

# Understanding and Controlling Basic Cost Inputs into the Cow Herd

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## Introduction

Cost calculation is a critical management exercise that is performed too seldom. Accurately calculating costs not only allows managers to determine a required breakeven price but also permits the examination of expenses and areas that may need addressing.

Controlling costs is one of the most critical practices a manager can perform. As a result, managers must know not only how much costs are but also how the costs are allocated.

## The Fallacy of Cow Cost

When most cattlemen discuss cattle costs they typically think of dollars per cow per year. While \$/cow/year is a good number to have, a more useful number is \$/Cwt. produced. The \$/Cwt. is a better number because it captures cow cost, the number of cows and calf crop percentage. More importantly, it breaks costs down to the Economic Unit Cost of Production (EUCOP) which is what producers are actually being paid for.

## Which costs should be included?

All ranchers know to include the obvious costs such as feed, fertilizer, fuel, repairs, etc. However, there are many costs that are often not accounted for including equipment and facility fixed costs, management, family living and miscellaneous overhead. In short, any input or asset used in the production of beef cattle likely has a cost and should be included in the cost of production.

A sample budget for a 250-head Central Florida ranch is included as part of this proceeding (Figure 1). It is likely that this budget doesn't fit any particular ranch. However, it should provide a reasonable representation of a ranch of this general size using a mix of new and used equipment.

## Types of Costs

There are two types of costs in an operation, variable and fixed. Variable costs are also sometimes called direct costs while fixed costs are sometimes called indirect or overhead.

Variable costs are those costs that directly impact production. Examples include fertilizer, feed, vet supplies, labor, fuel, etc. Anything that will change production if its level of use is changed is considered a variable cost. Fixed costs or overhead expenses are those expenses that occur regardless of the level of production. Examples of fixed costs are equipment and facility depreciation and interest, land taxes, family living expenses, etc.

In Figure 1, detailed examples of the different types of cost are shown.

To conduct any type of meaningful analysis all costs in an operation should be included. It is critical that variable costs be calculated and covered first because they are the costs that must be paid first. All money left after paying variable costs can then go towards fixed or overhead costs.

## Sticking Points

The main reason many producers do not analyze their financial records is because they are intimidated by how to allocate several items. Most of the questions arise concerning:

- Breeding stock cost and revenue,
- Equipment costs,
- Labor, management and family living and
- Land values.

Accounting for the cost and revenue of breeding stock is a cause of consternation among many cattlemen. Fundamentally, breeding stock is a capital asset and should be managed as such,

meaning it should be depreciated just like a piece of machinery, buildings, etc.

Practically, the accounting of breeding stock often depends on the origins of said animals. The most straightforward situation is when heifers, cows or bulls are purchased. When breeding animals are purchased it is appropriate to use the purchase price as the investment cost and then depreciate the animal over its useful life.

The more complicated instance is when heifers (or bulls) are retained, developed and then transferred into the herd. To arrive at a true investment cost, managers should include the market value of the animal plus the additional development costs. If some developing animals are culled before they enter the herd, then the sales value of these culls should be credited to the group before arriving at an average cost per head.

Interested ranchers can visit <http://www.ces.uga.edu/Agriculture/agecon/agecon.html> and look under “Computer Decision-Aids” for a copy of the Replacement Female Calculator. An example is provided in Figure 5.

Cull breeding stock revenue is easiest handled by deducting it from total variable costs (TVC) to yield Net Variable Costs (NVC) such as is shown in the breakeven table (Figure 2).

Allocating equipment costs probably causes more headaches for ranchers and farmers than any other single financial management issue. Although the calculations can be tedious, they are relatively simple. In a nutshell, equipment or any other asset (including labor) should be allocated to an enterprise based on its contribution to the enterprise.

The contribution amount can be based on hours of use or the enterprise’s contribution of revenue or net income to the total operation. For instance, if the 250 head cow-herd used in this budget is the only agricultural enterprise then the analysis is pretty easy, everything goes against the cattle operation. However, if in addition to the 250 cows, the operation also

produces hay or does custom hay work, then the equipment and labor used in both enterprises should be allocated accordingly. Figure 3 shows how some of the more common pieces of equipment can be allocated to different enterprises.

