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Using Enterprise Budgets To Make Decisions about Your Farm

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Farming West of the Cascades

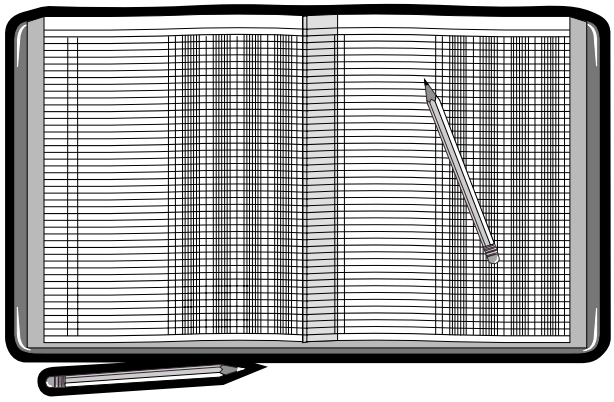
Enterprise budgets are important decision making tools. They can help individual producers determine the most profitable crops to grow, develop marketing strategies, obtain financing necessary to implement production plans, and make other farm business decisions.

The purpose of this publication is to describe how to develop and use an enterprise budget. The information herein defines the enterprise budget, outlines basic cost concepts, and presents a sample budget to illustrate the concepts. Instructions for adjusting costs in published budgets, doing a break-even analysis, and making decisions with enterprise budgets are also explained.

Enterprise Budgets and Related Concepts

An enterprise budget is a physical and financial plan for raising and selling a particular crop or livestock commodity. It is a physical plan because it indicates the type and quantity of production inputs and the output, or yield, per unit. It is also a financial plan, because it assigns costs to all the inputs used in producing the commodity.

Budgets are calculated in units of one acre to facilitate budgeting for different enterprise sizes and to simplify calculations. For planning purposes, costs are divided into **variable, fixed,** and **joint costs**. The following section



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describes these costs and related enterprise budget concepts.

Variable Costs

Variable costs are the out-of-pocket costs for inputs such as seed, fertilizer, fuel, and repairs; they are always included in a budget. Variable costs change directly with business volume (e.g., number of acres planted, number of animals or plants raised).

Fixed Costs

Fixed costs are the costs associated with building and equipment investment; they are prorated over a number of years. Fixed costs occur regardless of the crops or livestock produced or the volume of production in a given year. For instance, ownership costs are fixed costs that include interest, hazard insurance, property taxes, housing, and depreciation. Depreciation is the decrease in an asset's value due to wear, obsolescence, or deterioration.

Annual depreciation is calculated by subtracting the salvage value (the value remaining at the end of the depreciation period) from the initial investment and dividing by the number of years of useful life. For example, if you invested $5,000 in a piece of machinery with a useful life of 10 years, assuming a salvage value of $500, the machinery would have an annual depreciation of $450:

$5,000	–	$500	=	$4,500
investment	–	*salvage value*	=	*total depreciation*

$4,500	÷	10 years	=	$450/year
total depreciation	÷	*years of useful life*	=	*annual depreciation*

If this piece of machinery were used over 10 acres, the per-acre-depreciation would be $45 per acre:

$450	÷	10 acres	=	$45/acre
annual depreciation	÷	*area in acres*	=	*per-acre depreciation*

This depreciation is the straight-line method and is suitable for developing budgets. Other depreciation methods may be more appropriate for tax management.

Interest is another major component of annual ownership costs; it is calculated by determining the average investment and multiplying by an appropriate rate of interest. The average investment is simply the initial investment plus an estimated salvage value, divided by 2. The annual interest for a $5,000 investment with a $500 salvage value at 10 percent interest would be $275:

($5,000	+	$500)	÷	2	x	0.10	=	$275
(investment	+	*salvage value)*	÷	*2*	x	*interest*	=	*annual interest*

Using the 10-acre example, the per-acre interest component of the annual ownership costs would be $27.50:

$275	÷	10 acres	=	$27.50/acre
annual interest	÷	*area in acres*	=	*per-acre interest*

Interest is an ownership charge, whether or not debt-financing is used. If equipment is not debt-financed, there is still an opportunity cost associated with having the money tied up in machinery. In other words, the money could be earning interest elsewhere if it were not invested in machinery or equipment. If machinery is debt-financed, interest is a cash expense rather than an opportunity cost.

