

# CATTLE BUDGETING BY PRODUCTION STAGE

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## INTRODUCTION

Developing a budget is a fundamental component of most businesses. Budgets can be used for several reasons such as production planning, cost management and end of the year profitability calculations. From the cattle production standpoint, budgets can be and should be developed for each stage of a producer's operation. For instance, a cattle producer who has a cow-calf operation and then backgrounds those same calves should develop a budget for the cow-calf operation that sells the weaned calves into the backgrounding operation. This means the backgrounding operation is purchasing the calves from the cow-calf operation. Segregating these stages of production into different budgets allows a producer to see a clearer picture of what segments of the industry are most profitable and least profitable at that time. Thus, the objective of this publication is to outline some of the different stages of production and provide a budgeting example that may be beneficial to producers as they plan production practices and evaluate the success and failures of such production.

## ENTERPRISES RELATED TO CATTLE PRODUCTION

The term "cattle producer" is a broad term and could take several forms. In reality, calling oneself a "cattle producer" is vague. A cattle producer could be a cow-calf producer, stocker producer, backgrounding operator, heifer development operator or a feedlot operator. It is important to delineate between different stages of production. Thus, for this exercise, budgets will be presented for a cow-calf operation, stocker operation and a feedlot operation. The backgrounding operation and heifer development operation will be omitted as they could technically fall into a similar budgeting process as the stocker operation or the feedlot operation. A fourth budgeting alternative for any of these production stages is the hay enterprise. Many cattle producers consider hay production as part of the cattle enterprise, but hay production is a separate enterprise and should be considered as such.

## COW-CALF BUDGETING

The cow-calf sector is the foundation of the cattle business whether that be a seedstock operation or a commercial cow-calf operation. Additionally, it is the largest sector in terms of the number of producers participating in any stage of cattle production. This stage of production entails breeding females and growing their calves until they are of weaning age, which is typically six to eight months of age. The weaning age allows the breeding female adequate time to be reconditioned prior to her next calving cycle.

Table 1 specifies the general costs associated with cow-calf production for a 50-cow herd. This budget does not include fixed costs, but a similar budget that includes fixed costs can be downloaded on the University of Tennessee Institute of Agriculture Department of Agricultural and Resource Economics budget website. The budget includes revenue from the sale of cull cows, heifers and steers. Variable costs include feed (i.e. pasture, hay, purchased feed, mineral) veterinary expenses, breeding expenses, labor, interest, marketing and rent.

Some aspects of this budget to consider are how hay cost and replacement heifer cost are addressed. This budget assumes hay cost from the standpoint of producing it as part of the cattle operation. The underlying assumption for hay production that cannot be seen in this budget includes a 2.5 ton per acre hay yield and cows consuming 2.25 tons of hay per year, which is why 0.9 acres of hay is assumed per cow. Thus, the hay cost is nearly \$90 per ton or \$36 per 800-pound bale to produce. A person should evaluate hay production as a separate enterprise and consider the costs and revenue of hay production. For instance, if an 800-pound bale of hay could be sold for \$50 per bale then the hay enterprise would be generating \$14 per bale profit, while the cattle operation would be having to pay the additional \$14 per bale and thus lowering the return to the cattle operation. A hay producer may produce a superior quality hay exceeding the nutrient requirements of the cow herd and, thus, has a higher value. This higher quality hay could be sold and a lower quality hay, meeting the cow's nutrient needs purchased resulting in higher profits to the overall operation. Therefore, it is appropriate to develop enterprise budgets for the cattle operation and the hay operation to assist with the decision-making process and to identify the profitability of each operation.

Replacement heifer costs are assumed in this budget from the standpoint of no revenue being received from retained females. An alternative method of evaluating whether to retain heifers or purchase bred heifers is to develop a budget for bred heifer development, which would include the value of the animal at the time it was weaned and all the associated costs of growing that animal and breeding it. The cost of developing and breeding heifers can then be compared to the cost of purchasing bred females. The University of Tennessee heifer development budget can be downloaded from the Department of Agricultural and Resource Economics budget website.