When compiling their “figures” many agricultural producers conveniently forget to include the costs of certain major items such as:

- Pick-up trucks,
- Cattle & horse trailers,
- Family labor and
- Family living expenses.

All of these items have to be paid for eventually and so they should be included in the costs of the operation.

### **Handling Depreciable Assets**

Annual costs for assets other than land (breeding stock, equipment, buildings, fences, etc.) can be calculated one of two ways, either the annual principal and interest payments or annual depreciation and interest. If there is a payment for the asset, just include the payment amount in your cost estimates. If the asset is paid for, but will eventually have to be replaced, figure the annual depreciation and interest.

The machinery complement used in this budget as well as calculated depreciation, interest and annual loan payments are shown below in Figures 3 and 4. Readers interested in how to calculate depreciation and interest costs are referred to the end of this proceeding for some useful formulas in calculating these costs (Figure 6).

### **Labor, Management and Family Living Expenses**

Compensation for an owner-operator is sometimes a difficult number to calculate. Owners who are operating a business for profit should generate returns sufficient to reward them for their time, capital and risk. In an agricultural operation, charges for the owner-operator can be for either labor and management or family living.

Labor and management are two different items that often get confused. Labor is a variable cost that accounts for a hired person(s) or operator's time in performing daily operations such as working cattle, feeding, etc. Management is the compensation that the operator gets for utilizing his capital and making strategic decisions such as the determining when cattle should be moved or marketed, when to replace equipment, etc. Often times owner-operators will simply take "what's left over" as compensation. This approach can lead to a "feast or famine" approach to personal financial management which can have serious financial and tax implications in lean years.

Another way to calculate compensation is to include family living as a cost that captures both labor and management. Setting up a periodic (weekly, bi-weekly or monthly) draw enables an operator to plan his expenditures. It also allows/forces him to better manage his personal finances because he is in essence, bringing in a set salary.

### Land Value

The issue of land valuation is a very sensitive and individual one. Obviously, if land is financed that cost should be included in any ranch business analysis.

The more difficult task comes when trying to evaluate owned land. There are two generally accepted methods for calculating owned land costs, opportunity rental value and rate of return. The opportunity rental value method simply charges the operation the market value for pasture in the area. This is a very straightforward and acceptable method for calculating land costs.

Another method is the rate of return method. In this method, land cost is estimated by applying a rate of return to the value of the asset.

Land cost = Land Value X Rate of Return

The key numbers are the land value and desired rate of return and the value of the land. If selling the land used in the operation is not

really a consideration, use the agricultural value of the land. Otherwise use the Fair Market Value (FMV) of the land. Of course, doing so will usually greatly inflate land costs and raise breakeven process to unattainable levels.

The rate of return to be used should be consistent with what you would expect out of a capital investment with similar risk. It is worth noting that historically agricultural land has generated returns around 2%-4%

In both of these methods, it is assumed that the rates charged are sufficient to cover property taxes. If that is not the case, the internal charges should be increased until they are sufficient to cover real estate taxes. So, if either of these methods is used, producers should not charge for land taxes as this would be double-counting.

### Lowering Total Costs

As was mentioned earlier, the most important number is the cost/cwt. The formula is given below.

$$\text{Total Cost/Cwt.} = \frac{\text{Total Variable Cost} + \text{Total Fixed Cost}}{\text{Total Production}}$$

Total costs can be lowered by either reducing costs, increasing production or a combination of both. In difficult times such as these, the natural inclination of many ranchers is to reduce the level of inputs. However, since lowering the level of inputs usually changes the amount produced, cattlemen should be careful not to reduce costs to the point of negatively impacting production.

Another way to possibly reduce total costs is to increase production in hopes of lowering fixed costs/cwt. Many times this is a practical and prudent strategy. However there is one MAJOR caveat-variable costs are already being covered. If variable costs are not being covered, you cannot "make it up on volume."