Joint Costs

A *joint cost*, usually a fixed cost, is common to more than one crop or enterprise. Examples include depreciation for equipment used on more than one crop or property taxes that cannot be assigned to an individual enterprise.

Total Costs

Total costs are the summations of fixed, variable, and joint costs. It is sometimes difficult to allocate joint costs to an individual enterprise and determine total costs for a particular crop or product. In these cases, estimates for allocating costs need to be made; the point is to account for all costs.

A Hypothetical Budget

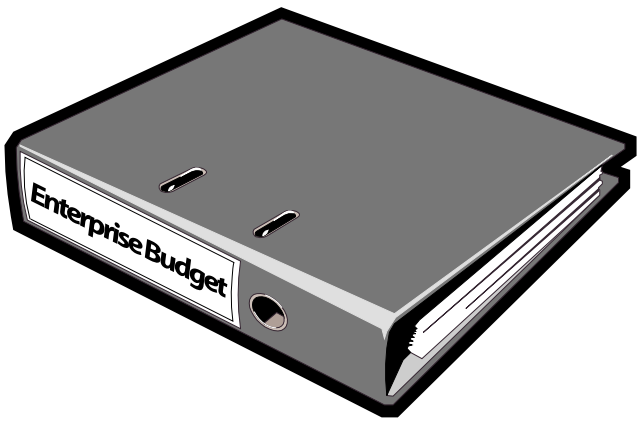
To illustrate the concepts of fixed and variable costs, I have developed a hypothetical budget for a crop I'll call "tribbles." Tribbles is an annual vegetable crop especially suited for Washington's climate—a highly nutritious vegetable that yields about 3,000 pounds per acre. Table 1 presents the production costs for tribbles.

Variable Costs for Tribbles

Typical out-of-pocket, or variable, costs include fertilizer, seed, compost, hired labor, and tractor fuel and oil. To facilitate budget revisions for when you adopt published budgets to your situation, both price and quantity are included for each input.

Notice that interest on operating capital is included under variable costs. It is included as a cost even if all operating costs are financed by the grower for the same reason that interest on machinery investments is included as a fixed cost—because of opportunity cost. If the money was not tied up in machinery or crop production costs, it could be earning interest in the bank or elsewhere.

In calculating interest on operating capital, all preharvest cash costs are totaled, multiplied by the fraction of a year they are outstanding, and multiplied by the cost of money. For example, if the period between planting and harvest was six months, cash production costs would be tied up in the crop for 6/12, or 1/2, of the year. Multiplying the preharvest variable costs by 1/2 and then multiplying that amount by the cost of money (interest rate) would yield the charge for interest on operating capital.



Fixed Costs for Tribbles

Fixed costs in the budget include interest and depreciation on machinery, equipment, and utility costs used to produce tribbles. To simplify our discussion, the tribbles' budget assumes that the entire farm is devoted to tribbles production. In practice, one farm usually produces several commodities with the same set of machinery, and budget construction requires an allocation of machinery use to each crop.

Land rent, or land charge, can be calculated in a number of ways. In this budget, an interest charge is assigned to the approximate market value of the land. With a $4,000 market value for the land and an 8 percent interest rate, the land charge would be $320 for each acre of tribbles produced:

$4,000	x	0.08	=	$320
market value of land	x	*interest rate*	=	*land charge*

A refinement to the land charge estimate would be estimated market value less sale costs and any capital gains tax due. The resulting amount would be the residual amount that could be earning interest if the land was sold.

