

Dairy Enterprise Budget Instructions

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Instructions for Using Dairy Enterprise Budget Spreadsheet

The Dairy Enterprise Budget spreadsheet (Bernhardt, 2025) provides users ability to model three scenarios thus enabling some comparability by a metric chosen by the user (production level, price, herd size, raised versus outsourced replacements, year, etc.). The spreadsheet includes separate worksheets (tabs) for estimating fixed costs, feed costs, mailbox prices, and sensitivity analysis.

Besides the 'Title Page' tab, there are six tabs. A quick look at each tab shows lots of potential entries and work! However, all but one of these six tabs are optional. The only tab that is mandatory for creating an enterprise budget is the 'Enterprise Budget' tab. All information, if known by the user, can be entered directly into the 'Enterprise Budget' tab and the rest of the tabs can be ignored.

The extra tabs are for those users who wish to dive deeper into analyzing some of the major cost and revenue items – feed, fixed capital costs, and price. Finally, there is a 'Sensitivity Analysis' tab that enables analysis of changes in profits caused by changes in costs, revenues, production, and price.

Throughout all spreadsheet tabs, only yellow-shaded cells are for user input. However, just because a cell is yellow shaded does not mean there has to be a value entered in the cell, but it is a place for users to enter their information if it is appropriate to do so. Cells that are unshaded or shaded a color other than yellow are for explanatory information, formulas, or estimates. It is important to remember that the information in green-shaded cells or those found in the accompanying worksheets is for information only and will not be part of the enterprise budget calculations unless they are manually entered into the corresponding, yellow-shaded cell.

The enterprise budget is based on a per cow unit for one year including offspring, replacements, and culls. Revenues and costs of production must be entered on a per cow basis.

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Final costs of production and profitability results are provided by cow, hundredweight, and for the whole herd. In addition, milk only costs of production and other metrics are provided.

The six tabs other than the 'Title Page' include:

1. 'Enterprise Budget' tab: This is the prize. All other tabs are calculators or information that provide information on revenues and costs for the 'Enterprise Budget' tab.

The remaining five tabs are all optional. They provide a means for more in-depth and/or a more personalized estimates of major costs and revenues.

2. 'Fixed Cost' tab (optional): Fixed costs typically include depreciation, interest, repairs, taxes, and insurance (DIRTI). This tab provides an estimate of fixed costs based on a percentage of market value of several types of assets. Results are transferred to the 'Enterprise Budget' tab, but only as information in green-shaded cells. Users must decide whether they want to use the estimate or something else. Either way, values must be manually entered in yellow-shaded cells on the 'Enterprise Budget' tab.
3. 'Mature Cow Feed Cost' tab (optional): Feed costs are one of the most significant expenses in a dairy, thus accuracy is important. The 'Mature Cow Feed Cost' tab provides a space for users to input prices and a ration for each of the three scenarios. Note, feed costs are often a combination of purchased and raised feeds where the cost of raised feeds is in the form of seed, fertilizer, labor, etc. The Enterprise Budget assumes all feeds are purchased. For example, most dairies raise their own corn silage. For the enterprise budget, the 'Mature Cow Feed Cost' tab can be used to give a price to the amount of corn silage that will be used. This price covers the cost of raising the silage including fixed costs of land. Thus, be sure not to also include costs for seed, fertilizer, labor, land charges, etc. as it would be double counting. Again, results are transferred to the 'Enterprise Budget,' but as information only in green-shaded cells.
4. 'Replacement Feed Costs' tab (optional): This tab is like the 'Mature Cow Feed Cost' tab, the difference being that it is for estimating the cost of feeding replacement heifers. Several columns are included for each scenario that can accommodate the many phases of a heifer from birth to first calf.
5. 'Mailbox Price Calculator' tab (optional): The mailbox price received depends on the Class III base price plus component values, quality premiums, and other premiums and discounts. Users must ultimately enter an average annual mailbox price; however, they can use the 'Mailbox Price Calculator' tab to evaluate the impact of changing components on the mailbox price. In-fact, one type of analysis can be comparison of three scenarios based on different rations (and costs) versus the impact on components and prices. The 'Mailbox Price Calculator' tab is optional.
6. 'Sensitivity Analysis' tab (optional): The best forecasts and estimates seldom turn out as originally expected. The 'Sensitivity Analysis' tab enables users to look at the impact on net returns from ranges of costs, revenues, prices, and production. The tables all start

from the base of the middle scenario (column F) on the 'Enterprise Budget' and range both lower and higher from that base. Note, users should put the scenario they most expect in column F of the 'Enterprise Budget.'

