

## **USING THE SPREADSHEET VERSION OF THE NCSU BEEF BUDGETS**

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There are six beef enterprise budgets:

- Cow-calf
- Beef Wintering
- Summer grazing
- Two finishing budgets, one for finishing on a high energy diet and the other for finishing on pasture
- A preconditioning budget

There is one enterprise budget per spreadsheet. Each spreadsheet budget consists of two worksheets, except for the preconditioning budget. One worksheet is the main enterprise budget and the second worksheet contains tables for generating the fixed costs and some of the operating costs included in the main budget.

The cost information in these enterprise budgets is intended as an example or guideline only and the spreadsheets should be used to develop one or more budgets for a specific farm situation. The example budgets are not intended to be used "as is" without being modified. They are developed by NCSU extension specialists to reflect a fairly typical farm situation, for an established farming operation, assuming somewhat above average performance and normal growing conditions. However, on a specific farm soil quality may be above or below average, which affects forage yields and animal performance. Different production practices may be used or input costs may be different, for example, when livestock manures are used instead of purchased commercial fertilizers. Similarly, the price received for cattle is affected by many factors, including the stage of the cattle cycle, time of year and the specific characteristics of the cattle.

Each spreadsheet has certain cells that are protected and others that the user can modify with his or her information. These cells are colored yellow or green. The yellow highlighted cells contain descriptions or data only, the green cells contain formulas or links to other worksheets that can be modified or overwritten with the user's data. More information and suggestions for modifying these budgets is provided below.

**CAUTION:** Every effort has been made to produce spreadsheets that work as intended but they are offered “as is” and the user must accept responsibility for any information generated and any decisions made based on that information.

### Costs and Returns

Each enterprise budget contains three categories of cost; operating, fixed and labor. Operating costs are also known as variable or out-of-pocket costs and include such items as feed and animal health costs. Note that forage production and harvesting stored forages are treated as separate farm enterprises and NCSU enterprise budgets are available on many forage crops. The operating costs for forage crops are based on the most recent NCSU forage budgets.

Fixed costs are the costs associated with the investments in equipment and specialized facilities used in the cattle enterprise. These costs are sometimes called ownership costs or overhead costs. Because these investments last for several years, we calculate annual charges that consist of a depreciation allowance, interest on the investment, property taxes and insurance. Interest charges are included regardless of the source of the investment, i.e., debt financed or owner financed. Note that for the example provided, machinery costs are based on new equipment prices in winter 2013-14. Equipment that is purchased used has a shorter useful life and has higher annual repair and maintenance costs. Users should use the actual prices of their own equipment.

Labor expense requires additional explanation because farm work may be performed by employees, by the owner or by some combination of the two. In the situation where some or all labor is provided by the owner, we recommend including a labor charge to reflect one of the following; the cost of hiring someone to perform the work, the minimum return the owner wants for his or her time, or the value of his or her time in some other activity, including leisure. In economic terminology this is an attempt to measure the opportunity cost of the owner’s labor.

Revenue depends on prices and the specific characteristics of the cattle. Cattle prices are cyclical, that is, there are years of increasing prices, which then reach a peak, followed by several years of declining prices. In most years, there is a predictable seasonal pattern to prices. The price received for a particular group of cattle is affected by the time of year they are sold, weight, breed or hide color, sex, frame size and fleshiness, whether cattle are raised with special attributes such as pre-conditioned, pasture finished. Prices and marketing costs are affected by the way cattle are marketed, e.g., weekly auction, special sales, on-farm sales in truck load lots.

As can be seen from this discussion, these budgets estimate the full economic cost of production. Profit measures include returns above operating expenses and returns above all specified costs (operating, fixed and labor). These are only partial profit measures because the budgets do not include farm overhead costs or land charges. This is because, by definition, an enterprise budget refers to a particular farm enterprise, not the whole farm operation. Note that in some situations, particularly for large new enterprises, one or more annual budgets may be needed through the start-

up period together with cash flow projections that include new borrowing and debt repayments.

### Modifying the budget

Each spreadsheet has certain cells that are protected and others that the user can modify with his or her information. These cells are colored yellow or green. The yellow highlighted cells contain data or descriptions only, the green cells contain formulas or links to other worksheets that can be modified or overwritten with data. The following discussion indicates some of the structure and workings of the budgets. Specific budgets may include footnotes that help explain individual items in that budget.

For each of the main budget worksheets:

- The header describes the enterprise relating to that budget. It may be useful to modify this to describe the specific farm situation to which the customized budget refers.
- All of the operating expense items may be changed with the exception of:
  - Equipment Operating expenses, which are calculated from information contained in Tables 1 and 2 in the second worksheet of each budget and transferred to the main budget worksheet automatically, and
  - Interest charge on Annual Working Capital.
- Fixed costs are calculated from information contained in Tables 1 and 2 in the second budget worksheet and transfer automatically. There are one or two exceptions where the user enters the acres and cost per acre directly in the budget. This is done to provide flexibility and cover more farm situations.

