EXTENSION

Using Enterprise Budgets in Farm Financial Planning

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Enterprise budgets project costs and returns for an activity such as raising livestock, producing grain or growing vegetables for a production period. Each budget specifies a system of production, inputs required and the annual sequence of operations, as well as summarizes the costs and returns associated with the process. Most budgets are based on one year. For enterprises where production spans more than one year (for example, pecans or cow-calf), a budget generally includes income and expenses for a representative one-year period. Reviewing budgets for a specific geographic area may bring attention to certain production cost items described in more detail on page 2 of this publication.

Interpretation of the enterprise budget requires an understanding of both economic and production concepts because it incorporates information about specific resources, management practices and technology used in production. For instance, separate enterprise budgets may be specified for different calving seasons and feeding systems in cow-calf operations.

Managers can use enterprise budgets to evaluate options before resources are committed, estimate the amount of rent that can be paid for land or machinery, determine breakeven yields or prices and calculate potential returns on an investment. In addition, these budgets can be used to determine the cost of production for different products or processes (such as raising stockers or replacement females) to help identify which production activities contribute the highest returns to owned and/or controlled resources. Also, Enterprise budgets provide critical input for whole farm planning, including the potential income for a particular farm, the size of farm needed to earn a potential return and anticipated cash flows during the year. Additional information on whole farm planning may be found at the OSU Department of Agricultural Economics Farm Management and Finance website at: http://www.agecon.okstate.edu/extension/farm.asp

Enterprise Budget Software

Spreadsheets now make budget development and recalculation of alternatives quick and easy. Representative budgets often are available through local Extension offices and Extension websites. Figure 1 shows an example enterprise budget summary for a cow/calf unit generated using OSU Enterprise Budget Software and Figure 2 shows a budget summary for wheat grain. Information about OSU enterprise budget software is available at www.agecon.okstate.edu/budgets or through your local Extension office or the OSU Agricultural Economics Department, 515 Agriculture Hall, Stillwater, OK 74078 or 405-744-9836.

Sample budgets should be tailored to fit an individual producer's operation due to differences in experience levels, management abilities and willingness to assume risk. Using a sample budget as a starting point, the OSU software allows users to develop business plans that are uniquely their own. For example, the user may:

1. Change prices, yields, rates, practices and/or costs to fit the planning situation being considered.
2. Combine returns and costs in different ways to evaluate residual returns to owned capital and labor.
3. Adjust land charges.
4. Adjust for other soil or production conditions.

Because the enterprise budget contains both ownership and operating costs, the budgets can be used in long-term planning.

A national resource for enterprise budget information is the Budget Library within the Ag Risk Library maintained by the Center for Farm Financial Management at the University of Minnesota at http://www.agrisk.umn.edu/Budgets/. A searchable database allows users to find budgets for specific crop or livestock enterprises and geographic regions. Budget contacts for individual states are listed, and links to state budget websites are provided.

Components of the Enterprise Budget

Title

Titles of budgets typically indicate the products to be sold (for example, cow-calf, wheat or soybeans), the size of the enterprise (100 cows) and other descriptive information (such as the forage base). Distinguishing features of the enterprise or inputs (for example, irrigation use or harvesting methods) will be noted in the budget title.

Returns to livestock enterprises are typically specified on a per head basis, with the herd or unit size given in the title. The unit size is important when economies of size in the use of facilities or labor exist (that is, fixed costs can be spread

over more units to reduce per unit production costs). Returns to the crop enterprises are typically specified on a per acre basis.

Production

The total quantity of production is multiplied by the actual or expected price to determine value of production. Gross or total receipts are the sum of production values for individual items. For example in most cow-calf budgets, the expected returns to a 100 cow unit are averaged for reporting on a per cow basis. A herd technically does not wean 41.82 head of 524.3 pound steers for sale. This is a statistical result of the averaging process for the herd. The averaging process yields a realistic estimate of the per cow returns to the entire herd given the assumed calf crop percentage, death loss, shrinkage and cull cow replacement rates. The sale of a portion of a commercial cow and aged bull is also a statistical by-product of the averaging process which assigns some of the receipts from the sale of cull cows and bulls to each cow.