An example comparison is made between three scenarios:

1. Base scenario,
2. Reducing stocking rates and

- Adding additional cows and leasing some additional land.

The base scenario utilizes the budget presented and assumes 300 acres of owned land with 200 acres of rented land at \$20/acre. The second alternative considers not fertilizing and lowering stocking rates but keeping all other costs in place. The last alternative considers adding 100 cows and leasing another 200 acres at \$20/acre.

The analysis of these scenarios is given below in Table 1.

**Table 1**  
**Comparison of Three Beef Cow Scenarios**

Item	Base	Reduced Stocking	Add Cows + Rented Pasture
<b>Num. Cows</b>	250	200	350
<b>Acres Owned</b>	300	300	300
<b>Acres Leased</b>	200	200	400
<b>Total Acres</b>	500	500	700
<b>NVC (\$/Cwt.)</b>	\$108.01	\$72.62	\$109.80
<b>FC (\$/Cwt)</b>	\$98.56	\$123.20	\$79.43
<b>TC (\$/Cwt.)</b>	\$203.05	\$191.41	\$187.05
<b>TC (\$/Cow)</b>	\$737.84	\$695.35	\$679.68

Most readers are likely startled by the high \$/cwt. and \$/cow costs from this analysis. However, if this is the only enterprise for this operation, these numbers are likely more accurate than many want to believe. Conversely, if this operation has other enterprises over which the fixed costs can be spread, the costs are likely overstated. In any event, the comparison of these three scenarios should provide some insight into the analysis of different alternatives.

In the base scenario, TC approach \$740 per cow and exceed \$200/Cwt. NVC account

for a little over 50% of TC while FC make up the remainder. It is interesting to note that the VC of forage and hay production plus supplemental feed account for about 2/3 of the TVC. When equipment costs are added, forage and feeding costs make up about 50% of the TC. The next largest expense is Family Living followed by Labor.

In this example, the best alternative would be to add cows and rent additional land. However, several interesting items also appear.

First, reducing the stocking rate significantly lowers NVC. Note however, that this analysis assumes that reducing the stocking rate by 50 cows will allow the rancher to maintain the same weaning weights. If weaning weights are negatively affected or if it takes an additional reduction in cows, this decision could turn out badly.

It should also be pointed out that producers who have a very low overhead or own most of their land could benefit from adopting this strategy.

In the second alternative, the producer is able to reduce fixed costs enough to justify the higher variable costs. Notice that this alternative assumes slightly more labor as well as access to land and replacement females.

### Summary

Cost determination is a critical component of sound financial management. Before managers can identify ways to reduce costs, they must know what those costs are and how they are allocated.

Even though it may seem challenging, the task of allocating equipment, breeding and family living costs is critical. The most straight forward way to allocate these expenses is either on a time or contribution basis.

When calculating the total cost of running an operation, ranchers should be sure to include the cost of trucks and trailers as well as family living and/or labor and management.