**Table 1. Estimated Returns and Expenses for Beef Cow-Calf Operation in Tennessee**

Revenue					
Item	Unit	Quantity	Price	\$/Cow	Herd Total \$
Cull Cows	lb	1200	\$1.40	\$268.80	\$13,440.00
Heifer Calves	lb	520	\$2.70	\$365.04	\$18,252.00
Steer Calves	lb	550	\$3.10	\$750.20	\$37,510.00
Total Revenue				<b>\$1,384.04</b>	<b>\$69,202.00</b>
Variable Expenses					
Pasture Production	acre	2.00	\$145.57	\$291.14	\$14,557.00
Hay Production	acre	0.90	\$224.57	\$202.11	\$10,105.65
Purchased Hay per Cow	ton	0.00	\$100.00	\$ -	\$ -
Bull (Pasture & Hay)	\$	1.7	\$493.25	\$33.54	\$1,677.06
Supplemental Feed	head	1	\$26.78	\$26.78	\$1,338.75
Salt & Mineral	lb	91	\$0.46	\$41.98	\$2,098.75
Vet & Med	head	1	\$33.09	\$33.09	\$1,654.60
Reproduction (Artificial Insemination)	head	0	\$69.25	\$ -	\$ -
Other Expenses	head	1	\$1.50	\$1.50	\$75.00
Labor	hours	8	\$15.00	\$120.00	\$6,000.00
Production Expenses				<b>\$750.14</b>	<b>\$37,506.81</b>
Interest	\$	\$750.14	7%	\$26.25	\$1,312.74
Marketing	head	0.86	\$51.26	\$44.08	\$2,204.06
Land Rent	acre	0.00	\$ -	\$ -	\$ -
Total Variable Expenses				<b>\$820.47</b>	<b>\$41,023.60</b>
Returns to Variable Expenses				<b>\$563.57</b>	<b>\$28,178.40</b>

## STOCKER/BACKGROUNDING BUDGET

Some cattle producers purchase calves or feeder cattle and grow them to heavier weights. Similarly, some cow-calf producers retain their calves following weaning and grow those calves to heavier weights. It is appropriate to consider this a separate enterprise from the cow-calf enterprise. Thus, in an instance when a producer retains owned animals to grow them, it is advisable to consider the stocker/backgrounding operation to purchase those animals from the cow-calf operation and calculate the profits or losses generated during this phase of production. Table 2 provides an example budget for stocker/backgrounding 22 steers produced from a 50-cow breeding herd for 90 days.

Based on the stocker/backgrounding budget, the operation would incur a \$64.20 per head loss compared to selling the calves at weaning. It should be noted the loss includes the producer paying themselves \$60 per head in labor and a 7 percent interest rate, which totals nearly \$34 per head. Lastly, the marketing expense will be incurred at the production stage the animal is marketed, and this value will generally be based on the value of the animal if marketing through a livestock auction barn. Based on this budget, a person would have to ask if the effort to background these animals is worth the return on labor and capital.

**Table 2. Estimated Returns and Expenses for Stocker/Backgrounding Operation in Tennessee**

Revenue					
Item	Unit	Quantity	Price	\$/Head	Group Total \$
Feeder Cattle <sup>1</sup>	lb	730	\$2.70	\$1,961.15	\$43,145.19
Total Revenue				\$1,961.15	\$43,145.19
Variable Expenses					
Calf Purchase	lb	550	\$3.10	\$1,705.00	\$37,510.00
Pasture Production	acre	0.33	\$145.57	\$48.04	\$1,056.84
Hay Production	acre	0.30	\$224.57	\$67.37	\$1,482.16
Purchased Hay	ton		\$100.00	\$ -	\$ -
Supplemental Feed	lb	360.00	\$0.14	\$48.60	\$1,069.20
Salt & Mineral	lb	30	\$0.46	\$13.80	\$303.60
Vet & Med	head	1	\$20.36	\$20.36	\$447.92
Other Expenses	head	1	\$1.50	\$1.50	\$33.00
Labor	hours	4	\$15.00	\$60.00	\$1,320.00
Production Expenses				\$1,964.67	\$43,222.72
Interest on Calf Purchase	\$	\$1,705.00	7%	\$29.43	\$647.43
Interest on Other Variable Expenses	\$	\$259.67	7%	\$4.48	\$98.60
Marketing	head	1	\$26.90	\$26.77	\$588.90
Land Rent	acre	0.00	\$ -	\$ -	\$ -
Total Variable Expenses				\$2,025.35	\$44,557.66
Returns to Variable Expenses				\$(64.20)	\$(1,412.47)

