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Budgeting — A Management Tool

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Low prices, declining asset values and increasing costs of operation have combined to cause severe financial stress for many farmers. Their survival may depend on their decisions relating to what, how much and when to change elements of their current farming operation.

A primary function of the farm operator is to predict the likely outcome of a projected change in the farming operation. These predictions must be as realistic and as accurate as possible. Budgeting is a proven method to select, assemble and interpret information needed to plan changes and to evaluate the consequences of change. The development and use of budgets as a management tool will enhance decisions regarding changes and adjustments that are required in today's agricultural industry.

Budgeting enables the operator to measure performance against predetermined standards in order to discover and remedy differences. The budget itself becomes the predetermined standard in the budgeting process. The budget, then, is an estimate of what you think will happen. How close the budget comes to what actually happens depends upon accuracy of estimated yields, estimated prices, estimated use of inputs and estimated costs of these inputs.

Budgeting is **forward planning**. That is, a budget is a quantitative statement of what, where, when and how you expect to do in your operation during the period covered by the budget. This period is usually the operating cycle of your operation.

Budgeting is also a **control tool**. The budget serves as the criteria against which you measure your performance. As a control tool, the budget can help you answer such questions as: Was my estimate of labor use and cost accurate? Were my machinery costs in line with my estimate, and if not, what was the reason? Did the rate of fertilizer applied result in the anticipated yield?

A farm operator can choose from a number of types of budgets. This publication discusses three types: The Whole Farm Budget, The Enterprise Budget and The Partial Budget.

The Whole Farm Budget

The whole farm budget is a complete financial budget for the total farm, and it is prepared only after a whole farm plan has been decided upon. Two or more whole farm budgets may be prepared to help determine the probable outcomes of different farm plans. Preparing a whole farm budget is a fairly extensive task, however, so it is often more practical to prepare one budget and then adjust it with the use of partial budgets.

Whole farm budgeting is not needed every year but is advisable every few years for review, or when major changes in the operation are anticipated. Farmers or ranchers who are experiencing wide fluctuations in income or financial difficulties should benefit from a thorough whole farm budget and analysis. The whole farm budget helps the farm or ranch operator:

1. Analyze net income potential, debt repayment capacity and overall values of the farm or ranch. This could also be useful to a lender or a potential buyer.
2. Determine whether he/she is economically better off in farming than in some other occupation.
3. Analyze the economic effect of changing the farm organization, enterprises or farm practices.

Information needed to construct a whole farm plan and budget includes:

1. Established goals and a complete inventory of resources available to the operator. This includes a description of the land, buildings, permanent improvements, machinery, livestock, labor, supplies, feed, management and financial resources available. A complete depreci-

ation schedule should be available for depreciable assets including cost, expected life, annual depreciation and present value.

2. Historical records of yields and performance of the farm and, if available, of similar farms in the area.
3. Enterprise budgets for existing or contemplated enterprises.
4. Balance sheets (financial statements) for recent years.
5. Profit and loss (income statements) for recent years, if available.
6. Price and cost estimates for the next 3 to 5 years.
7. A summary of current government programs and land restrictions applicable to this farm or ranch.

A whole farm budget gives a summary of expected income, expenses and net return or profit for a given farm plan. A whole farm budget can be as complex and detailed as the preparer chooses to make it. Essential components of a usable budget include estimates of:

1. Total farm income.
2. Total variable operating expenses.
3. Total fixed expenses (property tax, insurance, interest on intermediate and long-term debt, depreciation, etc.).
4. Net farm income.

Cash flow projection for at least 1 year ahead would be useful to assess future credit needs for the farm. Cash flow projections are also important from a lender's standpoint. Most loan applications require cash flow projections.

The components of the whole farm budget mentioned here are not exhaustive. Depending upon the type of farming operation, additional items may be needed. The critical point is that all aspects of the entire farming operation should be incorporated into the complete plan. For example, if the planning unit (the family) regularly has off-farm employment or an

off-farm investment, this should be included in the whole farm budget since it affects the availability and use of resources that have alternate uses.