**Figure 1**

**Example 250 Cow Budget  
Central Florida, 2009**

Item	Unit	Units/Cow	Total Quantity	\$/Unit	Total Amount	\$/Cow	\$/Cwt.
<b>VARIABLE COSTS :</b>							
Bermuda Pasture	Acre	0.00	0.00	\$125.11	\$0.00	\$0.00	\$0.00
Bahia Pasture	Acre	2.00	500.00	\$63.74	\$31,870.10	\$127.48	\$36.38
Winter Annual Pasture	Acre	0.50	125.00	\$128.59	\$16,074.06	\$64.30	\$18.35
Summer Annual Pasture	Acre	0.00	0.00	\$118.75	\$0.00	\$0.00	\$0.00
Hay Production	Acre	0.17	42.50	\$393.03	\$16,703.78	\$66.82	\$19.07
Purchased Hay	Tons/Cow	0.00	0.00	\$100.00	\$0.00	\$0.00	\$0.00
Total Supplemental Feed	Cow Unit				\$12,980.00	\$51.92	\$14.82
- Cow Herd	Ton	0.20	50.00	\$250.00	\$12,500.00	\$50.00	\$14.27
- Replacement Heifers	Ton	0.00	0.00	\$0.00	\$0.00	\$0.00	\$0.00
- Bulls	Ton	0.24	60.00	\$8.00	\$480.00	\$1.92	\$0.55
- Calves	Ton	0.00	0.00	\$0.00	\$0.00	\$0.00	\$0.00
Salt & Minerals	Lbs./Cow	91.25	22812.50	\$0.28	\$6,387.50	\$25.55	\$7.29
Total Vet & Medicine	Cow Unit				\$5,257.25	\$21.03	\$6.00
- Cow Herd	Cow	1.00	250.00	\$14.00	\$3,500.00	\$14.00	\$4.00
- Replacement Heifers	Heifer	0.00	0.00	\$16.00	\$0.00	\$0.00	\$0.00
- Bulls	Bull	0.03	8.00	\$47.00	\$376.00	\$1.50	\$0.43
- Calves	calf	0.85	212.50	\$6.50	\$1,381.25	\$5.53	\$1.58
Fence & Facilities Repairs & Maintenance	% of Facilities		\$162,200.00	1.00%	\$1,622.00	\$6.49	\$1.85
Labor (including insurance, taxes, and SS)	Hrs./Cow	8.00	2000.00	\$10.00	\$20,000.00	\$80.00	\$22.83
Pasture Rent	Acres	0.80	200.00	\$20.00	\$4,000.00	\$16.00	\$4.57
Machinery Rent	Year	0.00	0.00	\$0.00	\$0.00	\$0.00	\$0.00
Other	Cow	0.00	0.00	\$2.00	\$0.00	\$0.00	\$0.00
Interest on Operating Capital (8 months)	Percent		\$114,894.69	7.00%	\$5,361.75	\$21.45	\$6.12
Auction & Hauling	Head		250.00	\$19.19	\$4,797.23	\$19.19	\$5.48
<b>TOTAL VARIABLE COST</b>					<b>\$118,666.17</b>	<b>\$474.66</b>	<b>\$135.46</b>
<b>FIXED COST SECTION</b>							
Annual Livestock Fixed Costs					\$13,338.95	\$53.36	\$15.23
Annual Buildings & Facilities Fixed Costs					\$5,031.67	\$20.13	\$5.74
Annual Equipment Fixed Costs					\$24,283.25	\$97.13	\$27.72
Annual Land Fixed Costs Excluding Taxes	Percent of Land Value		\$225,000.00	3.00%	\$6,750.00	\$27.00	\$7.71
Annual Real Estate Taxes	Percent of Land Value		\$225,000.00	2.00%	\$4,500.00	\$18.00	\$5.14
Annual Farm Insurance	Pcnt. of Lvstk., FacI, & Eq.		\$162,200.00	1.50%	\$2,433.00	\$9.73	\$2.78
Family Living	Total				\$30,000.00	\$120.00	\$34.25
<b>TOTAL FIXED COST</b>					<b>\$86,336.87</b>	<b>\$345.35</b>	<b>\$98.56</b>

**Figure 2**  
**Expected Breakeven Table**

<b>ITEM</b>	<b>TOTAL</b>	<b>\$/Cwt.</b>	<b>\$/Cow</b>
Variable Cost	\$118,666.17	\$135.46	\$474.66
Less: Value of cull cows, bulls and heifers	\$20,542.50	(\$23.45)	\$82.17
<b>NET VARIABLE COST</b>	<b>\$98,123.67</b>	<b>\$112.01</b>	<b>\$392.49</b>
Annual Livestock Fixed Costs	\$13,338.95	\$15.23	\$53.36
Annual Buildings & Facilities Fixed Costs	\$5,031.67	\$5.74	\$20.13
Annual Equipment Fixed Costs	\$24,283.25	\$27.72	\$97.13
Annual Land Fixed Costs Excluding Taxes	\$6,750.00	\$7.71	\$27.00
Annual Real Estate Taxes	\$4,500.00	\$5.14	\$18.00
Annual Farm Insurance	\$2,433.00	\$2.78	\$9.73
Family Living	\$30,000.00	\$34.25	\$120.00
<b>TOTAL COSTS</b>	<b>\$184,460.54</b>	<b>\$210.57</b>	<b>\$737.84</b>