If you are a part-time farmer who has no alternative uses for owned land, it may not be appropriate to assign a land charge to an enterprise. However, if you want an estimate of the total costs of production, a land charge is necessary.

Adjusting Costs in Published Budgets

Why use a hypothetical budget to talk about production costs? The primary reason is to focus on concepts that apply to all crop and livestock production. Washington State University Cooperative Extension has developed a number of budgets for fruit, vegetable, grain, and livestock production. Some producers choose to start with these published budgets and adjust them for their own enterprises.

Please remember, budgets are only as good as their assumptions. With the geographical differences and the wide variation in possible cultural and manage-

ment practices, it is very important to adjust published budgets to make them relevant for individual farm decisions. For this purpose, all WSU budgets have a space for individual farm adjustments.

Assume for a moment you need to decide whether or not to produce tribbles and you have obtained a budget from your county extension office. Is this tribbles' budget appropriate for your farm? Start with the variable costs in Table 1. As you go down the list, notice that both units and the price per unit are specified for each item. Can you buy nitrogen for 18¢ per pound? If not, how much can you buy it for? Enter that amount in the last column. Line by line, the variable costs are relatively easy to evaluate for appropriateness.

The largest variable cost for tribbles' production is preharvest labor. Thirty hours per acre are required, and labor is priced at $7.50 per hour. If you're unfamiliar with tribbles' production, you may have no basis for changing labor hours, but the wage rate can be evaluated. Is unskilled harvest labor available for $7.50 per hour? If family labor is available, the $225 labor charge could be an opportunity to retain some production costs within the family unit. It also might mean that family payments could be deferred until after harvest, reducing cash flow problems.

Fixed costs are a little more difficult to evaluate from the information in the tribbles' budget (Table 1). Interest and depreciation for machinery and equipment are listed. However, the equipment complement and the replacement cost for each item are not included. The number of acres over which the machinery is used is also unknown. Is it used only for tribble production, or is it also used to produce other commodities? These assumptions, usually supplied with the budget in a narrative, need to be analyzed to determine whether machinery costs are appropriate and whether you will need to invest more in machinery.

Break-even Analysis

A break-even analysis identifies the price or production level necessary to cover all identified costs. If you already own all the machinery and equipment, and if you have decision making authority over the land, what budget information will help you determine whether or not to raise tribbles?

What if tribbles could be sold for 80¢ per pound and the average yield of an established producer was 3,000 pounds per acre (Table 1)? Notice that the break-even price to cover variable costs is 38¢ per pound. This value results from dividing total variable costs, $1,155, by 3,000 pounds. The difference between 38¢ and the market price of 80¢, or 42¢, is money available to cover fixed costs and provide a return to management and unpaid family labor. Notice that the break-even price to cover total costs is 54¢ per pound; again, this value is calculated by dividing total costs by production units per acre:

$1,613	x	3,000 pounds per acre	=	54¢/lb/acre
total costs	x	*yield per acre*	=	*break-even point for total costs*

The difference between total costs and total revenue (production units multiplied by market price) is net profit. Net profit is the return for risk and management. In our example, total costs per pound are 54¢ and total revenue is 80¢; the difference, 26¢, is the net profit per pound.

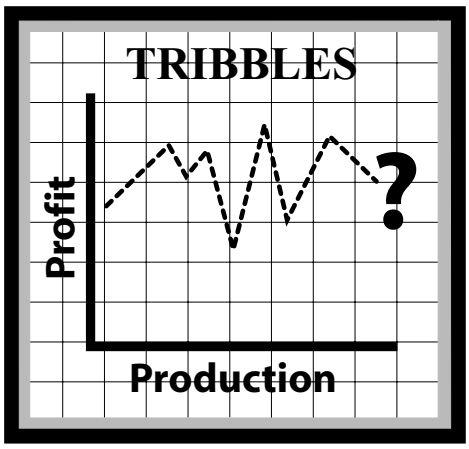
Decision Making with Enterprise Budgets

Enterprise budgets can be used as decision making aids. What would you do if, at harvest, the highest price you could receive for your tribbles crop was 35¢ per pound? Would you plow down the crop, or would you harvest it? In order to make the best decision, you need to evaluate the appropriate costs. The rule is, if expected returns exceed additional variable costs, proceed with production (harvest, in this case). All fixed costs may not be covered, but as long as variable costs are more than covered, some contribution toward fixed costs will result.