The Enterprise Budget

Regardless of the type of planning or the techniques of budgeting to be used, the enterprise budget is the base for developing the plan. An enterprise budget is an estimation of all variable and fixed costs for a single enterprise. It is a budget developed to estimate per acre, per head or per unit costs of production. Basic uses of an enterprise budget include:

1. Comparing product specific alternatives, i.e., wheat vs. barley vs. lentils.
2. Providing the basic data required to develop other types of budgets, i.e., whole farm, partial and cash flow budgets.
3. Providing the basic data required in the use of various analytical techniques such as long-range financial analysis, capital planning and linear programming models designed to find the optimum or best combination of enterprises to meet specific objectives and constraints of an individual farm or ranch operation.

A critical element in the development of enterprise budgets is the classification of costs into variable costs and fixed costs. This classification is critical because decisions regarding production may be based on variable costs alone or together with fixed costs, depending on whether the time period involved is short run or long run.

1. **Short Run** — The short run is a period in which not all resources can be adjusted. For example, you have land and certain equipment which cannot be changed. You will incur the costs of ownership whether or not you use these resources.
2. **Long Run** — The long run is a period in which all resources can be adjusted. You have time to sell the land and equipment or buy additional land and equipment.
3. **Variable Costs** — Variable costs are costs that can be varied during the production process, resulting from changes in the level of production as the use of variable inputs change. Examples of variable costs in the short run are the costs of seed, fertilizer, pesticides, herbicides, fuel, hired labor and certain repairs.
4. **Fixed Costs** — Fixed costs are costs incurred for fixed inputs that remain constant during the short run. These costs are incurred whether or not the fixed inputs are used in the production process. Examples of fixed costs are insurance,

taxes, interest, depreciation, interest on owner equity, certain repairs and long-term cash or fixed leases.

Short-run decisions may be made considering only variable costs. You have already incurred your fixed costs whether production takes place or not. In the short run, the only decision that is relevant is whether or not you can cover the variable costs associated with entering the production process, or with varying the level of inputs into the production process.

Long-run decisions should be made considering all costs. In the long run you have to cover all costs associated with a production process if you are to survive. Decisions over the long run must consider complete flexibility in the use, or non-use, of all input factors, including land and equipment.

Fig. 1, a budget for soft white winter wheat in northern Idaho for 1985, is an example of an enterprise budget.

The first column shows the basic items included in the budget — gross receipts, variable inputs (separated into preharvest and harvest inputs), fixed cost items and net returns. The second column identifies unit of measure; the third column lists price or cost per unit; the fourth column identifies quantity produced or the quantity of input used per acre; the fifth column shows the total value of production or cost of inputs used per acre. For example, under variable costs (preharvest), anhydrous ammonia is used at the rate of 80 pounds per acre. Unit cost is 19 cents per pound, and total cost is \$15.20 per acre.

In this budget, using \$3.30 per bushel price and a yield of 65 bushels per acre, gross receipts are \$214.50. Variable costs amount to \$108.60 per acre (\$89.44 preharvest plus \$19.16 harvest), so receipts are \$105.90 above variable costs. Fixed costs are \$120.18 per acre, resulting in total costs per acre of \$228.78 and a net loss of \$14.28 per acre.

The importance of using variable and fixed costs in decision-making can be illustrated by looking at harvest costs. In the example budget, the variable harvest cost is estimated to be \$19.16 per acre. This includes fuel, lube, variable repairs and labor costs required to harvest the crop. Let's assume the portion of fixed costs associated with the harvesting operation is \$15 per acre. Thus, the total cost of the harvesting operation is \$34.16.

Suppose a neighbor offered to combine your crop, when you want it harvested, for \$25 per acre. Would you harvest yourself or would you accept your neighbor's offer? You should decide to harvest your own crop

unless you need a new combine. You would only consider variable cost since this is a short-run decision. Out-of-pocket expense amounts to \$19.16 per acre if you harvest yourself, compared to \$25 if your neighbor harvests.

A long-run decision occurs, however, if your neighbor offers the same arrangement during the winter for next year's crop, and you have an opportunity to sell your harvesting equipment. In this case, you must consider both fixed and variable costs. Thus, your total cost of harvesting, including both fixed and variable costs, amounts to \$34.16 per acre, while your neighbor will charge \$25 per acre. You will save \$9.16 per acre harvesting costs by selling your equipment (not incurring the \$15 fixed cost per acre) and having your neighbor harvest the crop for you. This, of course, assumes that other considerations such as timeliness of harvest are favorable.

