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Enterprise Analysis: The Cow Herd

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Enterprise analysis can be used to evaluate both short and long term production and marketing decisions. For example, the cow herd operator thinking about expanding should first estimate his breakeven production price (cost of production) over the next few years. Analysis may indicate the need for adjustments in the cow herd enterprise and in the whole farm business.

The budget format used in this guide provides information useful in making both long run and short term decisions. The total budget example on page 5 looks at the long-run profit potential of the cow-calf enterprise. The budget looks at all costs and includes a fair rate of return to all resources used by the beef cow enterprise. Based on the example budget, using today's cattle prices and typical production costs, the long-run profit potential for the typical cow-calf producer does not look bright. Line 21 on page 5, Return Over Total Cost, shows a loss of \$87.27 per cow.

This situation has been happening for a number of years to North Dakota cow-calf producers. Profits over and above fair returns to labor, management, capital, and land plus production costs have been nonexistent. One might ask, "If profits are nonexistent, how do individual producers stay in business?" The cash budget on page 5 is presented to explain this situation.

In the long run, a producer must cover all costs to stay in business. However, in the short run, he need only recover variable or out-of-pocket costs to stay in business. The cash budget looks at the short-run situation of a typical cow-calf producer who has no debt against the resources used by the cow-calf enterprise. Line 22 of the cash budget shows a "Return Over Cash Cost" of \$203.68. He is not mak-

ing a return to all resources, but he has \$203.68 positive cash flow to stay in business in the short run if he chooses to do so.

The enterprise budget process is an important tool for both long-run and short-run decision making. The budget process presented here is provided to help North Dakota livestock producers consider economic alternatives relating to their business. The figures used in the example budget are representative data but not actual data for a particular enterprise. Individual producers should provide their own cost and return estimates with using the enterprise budget approach.

Steps in completing the budget are as follows (see example budget page 5):

1. Feed and forage cost—enter projected pasture and feed quantity and expected market price.

Feed produced on the farm and pasture represent an opportunity cost and should be priced at their expected market value. Pasture cost would usually be priced at its rental value, indicating the cost of giving up the opportunity to rent the pasture.

The example shows pasture cost in terms of animal unit months (AUM). In this example, a cow unit consists of the cow, her calf, 16 percent of a yearling replacement heifer (the example replacement rate) and 1/25 of a bull (the ratio indicating the number of cows per bull).

The cow unit in this example is 1.4 animal units (a standard animal unit is considered as 1000 pounds) calculated as follows:

<u>Animal</u>	<u>Average weight during pasture season (in pounds)</u>		<u>Fraction of cow unit</u>		<u>Cow unit pounds</u>
Cow	1000	×	1	=	1000
Calf	250	×	1	=	250
Replacement heifer	650	×	.16	=	104
Bull	1500	×	.04	=	60
TOTAL					<u>1414</u>

$$\frac{1414 \text{ cow unit pounds}}{1000 \text{ standard animal unit pounds}} = 1.4 \text{ animal units}$$

The example shown assumes 5 months of grazing for a total of 7 AUM (5 months times 1.4 animal units = 7 AUM).

Wintering feed costs per cow unit should also reflect the appropriate fraction of replacements and bull.

2. Breeding charge—enter the approximate cost per cow for breeding services, either by artificial insemination or bull depreciation.

The following formula can be used to estimate bull depreciation:

- a) purchase price minus sale value = depreciation
- b) depreciation divided by years of useful life = annual depreciation.
- c) annual depreciation divided by number of cows per bull = annual cost per cow

Example:

\$1200: bull purchase price

\$ 800: estimated salvage value

4 years: expected useful life

25 cows: average number of cows per bull

Breeding charge: a) $\$1200 - 800 = \400 Total depreciation

b) $\frac{\$400}{4} = \100 Annual depreciation

c) $\frac{\$100}{25} = \4 Annual charge per cow

3. Veterinary and medical—enter projected out-of-pocket expenses.
4. Labor—enter the number of hours per cow involved in the care and feeding of the cow herd and multiply by appropriate labor rate. Do not include the hours attributable to other enterprises such as production of feed grain and hay, as the value charged for these commodities (step 1) includes returns to labor.

Labor requirements for a cow herd vary depending on herd size and type of handling system. Approximate requirements are:

<u>Cow herd size</u>	<u>Hours per cow per year</u>
Under 40	12 - 14
40 - 80	10 - 11
80 - 120	8 - 10
Over 120	6 - 8

The wage rate chosen should reflect what it would cost to hire all the labor required, even though no hired labor is actually used.