At harvest, all production costs committed up to that point are fixed. The seed, compost, and the preharvest labor have become just as fixed as land rent and machin-

ery ownership costs. The relevant costs at this point are the variable costs of harvesting. By dividing the estimated hand-labor harvest plus container costs by 3,000 pounds, you calculate the harvest cost at approximately 6¢ per pound. When comparing this value with the crop price of 35¢ per pound, you decide you will be better off by 29¢ per pound if you harvest. Even though this 35¢ price will not cover even the variable costs, it does cover the additional harvest costs and contributes something toward what has already been spent.

Enterprise budgets can also be used to support other decisions. Selecting the most profitable crop mix is one such use. You can use variable production costs and market prices to array crop alternatives in order of their contributions to overhead or contribution toward covering fixed costs. The process is called gross margins analysis. Another use for budget information is developing market strategies. Budget information is necessary to establish market prices that will cover all production costs plus provide a return to management and capital (profit). Lenders also rely on enterprise budgets to evaluate the relative credit worthiness of various enterprises. For more information on farm records, an important source of budget information, please see another Farming West of the Cascades publication, *Farm Business Records: An Introduction.*



Additional Resources

Castle, E.N., Becker, M.H., Nelson, A.G. Farm business management: The decision making process. Third Edition, Macmillan Publishers, 1987.

Plan for Profit, Tip #7. SARE Farming for profit, stewardship, and community. http://www.sare.org/san/tipsheet/tipt.htm

Total resource budgeting of LISA (SARE) farm enterprises contact panel. Patterson, Paul, University of Idaho, 1776 Science Center Drive, Idaho Falls, ID 83402. 208-629-8376.

WSDA Farm Management: How to achieve your farm business goals. 1989 Year Book of Agriculture.

Table 1. Enterprise Budget for Tribbles

Item	Unit	Price or Cost Per Unit ($)	Quantity	Value or Cost ($)	Your Farm
Variable Costs					
Bacillus thuringensis	lb	0.75	13.33	10.00	
Compost	yd	12.00	15	180.00	
Containers	ea	2.00	50	100.00	
Custom hire (tilling, compost spreading)	acre	350.00	10	350.00	
Fuel and lubrication	acre	25.00	1.0	25.00	
Harvest labor	hr	7.50	10	75.00	
Insecticidal soap	qt	13.00	3	39.00	
Interest on operating capital	$	10%	550.00*	55.00	
Lime	ton	120.00	0.5	60.00	
Pre- harvest hand labor	hr	7.50	30	225.00	
Seed	lb	18.00	2	36.00	
Total Variable Costs				**1,155.00**	
Break-even variable cost				0.38	
* Total variable costs ÷ 2 at 10% (assumed costs outstanding for 6 months)					
Fixed Costs					
Equipment interest and depreciation	acre	20.00	1.0	20.00	
Land rent	acre	320.00	1.0	320.00	
Machinery interest and depreciation	acre	25.00	1.0	18.00	
Utilities	acre	1.00	1.0	100.00	
Total Fixed Costs				**458.00**	
Break-even total cost				0.54	
Total Cost				1,613.00	

Notes/Calculations

About the Author

Richard Carkner, Ph.D., is an agricultural economist at WSU-Puyallup. He specializes in farm management and applied research on the economic dimensions of agricultural industries. He is interested in alternative agriculture methods, practices and profitability, and the food system models that directly connect consumers and farmers.

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