Cull sales income for breeding livestock is treated as recommended by the American Agricultural Economics Association (AAEA) Task Force on Commodity Costs and Returns Estimation (https://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/technical/econ/references/?cid=nrcs143_009751). The treatment of income depends on whether the breeding herd is from raised or purchased sources.

Sale price times the number of head determines receipts from raised livestock since the cost of raising them is included as enterprise operating costs. For purchased animals, only the amount of sales exceeding salvage value is included in income. The cost of the purchased animal is prorated over its life through depreciation and the cull animals are presumed to be at the end of the useful lives, thus fully depreciated. This convention prevents an economic double counting of culled income.

In the budget example, all of the total cull cows were assumed to be from raised sources. In addition, raised replacement heifers were sold and bull sales were from purchased sources. As illustrated in the production section, cull cow income includes total cash receipts from 20 raised animals. For replacement heifers, total income is equal to total cash receipts since all were originally raised for breeding purposes. Finally, the zero value bull income is equal to the sales price less salvage value for one purchased bull, since it is assumed to be at the end of its useful life and fully depreciated.

In a crop budget, the expected per acre returns primarily reflect income from sales. Government program payments may be excluded from the crop budget, particularly if the payment is not tied to crop production. A producer will want to include those payments in a personalized whole farm budget and cash flow to get a 'true' picture of overall returns. The value for pasture may differ among producers.

Production Costs

Variable costs (also known as operating costs) and fixed costs make up the total cost of producing any farm commodity. Variable costs are incurred during the production of the enterprise. If the enterprise is not produced, these costs would not occur. Fixed costs are not affected by short-term enterprise decisions and are associated with breeding livestock, buildings, machinery, equipment and other capital assets. Fixed costs are prorated over the expected life of the asset, typically a period of years.

Costs that are difficult to allocate to individual enterprises (telephone, taxes and accounting services, electricity, etc.), are called overhead costs and may be variable or fixed in nature. Overhead costs are included in whole farm/ranch budgets, but are sometimes excluded from enterprise budgets.

Operating Costs

Operating costs are inputs that vary with the level of production and are used during one operation year or one production period. For example, recommended nitrogen fertilizer rates change, depending on the crop yield goal for wheat. They would not be purchased if production were not undertaken. Variable costs may be classified as cash or non-cash.

The price in dollars, the quantity or number of inputs, and the unit size (weight, volume, length, time, area, etc.) of operating inputs are often specified. In livestock budgets, operating costs include costs of hay and feed, salt and minerals, veterinary and medical expenses, hauling and marketing expenses, personal taxes, labor, fuel, lubricants and repairs for machinery, and equipment and interest on operating funds (annual operating capital). In stocker budgets, the money spent purchasing feeder cattle and for trucking expenses is also an operating cost. In crop budgets, operating costs may include seed, fertilizer, insecticide, custom harvest, labor, fuel, lubricants, repairs and interest on operating funds (annual operating capital). In horticultural crop budgets, operating inputs may include seed or transplants, herbicide, fertilizer, insecticide, labor (for transplanting, harvesting, sorting and grading), irrigation fuel, lubricants, repairs, rented machinery or equipment and annual operating capital.

Lease or rental payments and other costs such as housing and insurance are generally included in operating inputs. Custom hire of machine operations or hauling should be included as an operating input rather than as a fixed machinery input.

Operating costs should include the value of inputs produced on the farm that have a market value (for instance, homegrown feed or seed, and family labor) that are used in production. These inputs have an opportunity cost; they would be sold if not used in production.