"Enterprise Budget" Tab

The enterprise budget spreadsheet begins with several rows (rows 4-20) of general information on prices and production metrics. This information is used in deriving later estimates and enables the user some customization to their farm's situation. ***Note, all rows must be completed for the remainder of the spreadsheet to work as several cells depend on this information to complete calculations.***

Dairy budgets can be sensitive to changes in prices, production, capital invested in machinery and facilities, feed costs, labor, etc. Note, there are three columns (scenarios) for user entry. The three scenarios enable users to look at a range of results for any of the price or production metrics. Whichever metric is chosen as the test range, all following revenue and costs should be adjusted to that metric's value accordingly. The middle scenario (column F) should be considered as the most likely scenario, and it is the one that is used to evaluate changes of net returns on the 'Sensitivity Analysis' tab.

Note also that price entries are based on price per head. The optional table to the right of the budget in columns H-K provides a quick calculator for converting prices to a price per head. The calculator does not have to be used, it is for convenience and assistance only and is not a part of any formula calculations in the body of the budget. For a value to be used in calculations, it must be entered in the appropriate, yellow-shaded cell.

Any yellow-shaded cell in the "REVENUES," "VARIABLE COSTS (VC)," and "FIXED COSTS (FC)" sections are places for user entry if warranted. White-shaded cells are formulas. Note, cells with a red triangle in the upper right corner of the cell have additional explanation about that cell. Also, there is additional information in footnotes located below the spreadsheet.

Green-shaded cells to the right of the budget provide information only based on other user provided values for prices, production, etc. or are calculations from other tabs. Values in green-shaded cells are for information only; actual values must be entered manually in the budget by the user.

Below the budget is information on costs of production and net returns per cow, hundredweight, and for the total herd. Note, no user-entry is required in this section. The hundredweight equivalent and residual claimant statistics are based on methods that adjust net returns or costs of production to an estimate based on revenues and costs for milk only, which could be helpful for some management applications such as marketing. Explanation of the

methods are shown in the section below titled “Hundredweight Equivalent and Residual Claimant Methods for Determining Milk Costs Only.”

Raised versus Purchased Replacements

Typically, enterprise budgets are constructed in a way that sells all heifer calves and then purchases back springer heifers as replacements. This simplifies the spreadsheet but may not match the situation. In this enterprise budget, users can choose to sell all calves and buy back replacements or raise all replacements.

If the choice is selling all calves and buying back replacements the appropriate entries include:

- Selling all heifer calves in the “REVENUE” section.
- Purchasing replacement bred heifers (aka: springing heifers) in the “VARIABLE COSTS (VC)” section.

An estimate for the sale of all heifer calves and purchase of all replacements is provided to the right of the enterprise budget in green-shaded cells. Note, this is information only and users must still manually enter values in the appropriate, yellow-shaded cells.

If the choice is raising replacements, the appropriate entries include:

- Enter only heifer calf sales that are not being used as replacements in REVENUE section.
- Enter feed costs for raised heifer replacements in the VARIABLE COSTS section. Note that an estimate is provided in the green-shaded cells to the right of the budget, where the values shown are based on the ‘Replacement Feed Costs’ tab.
- Enter any additional costs for non-feed expenses due to the extra replacements (vet, labor, etc.) in their appropriate line.
- Enter zero for replacement heifer purchases. In this case, ignore the estimates in the green-shaded cells as they are for purchasing all replacements. Note, there may still be some purchases of replacements which could be entered accordingly.

‘Fixed Cost’ Tab (optional)

Note, this is an optional tab that can be used if the user wishes to evaluate fixed costs. If the user knows the values for the enterprise budget they can be entered directly, and this tab can be ignored.

