

Enterprise Budgets in Farm Management

An enterprise budget is an organized listing of your estimated gross income and costs, which can be used to determine the expected net income for a particular enterprise. You calculate this type of budget on a per unit basis, such as an acre of land or head of livestock, for one year or one production period. Enterprise budgets help you estimate per unit gross income, costs, net income, and break-even figures on an annual basis for crop and livestock enterprises.

The Enterprise Budget

The information in an enterprise budget can be organized in different ways, but it typically includes sections on *gross income*, *variable costs*, *fixed costs*, and *net income above selected costs*.

Gross Income

Gross income consists of *level of output* and *price per unit of output*. Estimate gross income for your enterprise by multiplying the amount of output you expect by the price per unit of output. What level of output and what price per unit should you use?

Base your estimated level of output (yield per acre, weight per head, and others) on expected input use: seed, fertilizer and the like, cultural practices, cropping sequence, soil conditions, weather conditions, feeding programs, class and type of livestock, and management level. In other words, base your estimates on what you think will happen

for the planning period. Use your records, responses from neighbors, and information from Extension agents and researchers to develop an output estimate. Avoid being too optimistic or pessimistic about output estimates.

It may be best to determine the estimate for the next year, and then vary the output above and below this number to determine the effect of various outputs on net return. You can also calculate break-even outputs to cover variable and total costs (fixed and variable) of production, which will provide you information about the minimum output needed to cover selected costs.

As with estimated output, use the best estimate of prices expected for the planning period. Prices depend on overall demand and supply and may vary considerably with changing conditions. Consequently, stay in close contact with marketing and management Extension and research specialists, Extension agents, local buyers, futures markets, published price reports, and outlook services (see Fact Sheet 544, "Marketing: Critical to Effective Farm Management"). Determine the price and then vary it above and below the selected price to determine the effect of various prices on net return. Break-even prices also can be calculated for selected levels of output for the enterprise.

Variable Costs

Variable costs depend on the level of output produced. They include items such as seed, fertilizer, lime, fuel, lubricants, chemicals for

weed, disease and insect control, purchased feed, veterinary services and medicine, repairs, and interest on variable capital. To simplify cost estimates, indicate the units, quantities, and prices associated with the individual expenses.

Some costs are easier to estimate than others, such as costs of seed, fertilizer, and chemicals, since you know exactly how much you need and the prevailing market prices of what you need. Other costs, including labor, repairs, and machinery operating costs, depend on the size and type of machine used and are more difficult to estimate. Good sources for this information are individual farm records and data from Extension agents, neighbors, and published reports from private and public sources.

Fixed Costs

Fixed costs are those costs incurred regardless of whether or not output is produced. Building and machinery fixed costs include depreciation, interest on average investment, some repairs, taxes, and insurance. These costs may be difficult to estimate for your enterprise since you have to allocate the overall fixed costs to various enterprises produced on the farm. Also, fixed costs depend on conditions associated with the fixed inputs: size, type, number, new or used machinery, field operations, and others.

Land is an important input and should be valued. If you own the land, charge an opportunity cost against the land since you cannot use the capital investment in an alternative endeavor.

Some producers, particularly those who own their farm, do not value the land as a cost item in constructing an enterprise budget. If you do not include the land as a cost item, you will overestimate your net return. See Fact Sheet 538, "Diagnosing Your Farm's Financial Health," for a more detailed discussion on analyzing the financial health of your farm business. Generally, you would multiply the land value by the cost of capital. For example, land valued at \$2,000 per acre multiplied by a 6 percent opportunity cost gives an estimated land cost of \$120 per acre. Use the method that most closely represents the actual land cost to the operator.

In general, and because land values in Maryland are inflated as a result of nonagricultural demand for land, multiplying the land value by the cost of capital will give a much higher estimate of value than if you were to use an agricultural rental value. For the past five years in Maryland, cropland rented for cash has had cash rent as a percent of value equal to 2.7, 3.3, 2.7, 2.0, and 1.8 for 1985 through 1989, respectively. These values represent cash rentals per acre that are closer to short-run opportunity costs than the land value times cost of capital. Therefore, if you are keeping the land in agriculture and not selling, use the rental rate as an estimate of the opportunity cost of capital invested in land.

Income Above Costs

Income above costs is the income remaining after covering the specified costs included in the budget. There are several incomes above costs that can be calculated. Two examples are *income above variable costs* and *income above variable and fixed costs*. Some publications list a net revenue figure without specifying which costs were subtracted from gross income. Always look behind the net figures to see what costs are included in the calculations.