**Table 3**  
**Fixed Cost Calculations for Depreciation, Interest and Annual Payments**

Item	Cost	Salvage Value	Useful Life	Depreciation	% Used in Cow-Calf	%Used in Hay	Cow-Calf Avg Investment	Hay Investment	Cow-Calf Depreciation	Hay Depreciation	%Financed	Interest Rate	Years	Total Payment
90 hp Tractor-2wd	\$25,000.00	\$5,000.00	15.00	\$1,333.33	100.00%	0.00%	\$15,000.00	\$0.00	\$1,333.33	\$0.00	0.00%	8.00%	5	\$0.00
130 hp Tractor-MFWD	\$40,000.00	\$8,000.00	10.00	\$3,200.00	100.00%	0.00%	\$24,000.00	\$0.00	\$3,200.00	\$0.00	50.00%	8.00%	5	\$5,009.13
Front-end loader w/spear	\$5,500.00	\$1,100.00	15.00	\$293.33	100.00%	0.00%	\$3,300.00	\$0.00	\$293.33	\$0.00	0.00%	8.00%	5	\$0.00
15' Rotary Mower	\$10,000.00	\$2,000.00	12.00	\$666.67	100.00%	0.00%	\$6,000.00	\$0.00	\$666.67	\$0.00	0.00%	8.00%	5	\$0.00
14' Disk Harrow	\$4,000.00	\$800.00	10.00	\$320.00	10.00%	0.00%	\$240.00	\$0.00	\$32.00	\$0.00	0.00%	8.00%	5	\$0.00
12' Grain Drill	\$5,000.00	\$1,000.00	10.00	\$400.00	10.00%	0.00%	\$300.00	\$0.00	\$40.00	\$0.00	0.00%	8.00%	5	\$0.00
8' Disc Mower	\$7,500.00	\$1,500.00	7.00	\$857.14	20.00%	80.00%	\$900.00	\$3,600.00	\$171.43	\$685.71	0.00%	8.00%	5	\$0.00
17' Double Hay Rake	\$5,000.00	\$1,000.00	8.00	\$500.00	0.00%	100.00%	\$0.00	\$3,000.00	\$0.00	\$500.00	0.00%	8.00%	5	\$0.00
17' Hay Tedder	\$5,000.00	\$1,000.00	8.00	\$500.00	0.00%	100.00%	\$0.00	\$3,000.00	\$0.00	\$500.00	0.00%	8.00%	5	\$0.00
20' Hay Trailer -5	\$6,875.00	\$1,375.00	15.00	\$366.67	0.00%	100.00%	\$0.00	\$4,125.00	\$0.00	\$366.67	0.00%	8.00%	5	\$0.00
Large Round Baler	\$25,000.00	\$5,000.00	7.00	\$2,857.14	0.00%	100.00%	\$0.00	\$15,000.00	\$0.00	\$2,857.14	50.00%	8.00%	5	\$3,130.71
27' Broadcast sprayer	\$4,000.00	\$800.00	10.00	\$320.00	100.00%	0.00%	\$2,400.00	\$0.00	\$320.00	\$0.00	50.00%	8.00%	5	\$500.91
F-250, Powerstroke/Brush	\$45,000.00	\$9,000.00	7.00	\$5,142.86	75.00%	50.00%	\$20,250.00	\$13,500.00	\$3,857.14	\$2,571.43	50.00%	8.00%	5	\$5,635.27
Cattle trailer	\$15,000.00	\$3,000.00	10.00	\$1,200.00	100.00%	0.00%	\$9,000.00	\$0.00	\$1,200.00	\$0.00	50.00%	8.00%	5	\$1,878.42
Other 4	\$0.00	\$0.00	5.00	\$0.00	0.00%	100.00%	\$0.00	\$0.00	\$0.00	\$0.00	50.00%	8.00%	5	\$0.00
Other 5	\$0.00	\$0.00	5.00	\$0.00	0.00%	100.00%	\$0.00	\$0.00	\$0.00	\$0.00	50.00%	8.00%	5	\$0.00
Other 6							\$0.00	\$0.00						
<b>Total</b>	<b>\$202,875.00</b>	<b>\$40,575.00</b>		<b>\$17,957.14</b>			<b>\$81,390.00</b>	<b>\$42,225.00</b>	<b>\$11,113.90</b>	<b>\$7,480.95</b>				<b>\$16,154.44</b>

