

# Developing Your Own Heifers: Cost and Returns



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The LSU AgCenter annually publishes enterprise budgets that contain projected cost of production and revenues for beef cattle production. The cost for an individual to retain and develop their own replacement heifers is not included in these budgets, but can be determined by adjusting information contained in the annual budget publication. A tight supply of cattle is contributing to higher prices for feeder and replacement animals that are likely to persist over the next few years. With the price of replacement animals rising, the question of whether purchasing or developing replacements internally is more cost effective should be asked. The cost of developing one's own heifers into replacements cannot be looked at in isolation as productivity of the replacement female will determine whether or not the investment decision is profitable. Productivity includes anticipated weaning weights of calves, pregnancy percentage, and expected longevity in the herd. The spreadsheet budget that accompanies this document will help producers work through the costs associated with developing heifers from their own herd and whether it will be more profitable to develop their own heifers or purchase replacements.

## Budget Information

The "Introduction" tab on the accompanying spreadsheet allows users to enter information on usage and prices of inputs that will be used as heifers are retained and developed on farm. Cells that can be adjusted by users are shaded blue. The majority of cells that need to be adjusted are included on the "Information" tab, but there are others throughout the budget, especially on the pasture and hay tabs, that will need to be adjusted based on the individual user's specific operation. Cells that need to be adjusted on the pasture and hay tabs are with regards to input and equipment usage. Initial assumptions for equipment and input usage rates for the pasture and hay budgets are based on the annual AgCenter enterprise budgets. These assumptions may be adjusted based on the management provided in an individual operation. The type of equipment used is altered by selecting the desired tractor or implement from a drop-down box that appears when the cell is clicked on (see Figure 1).

Equipment Usage (Year 1)		
	Times Used	Purchase Price
Tractor (105 HP)	5	\$22,500.00
Tractor (75 HP)	2	\$33,100.00
Tractor (105 HP)	2	\$1.00
Tractor (118 HP)	1	\$700.00
Tractor (150 HP)		
Tractor (225 HP)		
Tractor (300 HP)		
Tractor (170 HP)		
Tractor (190 HP)		

Figure 1. Selection of Tractor in Pasture Costs Tab

Retaining heifers from weaning to first calving is at least a 16 month process. Heifers are assumed to be weaned in the fall, graze winter ryegrass, cull heifers before the summer grazing period begins, and then graze winter ryegrass prior to a calf being born when the heifer is two-years old. During this time period, the replacement heifers will require additional labor and management as well as separate facilities from the cow herd for successful development. Costs included in development of heifers should be those costs directly attributable to the replacement heifer enterprise. Total amount and cost of purchased supplements (including soybean meal, corn, corn gluten feed, and salt/mineral) for the retained heifer enterprise should be entered on the “Introduction” tab and the budget will automatically calculate the per head usage. While producers may produce hay for the entire cow herd, the hay fed to replacement heifers needs to be expensed directly to this enterprise. The “Budget” tab shows how much hay is fed to heifers (after adjusting for death loss and cull rates). This figure may be adjusted by changing the number of cuttings and yield or the total number of acres devoted to hay production on the “Introduction” tab.

The accompanying spreadsheet budget assumes that heifers are kept separate from the cow herd but on land the cow herd would use if heifers were not retained. This fact results in indirect costs of depreciation and interest being charged to the retained heifer development enterprise due to the opportunity costs associated with using the land, equipment, and other resources for this enterprise relative to the cow/calf enterprise. Exclusion of these indirect costs would understate the true economic costs associated with retaining heifers and make the decision to retain heifer calves more profitable than what is may actually be. Similar to the annual LSU AgCenter enterprise budgets, new equipment is assumed to be used on the producer’s cattle operation. While this may not occur in practice, producers should understand there is an economic cost associated with use of equipment, even if it has been completely depreciated that needs to be reflected in the total cost of developing heifers. Accounting for the indirect costs will help to ensure that the operation is generating enough returns to help provide for new equipment in the future.

Interest on operating capital is calculated in two different ways in the accompanying spreadsheet. The heifer calf that is retained is assumed to be charged a higher interest rate than other inputs. This reflects the opportunity cost of retaining and developing a heifer as opposed to selling the animal at weaning. Ideally, the cost to obtain the replacement heifer should be the cost associated with raising that female from birth to weaning. If this value is not available, then the market rate for heifer calves at time of weaning is a suitable proxy. The money invested in the animal could have been used for an alternative investment and the interest selected for the heifer should reflect the rate of return that would be expected from the investment alternative. Choosing an appropriate interest rate, such as the rate expected to be charged by a bank if purchasing a replacement female, becomes important in deciding the best expansion strategy as explained in the next section.

Interest on operating inputs is calculated separately from the interest associated with the heifer calf. A lower interest rate is expected and would be consistent with a rate charged for an operating loan. Interest is calculated on half of all costs except for marketing and the opportunity cost of the raised replacement heifer. The reason interest is calculated on half of all inputs is due to the assumption that producers will purchase these inputs on an as needed basis during the time period heifers are developed. This is a departure from the AgCenter enterprise budgets which assume interest costs for the entire production period.

Labor is included as a cost in the accompanying spreadsheet budget, but it may be turned off (Figure 2). Producers may not normally include the cost of their labor in budgeting, but their time has an opportunity cost associated with it. Inclusion of labor costs will prevent development costs from being understated, but also provide funds for family living expenses. Although management costs may not be explicitly accounted for in budget cost estimates, it may be included as “other cash costs” or through increasing the number of non-pasture related labor hours. If no additional labor is hired to help with the heifer development enterprise, the cost of labor should reflect the prevailing wage rate that the producer could receive in another employment alternative.