The Crop Enterprise Budget

A corn enterprise budget illustrating the sections just discussed is shown in Table 1. It includes a column to insert information applicable to your farm.

Under "estimated yield," "inputs," and "prices" used in Table 1, an acre of corn will return \$137.34 above variable costs and \$47.34 above variable and fixed costs. These estimates represent only one set of conditions (yield, inputs, prices, others) that you, the producer, could face. Be as accurate as possible in making estimates about yields, inputs, and prices.

It is beneficial to calculate the income above variable and fixed costs for various yield and price situations. This is shown at the bottom of Table 1 for four yields (75, 100, 125, and 150 bushels per acre) and three corn prices (\$2.50, \$2.75, and \$3 per bushel). For low prices and yields, there is a negative net or a loss of \$99.37 above variable

and fixed costs. Conversely, at high yields and prices, there is a net of \$148.82 per acre. The first positive net above variable and fixed costs is at a yield of 100 bushels per acre and a price of \$3 per bushel.

Break-Even Yields and Prices

In many cases, you will want to calculate break-even yields and prices. Calculate the break-even yield by dividing total costs (variable plus fixed) by the expected output price. To calculate the break-even price, divide total costs (variable plus fixed) by expected yield. For example, in Table 1 the break-even yield for corn at \$2.75 per bushel is $\$296.41 \div \2.75 , or 107.8 bushels per acre. For \$2.50 and \$3 per bushel, the break-even yields is 118.6 and 98.8 bushels per acre, respectively. Compare these yield ranges to historical and expected yields to see if the analysis is reasonable for the farm.

You can also analyze break-even prices for their potential profitability. In Table 1 the break-even price for a 125-bushel yield is \$2.37 per bushel ($\$296.41 \div 125$). For 75-, 100-, and 150-bushel yields, the break-even price is \$3.95, \$2.96, and \$1.98 per bushel, respectively. These figures also represent the cost of production (variable plus fixed costs). The cost-of-production figure is always of interest since it represents the average cost of producing a bushel at the given output level.

In order to stay in business in the long run, you have to cover all costs as calculated above. In the short run, you can produce as long as variable costs are covered or if price per unit of output is above average variable cost. Consequently, break-even yield and price values based on variable costs become important. The break-even price when you consider variable costs in the example is $\$206.41 \div 125$, or \$1.65 per bushel. Therefore, if price per bushel is above \$1.65 per bushel, produce the corn in the short run. The break-even price can be calculated for the other yields assumed. Also, the break-even yield at a price of \$2.75 per bushel is 75.1 bushels.

Points to Remember

When estimating break-even yields and break-even prices, remember to:

- Use your own information in developing

the budget.

- Study the range in yields, prices, and break-even values.
- Form your own expectations about how likely the yields and prices will exceed variable or total costs for your planning period.

The Livestock Enterprise Budget

Table 2 illustrates gross income, variable costs, fixed costs, and income above selected costs per head for a beef cow-calf operation for one production period. The per head fixed costs are based on a 30-cow operation.

The livestock enterprise budget is similar in style to a crop budget but may be more difficult to estimate. In a livestock enterprise you may have multiple outputs, must consider herd replacement, and may use some home-produced feed.

Gross Income

The gross income in Table 2 is based on a 90-percent calving rate, an equal number of male (0.45) and female (0.45) calves, and a 15-percent herd replacement rate each year with raised replacement heifers. The prices are determined as for crops. With these assumptions, the sales involve 0.45 of a 475-pound steer calf at \$0.85 per pound, 0.30 (0.45 heifer calf minus 0.15 for replacement) of a 450-pound heifer calf at \$0.75 per pound, and 0.15 of a 1,100-pound cull cow at \$0.45 per pound. There is no receipt for a cull bull because it is purchased and no males are held back for replacement.

Variable Costs

Variable costs can include expenses for purchased and raised inputs used in the operation. Purchased items should reflect estimated cost and raised items should be valued at estimated market value. In this section, include prorated charges for repairs on fences, buildings, equipment, and power, as well as hired labor. Table 2 provides a listing of the associated variable costs for the livestock operation as well as the total variable costs of \$286.20 per head of livestock.