**Figure 4**  
**Calculation of Equipment Fixed Costs for 250-cow Example**

Average Cow Equipment Investment	\$46,251.95
Interest rate on Average Investment	8.00%
Interest on Average Cow Equipment Investment	\$3,700.16
<b>Total Cow Equipment Fixed Costs</b>	<b>\$14,814.06</b>
Average Hay Equipment Investment	\$24,852.98
Interest rate on Average Investment	8.00%
Interest on Average Hay Equipment Investment	\$1,988.24
<b>Total Hay Equipment Fixed Costs</b>	<b>\$9,469.19</b>

**Figure 5**  
**Example Replacement Heifer Budget**  
**Heifer Development Budget**

<i>Item</i>	<i>Unit</i>	<i>Cost/unit</i>	<i>Quantity</i>	<i>Item cost</i>
Heifer	cwt.	\$ 102.50	5.00	\$ 512.50
Winter Pasture	ac	\$ 140.00	0.67	\$ 93.33
Coastal Pasture	ac	\$ 140.00	0.67	\$ 93.80
Other Pasture	ac	\$ -	0.67	\$ -
Hay	ton	\$ 100.00	1.65	\$ 165.00
Feed - Developing Heifer	lbs	\$ 0.05	540	\$ 27.00
Feed - Pregnant Heifer	lbs	\$ 0.05	300	\$ 15.00
Feed - 1st Calf Heifer	lbs	\$ -		\$ -
Other Feed	lbs	\$ -		\$ -
Mineral	hd	\$ 18.20	1	\$ 18.20
Ear Tags	hd	\$ 2.80	1	\$ 2.80
Vet & Med - Vaccinations	hd	\$ 6.12	1	\$ 6.12
Vet & Med - Preg check	hd	\$ 3.00	1	\$ 3.00
Labor	hrs	\$ 9.00	1.5	\$ 13.50
<b>Total Variable Costs</b>	<b>hd</b>			<b>\$ 950.25</b>
Interest	hd	9.00%	\$ 475.13	\$ 42.76
Bull Costs	hd	\$ 19.20	\$ 1.00	\$ 19.20
Non-breeders	percent	15.00%	\$ 993.01	\$ 148.95
<b>Total Costs of Retaining Heifers</b>	<b>hd</b>			<b>\$ 1,161.17</b>
Adjustment for cull heifer sales	hd	\$ 85.00	800	\$ 102.00
<b><i>Total net costs for retaining heifer</i></b>				<b>\$ 1,059.17</b>

**Figure 6**  
**Useful Formulas for Calculating Fixed Costs**

$$\text{Depreciation} = \frac{\text{Purchase Price} - \text{Salvage Price}}{\text{Years of Use}}$$

$$\text{Interest} = \text{Intermediate Interest Rate} \times \text{Annual Average Investment}$$

Where,

$$\text{Average Annual Investment} = \frac{\text{Beginning Value} + \text{Salvage Value}}{2}$$

$$\text{Repairs} = \text{Repair \& Maintenance \%} \times \text{Purchase Price}$$

$$\text{Taxes \& Insurance} = \text{T \& I \%} \times \text{Average Annual Investment}$$