Another important reason for computing fixed and variable costs in the enterprise budget is that the availability of these costs facilitates breakeven analysis.

Breakeven analysis allows you to calculate the volume or level of production, or the price required, which will result in total revenue (price times quantity produced) and total costs (total fixed costs plus total variable costs) being exactly equal. In other words, this is the point where you break even. The following are formulas that can be used to calculate (1) the quantity required to break even and (2) the price required to break even. To illustrate the use of these formulas, let's again use data from the winter wheat crop enterprise budget.

1. Quantity required to break even:

$$Q_{BEP} = \frac{TFC}{P - V}$$

Where:

Q_{BEP} = Bushels per acre at breakeven point

TFC = Total fixed costs

P = Price per bushel

V = Variable cost per bushel

Illustration:

$$Q_{BEP} = \frac{TFC}{P - V} = \frac{\$120.18}{\$3.30 - \$1.67} = 73.7 \text{ bushels}$$

Where:

TFC = \$120.18

P = \$ 3.30

V = $\frac{\$108.60}{65} = \1.67

In this situation, yield must be 73.7 bushels per acre for total revenue to equal total costs, i.e., the breakeven point.

Fig. 1. Example of an enterprise budget.

District 1

MS 76-15

Crop Enterprise Budgets — 1985

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Winter Wheat - Soft White Northern Idaho

BUDGET ID # -- 71 102000 303 1
ANNUAL CAPITAL MONTH 8

	UNIT	PRICE OR COST/UNIT	QUANTITY	VALUE OR COST	YOUR VALUE
1. GROSS RECEIPTS FROM PRODUCTION				\$	
WIN.WHEAT-SW.	BU.	3.30	65.00	214.50	_____
TOTAL				\$ 214.50	_____
2. VARIABLE COSTS				\$	
PREHARVEST					
ANHYDROUS AMMON.	LB.	0.19	80.00	15.20	_____
16-20-0	LB.	0.11	200.00	22.00	_____
FERT. SPREADER	ACRE	1.25	1.00	1.25	_____
S. WHEAT SEED	LB.	0.11	75.00	8.25	_____
KARMEX	LB.	5.19	1.00	5.19	_____
2-4-D AMINE	QT.	4.82	1.00	4.82	_____
AIR SPRAY	ACRE	4.50	1.00	4.50	_____
SPRAYER	ACRE	1.25	1.00	1.25	_____
MACHINERY	ACRE	9.52	1.00	9.52	_____
TRACTORS	ACRE	3.94	1.00	3.94	_____
LABOR(TRACTOR & MACHINERY)	HOURL	5.50	1.03	5.68	_____
INTEREST ON OP. CAP.	DOL.	0.13	60.28	7.84	_____
SUBTOTAL, PRE-HARVEST				\$ 89.44	_____
HARVEST COSTS				\$	
MACHINERY	ACRE	13.66	1.00	13.66	_____
LABOR(TRACTOR & MACHINERY)	HOURL	5.50	1.00	5.50	_____
SUBTOTAL, HARVEST				\$ 19.16	_____
TOTAL VARIABLE COST				\$ 108.60	_____
3. INCOME ABOVE VARIABLE COSTS				\$ 105.90	_____
4. FIXED COSTS				\$	
MACHINERY	ACRE	50.16	1.00	50.16	_____
TRACTORS	ACRE	10.07	1.00	10.07	_____
LAND (NET RENT)	ACRE	55.79	1.00	55.79	_____
OVERHEAD	ACRE	4.17	1.00	4.17	_____
TOTAL FIXED COSTS				\$ 120.18	_____
5. TOTAL COSTS				\$ 228.78	_____
6. NET RETURNS TO RISK				\$ -14.28	_____

LAND CHARGE-1/3 COST SHARE

BREAKEVEN PRICES

IF 65.00 BU. WIN.WHEAT-SW. ARE PRODUCED:

TO COVER PREHARVEST VARIABLE INPUTS	1.376
TO COVER HARVEST VARIABLE INPUTS	0.295
TO COVER FIXED INPUTS	1.849
TO COVER ALL COSTS EXCEPT RISK	3.520