The second worksheet for each budget contains three items:

- Table 1 with a list of the facilities and equipment used in the enterprise, calculations of the fixed or ownership costs and estimates of the share to be allocated to this particular enterprise.
- Table 2, which is linked to Table 1 and contains calculations of the estimated operating expenses for each item of equipment and the machinery labor requirement,
- A sensitivity analysis that shows the effect of changes in the assumptions about revenue and costs.

The following changes can be made in Table 1.

- Interest rate. This is used to calculate the annual interest charge on the average value of the investment in equipment. The rate used should reflect the cost of capital for the farm.
- Tax and insurance rate. This combined rate is used to calculate these cost items based on the average value of the equipment used in the enterprise. It is expressed as a percentage of the average investment.
- Individual facilities, pieces of equipment items and, in some cases perennial pasture establishment, are listed. Tractor drawn or powered equipment is shown linked to the tractor providing the power. The following items, identified

in the column headings, should be evaluated for each piece of equipment and changed if warranted:

- The expected life of the facility or piece of equipment (or the planning horizon or economic life if less than the physical life),
- The initial cost (investment cost or purchase price including the value of any trade-in) and the estimated salvage value, if any. These values are used to calculate the annual depreciation charges. The example initial cost figures are based on winter 2013-14 estimated prices. Example salvage values are calculated by formula as a percentage of the initial cost using “book values” developed from agricultural engineering data.
- Total fixed costs – depreciation, interest, tax and insurance
- Share to this enterprise. Facilities and equipment may be shared between two or more enterprises or farming activities. This figure is used to allocate the total fixed costs for a particular item to this particular beef enterprise.

The pro rated share of total fixed cost calculated in Table 1 is transferred over to the main budget worksheet.

The following changes can be made in Table 2. The list of equipment transfers automatically from Table 1.

- Fuel price per gallon. This figure is used to calculate the fuel cost per hour for all self-propelled equipment listed.
- Labor cost per hour. This figure is used to calculate the machinery labor cost per hour for all equipment listed.
- Tractor horse power. This is used to estimate fuel consumption and cost.
- Repairs and maintenance. The annual cost figure is calculated as a percentage of the initial cost (purchase price). The percentages shown are “book values” based on new equipment prices and reflect the average annual cost over the life of the piece of equipment. These percentages are applied to the initial cost figures shown in table 1. If used equipment is purchased and priced in Table 1, the repairs and maintenance percentages will be higher than those shown in the example. A pro rated share of the annual total cost is allocated to this enterprise based on the share reported in Table 1.
- Fuel use. For tractors and self-propelled equipment this is calculated from the horsepower figure provided. For farm vehicles, the fuel use per hour can be entered in the appropriate cell.
- Fuel and lube. This is based on the calculated fuel cost plus a percentage.
- Hours of use. This is the estimated use for the whole year for this enterprise and is used to calculate total operating expense. It is also used to calculate the labor cost of charge for the time spent operating each item of equipment.
- Labor cost. The equipment labor cost calculation includes a percentage to cover additional time spent, for example, adjusting and cleaning up equipment. Note that for some activities, the equipment might be running for less time than it takes to complete the activity. In this case, the additional labor should be entered as “Livestock labor” on the main budget worksheet. One example might be pasture management, where some time is spent driving to pastures but then additional time may be spent on foot checking the cattle, moving fences, cleaning or repairing waterers. Similarly, when hay is being put out

there may be additional tasks performed that do not require the tractor to be kept running.

Total operating expense per acre includes repairs and maintenance, fuel and lube, and the cost or charge for the time spent operating the equipment. These figures transfer automatically to the main enterprise budget.

Table 3 is a sensitivity analysis. The effects of specified percentage increases or reductions in revenue and cost are shown, singly and in combination. The percentage change can be modified by the user. This provides a quick and simple way of evaluating alternative scenarios without re-running the entire budget. However, if the results are very sensitive to these percentage changes, it is important to review the entire budget carefully and verify these results by making more detailed changes to the original assumptions in the base budget.

### Other Resources

North Carolina agriculture is very diverse and it is not possible to cover all the variations in cattle production practices. Enterprise budgets from many other states and agencies can be located through a searchable budget database located on a USDA Risk Management Agency web site at <http://www.agrisk.umn.edu/Budgets/>

The following items provide more information on the machinery and equipment costs and calculations:

"Estimating Farm Machinery Costs," Ag Decision Maker A3-29, Iowa State University, University Extension, April 2002 is a useful publication explaining machinery costs that can be found on-line at <http://www.agrisk.umn.edu/Budgets/CustomSearch.aspx>

"Farm Machinery Cost Estimates," William F. Lazarus, Department of Applied Economics, University of Minnesota, June 2013, can be found on line at <http://faculty.apec.umn.edu/wlazarus/documents/machdata.pdf>

"Agricultural Machinery Management Data," ASAE Standards, ASAE D497.4 FEB03, American Society of Agricultural Engineers.