5. Marketing—enter expected costs of trucking, commission, yardage, and other selling costs.
6. Operating and miscellaneous—enter expected out-of-pocket expenses for fuel, repairs, supplies, etc.
7. Interest on ½ variable cost—add all variable costs estimated to this point (step 1-6 on the budget), multiply that total by ½ and multiply that result by the interest rate (the factor ½ assumes that not all of these expenses would be incurred at the start of the year but are spread throughout).
8. Total variable cost—sum all the variable cost entries (steps 1 through 7).
9. Taxes and insurance—enter taxes (such as real estate) and insurance costs (buildings, equipment, livestock) that apply to the cow herd enterprise.
10. Depreciation on building and equipment—determine by dividing your current investment in livestock buildings and equipment by the estimated remaining life and divide this figure by the number of cow units.
11. Interest on buildings and equipment—consider actual interest rates for buildings and equipment currently funded by credit and opportunity cost rates for items that have an alternative value if **not** used in the cow-calf enterprise.
12. Interest on breeding stock—calculate total current value of the cow herd (cows, replacement heifers and bulls), divide that total by the number of cows in the herd, and multiply the per cow investment by the appropriate annual interest rate.

Example: 100 cows at \$500 each = \$50,000
 18 heifers at \$425 each = 7,650
 4 bulls at \$1000 each = 4,000
 TOTAL CURRENT VALUE = \$61,650

$\frac{\$61,650}{100} = \616.50 per cow unit investment in breeding stock

Interest cost = $\$616.50 \times \underline{\hspace{2cm}}$ % interest

13. Total fixed cost—sum all the fixed cost entries (steps 9 through 12).
14. Total variable and fixed cost—add the entries at steps 8 and 13.
15. Returns from steer calves—multiply the projected sales weight times the percentage of calves sold that are steers and multiply that total by the projected sales price.

The example shown assumes a 90 percent calf crop with half of the crop (45 percent) as male animals.

16. Returns from heifer calves—multiply the projected sales weight times the percentage of calves sold that are heifers and multiply that total by the projected sales price.

The example shown assumes a 90 percent calf crop with half of the crop (45 percent) as female animals and an 18 percent heifer retention rate, resulting in 27 percent of a heifer sold per cow (45 percent minus 18 percent = 27 percent).

17. Returns from cull cows—multiply projected sales weight times the percentage culling rate (replacement rate minus death rate) and multiply that total by the projected sales price.
18. Returns from cull heifers—multiply projected sales weight times the percentage heifer culling rate (heifer retention rate minus actual replacement rate) and multiply that total by the projected sales price.

19. Gross returns per cow—sum of the entries in steps 15 through 18.
20. Return over variable cost—subtract total variable cost entry (step 8) from gross returns per cow (step 19).
21. Return over total cost—subtract total variable and fixed cost (step 14, “total” column) from gross returns per cow (step 19). A positive number indicates profit while a negative number indicates loss.
22. Return over cash cost—subtract total variable and fixed cost (step 14, “cash” column) from gross returns per cow (step 19).

COST-RETURN BUDGET FOR BEEF COW HERD (PER COW UNIT)

VARIABLE COST:

	Example		Your Herd	
	Total ^a	Cash ^b	Total	Cash
1. Feed and Forage				
Pasture <u>7</u> AUM @ <u>\$8</u> /AUM (5 months)	\$ 56.00	\$ 0		
Feed 1. <u>1.75</u> ton alf. hay @ <u>\$45</u> /ton	78.75	20.00		
Feed 2. <u>1</u> ton corn silage @ <u>\$16</u> /ton	16.00	7.00		
Feed 3. <u>1.25</u> ton oatstraw @ <u>\$20</u> /ton	25.00	5.00		
Feed 4. <u>35</u> lbs. mineral @ <u>20¢</u> /lb.	7.00	7.00		
Feed 5. _____				
2. Breeding Charge	4.00			
3. Veterinary and Medical	5.00	5.00		
4. Labor <u>8</u> hours @ <u>\$4</u> /hr.	32.00			
5. Marketing (trucking, commission, yardage, etc.)	20.00	20.00		
6. Operating and Miscellaneous	10.00	10.00		
7. Interest on ½ Variable Cost @ <u>14%</u>	16.20	5.00		
8. Total Variable Cost	<u>\$269.95</u>	<u>\$ 79.00</u>		