Fixed costs are those costs that cannot be changed in the short run regardless of the level of production, that is, owners must pay fixed costs even if there is zero production. What is considered a fixed versus variable cost can change by operation and situation. However, the ‘Fixed Cost’ tab provides a means to estimate five common fixed costs, which are depreciation, interest, repairs, taxes, and insurance (DIRTI). Other potential fixed costs items are included in

the budget itself. Note, the repairs portion of fixed costs are those that are minimal annual maintenance needed to keep machinery, equipment, and buildings operational.

The 'Fixed Cost' tab uses a method for estimating depreciation, interest, repairs, taxes, and insurance based on a percent of market value. This is the simplest estimate as no line-item breakdown by piece of equipment, building, etc. is needed, only total market values, a corresponding percent charge for each fixed cost, and what percent should be associated with the dairy enterprise. Of course, if you have your own history of fixed costs then dividing by the number of mature cows provides a more personalized estimate of fixed costs per cow based on your own history.

Once all information is complete, results are transferred to a green-shaded cell to the right of the Enterprise Budget for the user to use as information for the entry they make in the budget. Again, the transferred numbers are for information only and users must enter what they believe to be the best estimate in the yellow-shaded cells.

Note on "land" costs. This Enterprise Budget assumes that the annual cost of land for raising feed is incorporated into the cost of feed. Thus, the only land charge in the fixed cost section is any land used for the facilities, manure pits, pasture, or other land used for the dairy that is not used for raising feed.

'Mature Cow' and 'Replacement' Feed Cost Tabs (optional)

Note, these are optional tabs that can be used if the user wishes to evaluate feed costs. If the user knows the feed values for the enterprise budget they can be entered directly, and these tabs can be ignored.

Feed costs are one of the most significant singular costs in a dairy enterprise. Thus, getting it right is critical for budget accuracy. Feed costs are complicated as there are different rations for separate groups of cows, open heifers, bred heifers, dry cows, etc. In addition, feed can be both raised or purchased. Purchased feed costs are straight-forward, but raised feed costs include the costs of seed, fertilizer, capital, labor, land charges, and the opportunity cost of selling the crop versus feeding it.

Typically, enterprise budgets (including this one) purchase all feeds whether raised or not. Thus, feed costs include purchased feeds and the opportunity cost value of raised feeds. Using this method, it is important that raised feed costs like seed, fertilizer, etc. are not also entered in the enterprise budget as that would result in double counting.

The two feed costs tabs enable a deeper dive by calculating per cow feed cost based on entering ingredients, dry matter percent, percent shrink loss, prices, and amounts fed. Results

are transferred to a green-shaded cell to the right of the Enterprise Budget. The feed cost tabs enable multiple rations for separate groups of cows and replacements and do so for each of the three different scenarios. This flexibility makes it a large spreadsheet. For those who want to do a deep dive, it is there, for those who do not, then ignore the tabs completely and enter your feed costs directly into the Enterprise Budget.

Again, the transferred results of feed cost estimates in the green-shaded cells are for information only and users must ultimately enter their own value in the yellow-shaded cells of the Enterprise Budget.

'Mailbox Price Calculator' Tab (optional)

Note, this is an optional tab that can be used if the user wishes to evaluate mailbox prices, particularly the impact of changes in components. If the user knows the mailbox price and/or knows there is likely to be no change in components, then a price can be entered directly, and this tab can be ignored.

The mailbox milk price a producer receives is a complicated package of premiums, discounts, pool differentials, component, and class pricing. Many of the factors lie outside the farm's control, but components can be changed through nutrition, genetics, and other production practices. As these values change, so does the mailbox milk price for that farm, however, costs might change as well for feed, etc. If a user is using the enterprise budget to analyze change, then part of that change may impact components and thus mailbox price. The 'Mailbox Price Calculator' tab provides a space to analyze the impact on mailbox prices.

Note, in this case there is nothing that is transferred to the 'Enterprise Budget' tab. Ultimately, an average annual mailbox price must be manually entered in the 'Enterprise Budget' tab.

'Sensitivity Analysis' Tab (optional)

Note, this is an optional tab that can be used if the user wishes to evaluate ranges of prices, production, costs, and revenues.