## FINISHING BUDGET

Some producers may purchase calves with the intention of finishing them and selling them as cattle shares for freezer beef or retail cuts of beef. Similarly, there are cow-calf operations that have a similar business model. Thus, it is appropriate to evaluate the finishing phase to determine what profit is being gained from growing an animal to a finished weight and marketing it as freezer beef. A person could also evaluate selling cuts of beef, but, for simplicity, the focus here will be on selling live animal shares for freezer beef. The stocker/backgrounding budget also can be used as the finishing budget. It allows for the purchase of the animal, associated costs and sale of the animal. Table 3 provides an example of the costs and revenue for carrying an animal from 730 pounds to a finished weight of 1,300 pounds.

Based on the finishing budget and a selling price of \$2.45 per pound of live weight, the producer could make a return of \$309.42 per head across 22 head that were finished. The budget assumptions result in a cost of gain of \$1.36 per pound, which means it cost \$1.36 to put on one pound of gain. It is clear this return hinges heavily on what price a person can market freezer beef. The breakeven price in this specific scenario is \$2.21 per pound. Thus, the producer would have to be able to sell this animal for more than \$2.21 per pound of live animal to earn a profit.:

**Table 3. Estimated Returns and Expenses for a Finishing Operation in Tennessee**

Revenue					
Item	Unit	Quantity	Price	\$/Head	Group Total \$
Feeder Cattle	lb	1301	\$2.45	\$3,170.29	\$69,746.47
Total Revenue				\$3,170.29	\$ 69,746.47
Variable Expenses					
Calf Purchase	lb	730	\$2.70	\$1,971.00	\$43,362.00
Pasture Production	acre	0.00	\$145.57	\$ -	\$ -
Hay Production	acre	0.30	\$224.57	\$67.37	\$1,482.16
Purchased Hay	ton		\$100.00	\$ -	\$ -
Supplemental Feed	lb	4075.00	\$0.15	\$611.25	\$13,447.50
Salt & Mineral	lb	30	\$0.46	\$13.80	\$303.60
Vet & Med	head	1	\$20.36	\$20.36	\$447.92
Other Expenses	head	1	\$1.50	\$1.50	\$33.00
Labor	hours	4	\$15.00	\$60.00	\$1,320.00
Production Expenses				\$2,745.28	\$60,396.18
Interest on Calf Purchase	\$	\$ 1,971.00	7%	\$61.61	\$1,355.51
Interest on Other Variable Expenses	\$	\$774.28	7%	\$24.20	\$532.49
Marketing	head	1	\$29.93	\$29.78	\$655.07
Land Rent	acre	0.00	\$ -	\$ -	\$ -
Total Variable Expenses				\$2,860.88	\$62,939.26
Returns to Variable Expenses				\$309.42	\$6,807.21

## CONCLUSIONS

The purpose of this exercise is to evaluate and identify the stages of production that are most profitable for a specific operation. In doing that, a producer can determine the stages of production they should focus on in the cattle business or areas where they need to improve to generate a profit. There are certainly synergies across production stages, but it does not mean a person needs to participate in every one of them. This process omitted the evaluation of heifer development and hay production as separate enterprises, but producers can certainly consider those separate from the enterprises evaluated.

## ONLINE RESOURCE

University of Tennessee Institute of Agriculture, Department of Agricultural and Resource Economics, budgets for field crops, livestock, forage, tobacco, fruit and vegetable and industrial hemp: [arec.tennessee.edu/extension/budgets/](http://arec.tennessee.edu/extension/budgets/)



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