = Market value;
[I]Financial costs are taken from the farm and ranch accrual-adjusted financial statements (prepared during a SPA analysis). In general, financial costs represent your direct "out-of-pocket" expenses.
[J]Economic costs include the financial costs plus an opportunity cost for owned land, raised-feed values, and equity capital.

er grazing costs than average, but only Nebraska reported a lower financial grazing cost than Florida. Considering that Nebraska's grazing season is much shorter than Florida's, our grazing season should be a tremendous economic advantage. High-return producers tend to be low-cost producers, but increased expenditures can be justified if they provide revenue that exceeds the expense. Some Florida producers may benefit by selectively increasing expenditures to enhance the nutritive value of feeds supplied to their cow herd if it improves reproductive performance, which has been identified as an important management focus for Florida cow–calf production. In North Dakota, 1994 cooperating SPA producers were grouped into thirds according to their cost to produce a hundredweight of calf. Those producers in the middle third spent $142/cwt on winter feed costs. The low-cost producers, however, spent $146/cwt (Hughes, 1996a). In return for this additional $4 investment, pounds weaned per female exposed was increased by 54 lb (Hughes, 1996b).

Although feed and grazing costs represent the majority of total cow costs, it is important to manage additional operating costs. Unfortunately, SPA does not break out average expenditures associated with basic operation of the ranch (such as labor, insurance, fuel, utilities, veterinary and medical supplies, semen and AI supplies, maintenance, fertilizer and seed, etc). Average Flori-da producers spend $135 on non-feed operating costs compared to the national average of $158.

Iowa's customized program (Strohbehn, 1997) identifies some specific non-feed costs for their cooperating producers, such as depreciation ($73 /cow) and hired labor cost ($8/cow). They also calculated that their veterinary medical costs were $4.97/cwt beef produced, or $24/cow. North Dakota reported an average per-cow veterinary and medicine cost of $17 for 1994 (Hughes, 1996a). However, when grouped according to unit costs of producing a hundredweight of calf, the average expenditure for producers in the lowest third was $21/cow; producers in the highest third spent only $13/cow. Obviously, low-cost producers utilize more preventive medicine to circumvent major losses.

Florida's costs of production are among the lowest in the country ($293 vs $410/cow) because of our ability to maximize the natural harvesting ability of our cows, to match genetics with resources, and to minimize debt. As a result, Florida SPA cooperators returned a net financial income of $50/cow. Economically, however, the resources invested (such as land and capital) did not return their opportunity value, indicating that those resources could have been more profitably invested in other ventures. It is not all gloom, for it appears that many producers have weathered the most recent down cattle cycle due to our low costs of production, the market forecast is good, and we have identified our problems. Through a concentrated management effort, profit can be restored to the cow–calf sector of Florida agriculture.

Feeder Calf Prices Received

Although unrelated to production costs, prices bid for feeder cattle are an important component of the profit equation; but there is little we can do to alter the feeder-calf board price. Additionally, we often pay for the price of freight through discounted prices. Pay–weight average prices received by SPA cooperating producers in various states are shown in Table 3. The Florida, Nebraska, and Texas values are somewhat comparable because the majority of records submitted for these states were for the years 1991-1994. The Iowa and Montana (Griffith, 1997) prices, however, reflect the most recent down cattle cycle. Assuming a freight charge of $5/cwt, Florida calves still sell at a discount to Texas- and Nebraska-produced calves due to perceived quality

and performance risks. Right or wrong, perception is real so we must promote our innovative producers and livestock raised in Florida.

Conclusions and Cautions

Although the SPA database provides some benchmark values to be used for comparative, managerial purposes, there is still only a limited number of herds in the database. It is difficult to draw statistically valid conclusions, but initial results from across the country indicate that competitive production and management systems exist within every operational-size group and environment (McGrann et al., 1996).

The SPA analysis is used to identify areas of needed change so producers can improve their competitive position, but it is important to realize that every operation is unique. Special circumstances may exist that cause your herd's performance or cost of production to differ drastically from the average. If these situations occur and you can financially account for the differences that exist, you might choose to ignore benchmark signals in favor of your own judgement. It is also important to maintain standardized records of production and financial information over a number of years so that trends can be assessed: Are you making progress? To make progress toward greater profitability and sustainability, we must focus our management energy on facts, not perception.

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