The "Sensitivity Analysis" tab evaluates what will happen to net returns if the actual costs, revenues, production per cow, or milk price is different from the estimate entered in column F of the 'Enterprise Budget' tab. The Sensitivity Analysis only pertains to ranges around the middle column of results, column F of the 'Enterprise Budget' tab.

There are two sets of tables. The first set, Table 1, shows changes in net returns that follow from user-defined percent changes in revenues and costs. Percent changes in revenues and

costs are entered by the user in the upper left chart. Resulting changes in net returns are shown per cow, per hundredweight, and total dollars for the herd.

The same process follows for the second set of tables, Table 2, except in this case the initial shocks are user-defined changes in production per cow and milk price.

Hundredweight Equivalent and Residual Claimant Methods for Determining Milk Costs Only

Enterprise budgets often include income and expenses that are not from the primary product, milk in this case. For example, cull cows, calves, and heifers have associated costs of production that will be added to costs of milk when dividing total costs by hundredweight sold. Hundredweight Equivalent and Residual Claimant are two methods for adjusting costs to estimate costs of production for milk sales only.

Hundredweight equivalent (cwtEQ) adjusts the denominator (hundredweight of milk sales) by taking total income and dividing it by milk price. The result is a hundredweight value that when used as a denominator will give a value that adjusts for non-enterprise income and expenses. The adjustment shows how much milk would have to be produced to acquire the same amount of income as current total income.

Residual Claimant recognizes that there can be and often is co-product sales. Using this method assumes that the co-product sales are a recovery of costs associated with the co-products. Thus, by subtracting co-product revenue from total costs, the difference is milk costs only. This assumes that the co-product sales are equivalent to the costs of production for those co-products. The closer this assumption to reality, the better the estimate of milk only costs of production.

As an example, assume the following values:

- Milk Revenue: \$639,600
- Co-Product Revenue: \$88,200
- Total Revenues: \$727,800
- Price: \$20.50/cwt
- Total Costs of Production, COP, (milk and co-products): \$670,920
- Total hundredweights of milk sales: 31,200 cwt

In this example, costs of production per hundredweight with no adjustments would be:

$$\frac{\text{Total costs}}{\text{hundredweight sales}} = \frac{\$670,920}{31,200 \text{ cwt}} = \$21.50 \text{ COP per cwt}$$

However, there are co-product cull, calf and heifer costs of production included. Adjusting for just milk only costs of production based on the hundredweight equivalent method gives the following:

$$\text{Step 1: Determine cwtEQ} = \frac{\text{Total revenues}}{\text{price per cwt}} = \frac{\$727,800}{\$20.50} = 35,502 \text{ cwtEQ}$$

$$\text{Step 2: Costs of Production per cwtEQ} = \frac{\text{Total costs}}{\text{cwtEQ}} = \frac{\$670,920}{35,502 \text{ cwtEQ}} = \$18.90 \text{ COP per cwtEQ}$$

In addition, single item costs such as feed costs, labor, etc. could also be divided by the cwtEQ to get an estimate of per item costs of production.

Using Residual Claimant, the following adjustments are made:

$$\text{Step 1: Residual Costs} = \text{Total costs} - \text{co_product revenues} = \$670,920 - \$88,200 = \$582,720$$

$$\text{Step 2: } \frac{\text{Residual Costs}}{\text{hundredweight sales}} = \frac{\$582,720}{31,200 \text{ cwt}} = \$18.68 \text{ COP per cwt}$$

Energy Corrected Milk (ECM)

A method for determining a more accurate cost of production is to use “Energy Corrected Milk” (ECM). This method determines a hundredweight value of milk production that corrects for component values that are different than those used in the standard Class III pricing formula. Thus, dividing total cost, feed costs, or some other cost item by ECM gives credit to the higher value of milk if it has higher components. That is, a producer might spend more money to get better components (thus a better price). The formula used is:

$$ECM = (.327 * \text{lbs Sold}) + (12.95 * (\%Fat * \text{lbs Sold})) + (7.2 * (\%Protein * \text{lbs Sold}))$$

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