Fixed Costs

Fixed costs are those that do not change with the level of production. They remain the same whether or not a crop is produced and whether income is high or low. Fixed costs may be cash or non-cash in nature. Real estate taxes, personal property taxes, insurance on buildings and equipment, interest payments on non-current (intermediate and long term) debt and farm maintenance are cash fixed costs. Non-cash fixed costs include costs that are not cash expenses in the production period. Non-cash costs (such as depreciation and interest on the money invested in buildings and equipment) are foregone opportunities. If a charge for the use of land owned is included in the enterprise budget, it too, is a non-cash fixed cost.

It is important to remember that all components of fixed costs, cash and non-cash, should be included in an enterprise budget. It is the only valid way to determine enterprise profit-

ability. Total fixed cost is the sum of interest, depreciation, taxes and insurance costs.

Returns above Total Operating Costs

The return to fixed costs, land, overhead, risk and management (that is, the returns above total operating costs) is computed by subtracting total operating costs from total receipts. When returns above operating costs are positive, production is economically rational for an enterprise already in production. Positive returns above total operating costs indicate that the enterprise generates enough revenue to cover all variable costs and some portion of fixed costs. If returns above total operating costs are negative, the enterprise is not generating enough revenue to cover even variable costs. Eliminating this enterprise will increase profits or decrease losses in the overall operation.

The returns to overhead, risk and management (returns above all costs) are computed by subtracting total operating costs and total fixed costs from total receipts, or by subtracting total fixed costs from the returns above total operating costs. When returns to overhead, risk and management are positive, the enterprise is profitable and self-supporting. Profits contribute revenue to cover general farm maintenance and also reward the operator financially for managerial skills. In budgets where no land charge is included, returns should be interpreted as returns to land, overhead, risk and management.

Using Enterprise Budget Information

Careful analysis of a budget before investing in an enterprise familiarizes the potential producer with inputs and their prices, production and management practices involved in production, and possible income. It also provides an in-depth study of the components such as yields and market prices, plus builds awareness of the risk involved in production. An old saying goes, "If you can't pencil a profit, you aren't likely to plow one." A well-developed enterprise budget can demonstrate a good understanding of the business aspects of an enterprise to a lender and enhance prospects for funding.

Knowing the potential returns to an enterprise allows a producer to make informed rental offers for land or machinery. As the margin between income and expenses on agricultural enterprises is often narrow, offering too much for land rents can result in losses to the enterprise. Estimating the net returns (income minus variable and fixed costs, excluding the land charge) for the production activity sets the upper limit on what can be paid for land. The landlord and tenant then negotiate a rate that is fair to both parties.

The wheat enterprise budget (Figure 2) provides information on breakeven grain prices and yields in a summary table at the bottom of the budget sheet. Breakeven analysis is a useful technique in weighing revenue relative to costs. Revenue per acre is determined by price multiplied by yield, then adding any other income. To calculate a breakeven figure, hold one revenue component constant (either price or yield) and solve for the other component so that enterprise revenues equal costs. For example, the breakeven price above operating input costs using an expected yield of 35 bushels per acre is $5.02 per bushel. This amount is determined by using the following formula:

$(P_{BE} \times \text{Yield}) + \text{Other Income} = \text{Operating Cost}$

$P_{BE} \times \text{Yield} = \text{Operating Cost} - \text{Other Income}$

$$P_{BE} = \frac{\text{Operating Cost - Other Income}}{\text{Yield}}$$

Subtracting other income (here, zero) from total operating costs ($175.68), then dividing by the production level of 35 bushels provides the breakeven price of $5.02.

To determine the breakeven yield to cover operating inputs in comparable fashion, the formula is:

$(\$4.50/\text{bu.} \times Y_{BE}) + \$0/a = \$175.68/a$

$\$4.50/\text{bu.} \times Y_{BE} = \$175.68/a$

$$Y_{BE} = \frac{\$175.68/a}{\$4.50/\text{bu.}}$$

$Y_{BE} = 39.0$ bu./a

Similar calculations may be made to reveal grain breakevens covering total costs (also shown in the breakeven summary at the bottom of Figure 2).