Table 1. Estimated gross income, variable costs, fixed costs, and income above selected costs per acre of corn per year

Item	Unit	Quantity	Price	Total	Your farm
Gross income					
Corn	Bushel	125	\$2.75	\$343.75	_____
Variable costs					
Seed	Thousand	22	0.90	19.80	_____
Fertilizer					
Nitrogen (N)	Pound	150	0.25	37.50	_____
Phosphorus (P)	Pound	75	0.25	18.75	_____
Potassium (K)	Pound	100	0.16	16.00	_____
Lime	Ton	0.5	24.00	12.00	_____
Crop chemicals					
Aatrex	Quart	1	2.25	2.25	_____
Lasso	Quart	1.5	5.50	8.25	_____
Furadan	Pound	8	1.50	12.00	_____
Fuel	Gallon	5	0.90	4.50	_____
Oil and lubricants (15 percent of fuel cost)	Acre		0.68		_____
Repairs (variable portion)	Acre	1	8.00	8.00	_____
Custom hire					
Harvest	Acre	1	22.00	22.00	_____
Haul	Bushel	125	0.10	12.50	_____
Dry	Bushel	125	0.08	10.00	_____
Hired labor	Hour	0	-	0.00	_____
Crop insurance	Acre	1	5.50	5.50	_____
Miscellaneous	Acre	1	5.00	5.00	_____
Interest on variable capital (6 months at 12 percent APR)				11.68	_____
Total variable cost				\$206.41	_____
Fixed costs					
Depreciation, interest on average investment, repairs, taxes, and insurance (based on 800 acres)				30.00	_____
Land charge				60.00	_____
Total fixed cost				\$ 90.00	_____
Total variable and fixed costs				\$296.41	_____
Income above variable cost				\$137.34	_____
Income above variable and fixed costs				\$ 47.34	_____

Income above variable and fixed costs for various yields per acre and prices per bushel

Yields	Prices		
	\$2.50	\$2.75	\$3.00
75	-99.37	-80.62	-61.87
100	-41.64	-16.64	8.36
125	16.09	47.34	78.59
150	73.82	111.32	148.82

Crop enterprise budget sheet

Item	Unit	Quantity	Price	Total for your farm
Gross income				
Corn	Bushel	_____	_____	_____
Variable costs				
Seed	Thousand	_____	_____	_____
Fertilizer				
Nitrogen (N)	Pound	_____	_____	_____
Phosphorus (P)	Pound	_____	_____	_____
Potassium (K)	Pound	_____	_____	_____
Lime	Ton	_____	_____	_____
Crop chemicals				
Aatrex	Quart	_____	_____	_____
Lasso	Quart	_____	_____	_____
Furadan	Pound	_____	_____	_____
Fuel	Gallon	_____	_____	_____
Oil and lubricants (15 per cent of fuel cost)	Acre	_____	_____	_____
Repairs (variable portion)	Acre	_____	_____	_____
Custom hire				
Harvest	Acre	_____	_____	_____
Haul	Bushel	_____	_____	_____
Dry	Bushel	_____	_____	_____
Hired labor	Hour	_____	_____	_____
Crop insurance	Acre	_____	_____	_____
Miscellaneous	Acre	_____	_____	_____
Interest on variable capital				_____
	Total variable cost			_____
Fixed costs				
Depreciation, interest on average investment, repairs, taxes and insurance				_____
Land charge				
	Total fixed cost			_____
Total variable and fixed costs				_____
Income above variable cost				_____
Income above variable and fixed costs				_____

Income above variable and fixed costs for various yields per acre and prices per bushel

Yields	Prices		
	\$ _____	\$ _____	\$ _____
_____	\$ _____	\$ _____	\$ _____
_____	\$ _____	\$ _____	\$ _____
_____	\$ _____	\$ _____	\$ _____
_____	\$ _____	\$ _____	\$ _____

Table 2. Income, variable costs, fixed costs, and income above selected costs per head for cow-calf beef operation for one production period^a