2. Price required to break even:

$$P_{BEP} = \frac{TFC + TVC}{Q}$$

Where:

Q = Bushels per acre
TFC = Total fixed costs
TVC = Total variable costs
 P_{BEP} = Price per bushel at breakeven point

Illustration:

$$P_{BEP} = \frac{TFC + TVC}{Q} = \frac{\$120.18 + \$108.60}{65} = \$3.52$$

Where:

TFC = \$120.18
TVC = \$108.60
Q = 65 bushels

In this situation, price must be \$3.52 per bushel for total revenue to equal total costs, i.e., the breakeven point.

Breakeven analysis can be a very useful tool in the decision-making process. However, it should only be used as a guide, not as a substitute for judgment, logical thinking or common sense. Further, to be effective, the cost estimates used in breakeven analysis must be realistic.

The Partial Budget

A partial budget, like any other type of budget, is simply a means by which necessary facts may be selected, assembled and interpreted to provide better guides to decision-making. With partial budgeting, only the expenses and receipts that would change as a result of the action being evaluated are considered. Partial budgeting is an effective way to compare costs and returns for any two alternative courses of action. For example, partial budgeting can be used to:

1. Weigh the advisability of replacing hand labor with a labor-saving machine.
2. Analyze the merits of substituting a new livestock program or crop for an existing enterprise.
3. Consider the merits of purchasing a new machine to replace an old one.
4. Consider the effect on net farm income of expanding an existing enterprise.

5. Determine the wisdom of hiring a custom operation, rather than purchasing equipment to do the job.
6. Arrive at the feasibility of making capital improvements.
7. Determine the best plan to follow in government programs that have more than one alternative.

In general, a simple partial budget is constructed as follows:

I. Income Increasing Changes

Added returns	\$ _____
Reduced costs	\$ _____
Total	\$ _____

II. Income Reducing Changes

Added costs	\$ _____
Reduced returns	\$ _____
Total	\$ _____

III. Estimated Change in Net Farm Income

$$I \text{ minus } II = \$ \text{_____}$$

Example:

You have been hiring custom combining for 500 acres of wheat at \$20 per acre. You can rent a self-propelled combine for \$15 per acre but you will need to furnish your own fuel, oil and grease. You estimate these items will amount to \$1 per acre.

Assume your labor to be worth \$5.00 per hour because of other uses at this time with .2 hour of labor needed per acre. Further, you feel that you will be able to get an additional \$4 worth of wheat per acre by operating the machine yourself rather than hiring the job done.

What is the estimated effect on net farm income if you change from custom hiring to renting?

I. Income Increasing Changes

Added returns:	
Improved harvesting (500 acre × \$4)	\$ 2,000
Reduced costs:	
Custom hire (500 acres × \$20)	\$10,000
Total	\$12,000

II. Income Reducing Changes

Added costs:

Rent combine (500 acres × \$15)	\$ 7,500
Fuel, oil, grease (500 acres × \$1)	500
Labor (500 acres × .2 hr. × \$5)	500

Reduced returns:

None	0
Total	\$ 8,500

III. Estimated Change in Net Farm Income

$$\$12,000 \text{ minus } \$8,500 = + \$ 3,500$$

In this example, the change from custom hiring to renting is estimated to result in an increase of \$3,500 in net farm income.

Summary

Budgeting is a management tool that can help farmers and ranchers in their decision-making process as they evaluate both short-run and long-run adjustments in their operations. The determination of fixed and variable costs during the budgeting process is critical to the effective use of budgets. It is particularly critical for use of breakeven analysis.

Many types of budgets may be used to guide management decisions and future planning. A budgeting analysis can encompass the entire farming operation or budgeting can be done on only a small portion of the operation such as a single enterprise. The important point to remember is that budgeting is a technique for testing proposed operational adjustments before putting them into actual operation.

Early detection of problems and early recognition of an opportunity to make an adjustment in the operation is equal to half the solution. Heading off trouble early with an economically feasible adjustment can make the difference between financial growth and stagnation, or even failure. Budgeting can assist in the determination of the economically feasible adjustment.

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