FIXED COST:

9. Taxes and Insurance	\$ 5.00	\$ 5.00		
10. Depreciation on Buildings & Equipment	10.00	0		
11. Interest on Buildings & Equipment	5.00	0		
12. Interest on Breeding Stock @ <u>14%</u>	85.00	0		
13. Total Fixed Cost	<u>105.00</u>	<u>5.00</u>		
14. Total Variable and Fixed Cost	<u>\$374.95</u>	<u>\$ 84.00</u>		

RETURNS PER COW¹ (90% Calf Crop):

15. Steer Calves: <u>450</u> lbs. × <u>45%</u> @ <u>72¢</u> /lb.	\$145.00		
16. Heifer Calves: <u>420</u> lbs. × <u>27%</u> @ <u>64¢</u> /lb.	72.58		
17. Cull Cows <u>1000</u> lbs. × <u>15%</u> @ <u>40¢</u> /lb.	60.00		
18. Cull Heifers <u>750</u> lbs. × <u>2%</u> @ <u>62¢</u> /lb.	9.30		
19. Gross Returns/Cow	<u>\$287.68</u>		
20. Return over Variable Cost	\$ 17.73	\$208.68	
21. Return over Total Cost	(-\$87.27)		
22. Return over Cash Cost		<u>\$203.68</u>	

¹Estimated percentage of sales can be calculated as follows:

Steer Calves: Calf crop % 90 times ½* = 45%

Heifer Calves: Calf crop % 90 times ½* = 45% minus heifer retention rate (%) 18 = 27%

Cull Cows: Replacement rate (%) 16 minus death rate (%) 1 = 15%

Cull Heifers: Heifer retention rate (%) 18 minus replacement rate (%) 16 = 2%

*(The factor ½ assumes calf crop will be half male, half female.)

^aTotal is the example budget for all costs including a fair rate of return to all resources used by the beef cow enterprise.

^bCash is the example budget which includes only the out-of-pocket cash costs for a cow calf producer who has no debt, owns his crop and pasture land, raises his own feed and does not hire labor. Cash costs for feed and forage include only variable or direct costs for production and harvesting.

BREAKEVEN CALF PRICES:

	Example		Your Herd	
	Total	Cash	Total	Cash
Total Variable Cost	\$269.95	\$ 79.00		
Minus Cull Cow & Heifer Return	- 69.30	- 69.30		
Adjusted Variable Cost	<u>\$200.65</u>	<u>\$ 9.70</u>		
Breakeven Calf Price over Variable Cost (Adjusted Cost ÷ cwt of Calf Sold per Cow) ¹ (Cost ÷ 3.159)	<u>\$ 63.52</u>	<u>\$ 3.07</u>		
Total Cost	\$374.95	\$ 84.00		
Minus Cull Cow & Heifer Return	- 69.30	- 69.30		
(Adjusted Total Cost)	<u>\$305.65</u>	<u>\$ 14.70</u>		
Breakeven Calf Price over Total Cost (Adjusted Total Cost ÷ cwt of Calf sold per Cow) ¹ (Cost ÷ 3.159)	<u>\$ 96.76</u>	<u>\$ 4.65</u>		

¹Hundredweight of calf sold per cow is calculated by adding the pounds times percent of steer calves (from item number 15) plus the pounds times percent of heifer calves (item number 16) and dividing that total by 100.

Example: Pounds, steers: 450 × .45 = 202.5
Pounds, heifers: 420 × .27 = 113.4

Total 315.9

315.9 ÷ 100 = 3.159 hundredweight

To calculate breakeven calf price per hundredweight for steers versus heifers:

- 1) Multiply expected price differential per hundredweight between steer and heifer calves \$8.00 times percent of calf sales that will be heifers¹ .375 = \$3.00 (A)
- 2) Add (A) \$3.00 to the indicated average breakeven price \$96.76 = \$99.76 (= breakeven for steers)
- 3) Subtract the expected steer-heifer price differential \$8.00 from the breakeven price for steers \$99.76 = \$91.76 (= breakeven for heifers)

¹Percent of heifer calf sales (from RETURNS PER COW section):

Percent of Total sales for steer calves	<u>45</u> (A)
Percent of Total sales for heifer calves	<u>27</u> (B)
TOTAL	<u>72</u> (C)

B ÷ C = heifers as a % of Total calf sales
(27 ÷ 72 = .375 or 37½%)

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