Item	Unit	Quantity	Price	Total	Your farm
Gross income					
Steer calf .45 head @ 475	Pounds	213.75	\$0.85	\$181.69	_____
Heifer calf .30 head @ 450	Pounds	135	0.75	101.25	_____
Cull cow .15 head @ 1,100	Pounds	165	0.45	74.25	_____
Total				\$357.19	_____
Variable costs					
Corn grain	Bushel	4	2.75	11.00	_____
Hay	Ton	2	90.00	180.00	_____
Salt and minerals	Pounds	60	0.10	6.00	_____
Pasture maintenance	Acre	2.5	10.00	25.00	_____
Veterinary service and medicine	Head	1	15.00	15.00	_____
Marketing and hauling	Head	1	10.00	10.00	_____
Machine fuel, repair, others	Head	1	5.00	5.00	_____
Building and fence repair	Head	1	3.00	3.00	_____
Hired labor	Hour	0	--	0.00	_____
Miscellaneous	Head	1	15.00	15.00	_____
Interest on variable capital (6 months at 12 percent APR)				16.20	_____
Total variable cost				\$286.20	_____
Fixed costs					
Land charge (pasture)	Acre	2.5	20.00	50.00	_____
Depreciation					
Bull	Head	1	3.33	3.33	_____
Buildings, fences, and machinery	Head	1	12.50	12.50	_____
Interest					
Livestock	Head	1	42.00	42.00	_____
Buildings, fences, and machinery	Head	1	7.50	7.50	_____
Repairs, taxes, and insurance	Head	1	5.50	5.50	_____
Total fixed cost				\$120.83	_____
Total variable and fixed costs				\$407.03	_____
Income above variable cost				\$ 70.99	_____
Income above variable and fixed costs				\$-49.84	_____

^a Based on a 90-percent calf crop and a 15-percent herd replacement rate with raised replacement heifers. Fixed costs are based on a 30-cow operation.

Livestock enterprise budget sheet

Item	Unit	Quantity	Price	Your farm
Gross income				
Steer calf	Pounds	_____	_____	_____
Heifer calf	Pounds	_____	_____	_____
Cull cow	Pounds	_____	_____	_____
Total		_____	_____	_____
Variable costs				
Corn grain	Bushel	_____	_____	_____
Hay	Ton	_____	_____	_____
Salt and minerals	Pounds	_____	_____	_____
Pasture maintenance	Acre	_____	_____	_____
Veterinary service and medicine	Head	_____	_____	_____
Marketing and hauling	Head	_____	_____	_____
Machine fuel, repair, others	Head	_____	_____	_____
Building and fence repair	Head	_____	_____	_____
Hired labor	Hour	_____	_____	_____
Miscellaneous	Head	_____	_____	_____
Interest on variable capital (6 months at 12 percent APR)				_____
Total variable cost				_____
Fixed costs				
Land charge (pasture)	Acre	_____	_____	_____
Depreciation		_____	_____	_____
Bull	Head	_____	_____	_____
Buildings, fences, and machinery	Head	_____	_____	_____
Interest				
Livestock	Head	_____	_____	_____
Buildings, fences, and machinery	Head	_____	_____	_____
Repairs, taxes, and insurance	Head	_____	_____	_____
Total fixed cost				_____
Total variable and fixed costs				_____
Income above variable cost				_____
Income above variable and fixed costs				_____

Fixed Costs

Fixed costs associated with your enterprise should include a land charge, depreciation, interest, certain repairs, taxes, and insurance as appropriate for the operation. The prorated fixed costs are based on a 30-cow farming operation. The depreciation for the purchased bull represents a prorated cost of the bull over its useful life. Depreciate replacement cows, also, if they were purchased. If you purchase replacement female animals, all born heifers would be sold as were true for the steer calves. Be consistent in the handling of herd replacements. Interest on livestock investment can be high because of the high capital investment in cows and the bull. Include taxes and insurance; they can be taken from farm records. Table 2 shows a fixed cost of \$120.83 per head of livestock.

Income Above Selected Costs

The income above variable costs amounts to \$70.99 per head. However, there is a \$49.84 negative income above variable and fixed costs. As with crops, you must cover all costs to stay in business in the long run. In the

short run, produce as long as variable costs are covered. This can allow you time to make changes in the operation to improve the long-term profitability of your business.

What about calculating break-even prices for the livestock operation? If there are multiple outputs as above, calculating these is more difficult than calculating for a single output enterprise like corn. It can be done, but it may require some trial-and-error calculations. You can obtain different break-even prices by varying the relationship between prices of steers, heifers, and cull cows.

As for the corn enterprise, enter your numbers in the "Your farm" column and see how you come out relative to a net income per animal.

For More Information

Enterprise budgets for different crop and livestock activities produced on Maryland farms are available from your local Extension office. You may find these budgets helpful as you plan changes in your operation or when you want to compare your farm numbers to cost and return figures of other operations.

Enterprise Budgets in Farm Management

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