Interest Rate for Operating Note:	5.25%
Interest Rate/Opportunity Cost of Replacement Heifers:	7.00%
Diesel:	\$2.75
Include Labor Costs:	Yes
Labor Cost per Hour:	
Hay:	
Number of Hay Cuttings:	1.00
Tons/Acre per Cutting:	1.50
Bermudagrass/Native Pasture:	Native Pasture
Purchased Hay Cost (\$/ton):	\$0.00
Total Hay Purchased (in tons):	0.00
Number of Years Bull Retained in Herd:	4
Number of Heifers Serviced by Bull:	20
Purchase Price of Bull:	\$3,500.00
Months from Weaning to Calving:	17.00
Self-Propelled Equipment (Truck) Cost:	\$25,000.00

Figure 2. Inclusion of Labor Cost

## Comparison of Different Replacement Female Strategies

Accurately accounting for the costs of developing an operation’s own heifers is important, but this is just one strategy for expansion. Purchase of bred cows, 3-in-1 cow (bred cow plus calf), or bred heifers are alternative expansion strategies to developing heifers from the herd that an operation may pursue. Each potential strategy has its advantages and disadvantages, but by using information from the operation, a producer can determine which strategy will be the most profitable given their operation’s resources.

On the “Introduction” tab below the inputs for the heifer development enterprise, are the expected purchase costs, weight and price at culling, and expected herd longevity for alternative expansion strategies. These assumptions should be adjusted based on a producer’s prior experiences and expectations of the future. Adjusting these assumptions will allow users to make a more informed and accurate decision on the best to way expand their herd.

The “Revenues” tab allows a user to further refine assumptions about each potential expansion strategy, namely the expected weaning weight, sale price of the calf, expected calf crop, and annual cow cash costs. As stated before, cells that are shaded in blue may be adjusted by the user. Changing these cells will alter the expected revenue streams and whether or not the potential expansion strategy will be profitable over the long run. The initial sale prices are set to the long term USDA baseline projections of prices received by U.S. producers through 2020. Expected calf crop is 87%, consistent with the LSU AgCenter enterprise budgets. Annual cow cash costs should be adjusted to reflect each individual operation’s cost structure. Cash cost

projections should not ignore labor and management provided by the operator. Costs for beef cattle operations have increased greatly in the past few years. Longer term cost increases suggest a 5% year-to-year increase is not unreasonable to include for the growth rate of annual cow cash costs.

The “Summary” tab contains the purchase price, current economic value, breakeven purchase price, internal rate of return, and payback period associated with each of the alternative expansion strategies. Two entries are included for the raised replacement heifer that reflects all costs (direct and indirect) and only the direct costs of retaining a heifer. Inclusion of these two alternative valuation measures allows producers to see that the investment is profitable when accounting for direct costs, but may not be profitable when all costs are accounted for.

The breakeven purchase price is the most the producer can afford to pay (or invest if retaining heifers) for an animal given the current assumptions about longevity of the female in the herd, expected sales price of calves, and expected cull value of the female. In addition to the breakeven purchase price being impacted by the aforementioned assumptions, the interest rate associated with retaining a heifer chosen greatly impacts the breakeven purchase for a replacement female. Careful consideration of the interest or discount rate should be given before analyzing which potential expansion strategy best suits an individual operation. The discount or interest rate should reflect the desired rate of return from the investment. Higher (lower) discount rates decrease (increase) the breakeven purchase price for a replacement female. Chosen discount rates should also account for risk that may be present in the investment since the money invested in replacement females may be invested in similarly risky investments.

The economic value of the investment is simply the net present value (NPV). Net present value accounts for the time value of money and the nature of cash inflows (outflows) over the life of the investment. Positive values suggest that the investment could be made and return a profit level at least equal to the chosen discount (interest) rate. Negative values indicate the investment will not be profitable given current assumptions. A value of zero for the economic value would mean the producer should be indifferent to the expansion strategy.

The internal rate of return is another valuation method included in the accompanying spreadsheet. If two strategies both return a positive economic value/NPV, the internal rate of return allows the user to know the discount rate that would make the investment equal to zero. While the IRR is a useful tool, it is not preferred to the results from NPV analysis. The final valuation method included is the payback period. This method provides information on how long the replacement female must be held to recoup the money invested through the annual cash revenues. The payback period does not reflect the timing of cash flows received by the operation and is the least recommended option to determine which investment strategy is preferred.

## **Conclusions**

This spreadsheet will help determine the costs and returns associated with expanding your herd, but there are non-economic factors of expanding your herd this spreadsheet tool cannot decide for you. These factors include the pasture resources to manage potential raised replacement heifers and ability to effectively manage these animals to maturity. What is the genetic potential of purchased animals relative to raised heifers? There are some economic factors that are not calculated but should not be ignored when making a decision on which expansion strategy to pursue. How will the operation's cash flow be affected by loss of revenue by developing heifers as opposed to selling them at weaning? Is the operation prepared for the tax implications of raising versus purchasing animals? Raised breeding animals cannot be depreciated, but are taxed as capital gains, not ordinary income. These factors should be considered when making the decision to expand in addition to the potential costs associated with different expansion strategies.

### **Additional Resources:**

Lawrence, J.D. "Profiting from the Cattle Cycle: Alternative Cow Herd Investment Strategies."

Available at:

<http://www2.econ.iastate.edu/faculty/lawrence/Acrobat/AlternativeCowHerdInvestStratBRR.pdf>.

Accessed June 6, 2011.

USDA Economic Research Service. *Agricultural Baseline Projections*.

<http://www.ers.usda.gov/Briefing/Baseline/>. Accessed June 6, 2011.