Enterprise budgets also provide historical or projected data necessary to build whole farm plans and conduct financial analysis. The enterprise budgets are summed and any overhead costs not included in the enterprise budgets are added to derive total farm costs and returns. Specific questions such as how and what to produce, production levels, and achieving goals can be addressed. While calculations may be done by hand, software makes summary and analysis, as well as evaluation of alternative scenarios, much easier. See agecon.okstate.edu/budgets for sample budgets.

Summary and Conclusions

Enterprise budgets are designed to provide a decision framework for short- and long-range economic analyses of production agriculture. Enterprise budgets assist in understanding the costs and returns of a production activity, identifying potential sources of risk, and evaluating alternatives. Knowledge of budgeting and the ability to use them helps producers make sound business decisions.

Figure 1. Cow-Calf Enterprise Budget - 100 Cow Unit Size

(sample only)

See www.agecon.okstate.edu/budgets for information on OSU Enterprise Budget Software.
Prices based on 2020 market projections
February calving percentage- 87.3, calf death loss 4.2%
Grant County- North-Central Oklahoma
25% heifer replacement rate with none purchased and 25 raised
Primary forages- Native. Used machinery complement

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PRODUCTION	Weight	Units	Price/cwt	Quantity	Total	$/Head
Steer Calves	524.3	Lbs	$ 155.00	41.82 Hd	$ 33,983	$ 339.83
Heifer Calves	514.7	Lbs	$ 143.00	16.82 Hd	$ 12,377	$ 123.77
Cull Cows	1,150.0	Lbs	$ 70.00	20.00 Hd	$ 16,100	$ 161.00
Cull Replacement Heifers	825.0	Lbs	$ 125.00	5.00 Hd	$ 5,156	$ 51.56
Cull Bulls	1,750.0	Lbs	$ 90.00	1.00 Hd	$ -	$ -
Other Income		Head	-	1.00 Hd		
Total Reciepts					**$67,617**	**$676.17**

OPERATING INPUTS	Unit	Price	Quantity	Total	$/Head
Pasture	Head	$ 64.50	1	$ 6,450	$ 64.50
Hay	Head	$ 63.17	1	$ 6,317	$ 63.17
Grain	Head	-	1	-	-
Protein Supplement	Head	$ 61.16	1	$ 6,116	$ 61.16
Salt	Head	$ -	1	-	$ -
Minerals	Head	$ 13.36	1	$ 1,336	$ 13.36
Other Feed Additives	Head	-	1	-	-
Vet Services/Medicine	Head	$ 35.00	1	$ 3,500	$ 35.00
Vet Supplies	Head	$ 6.84	1	$ 684	$ 6.84
Marketing	Head	$ 8.36	1	$ 836	$ 8.36
Mach/Equip Fuel, Lube, Repairs	Head	$ 62.63	1	$ 6,263	$ 62.63
Machinery/Equipment Labor	Hrs	$ 15.00	3.35	$ 5,025	$ 50.25
Other Labor	Hrs	$ 15.00	5.90	$ 8,850	$ 88.50
Other Expenses	Head	$ 47.00	1	$ 4,700	$ 47.00
Annual Operating Capital	Dollars	5.50%	325.32	$ 1,789	$ 17.89
Total Operating Costs				**$ 51,866**	**$ 518.66**
Returns Above Total Operating Costs				**$ 15,751**	**$ 157.51**

FIXED COSTS	Units	Rates	Total	$/Head
Machinery/Equipment				
Interest at	Dollars	5.75%	$ 765	$ 7.65
Taxes at	Dollars	1.00%	$ 244	$ 2.44
Insurance	Dollars	0.85%	$ 113	$ 1.13
Depreciation	Dollars		$ 2,179	$ 21.79
Livestock				
Interest at	Dollars	5.75%	$ 6,924	$ 69.24
Taxes at	Dollars	1.00%	$ 1,327	$ 13.27
Insurance	Dollars	0.85%	$ 1,024	$ 10.24
Depreciation	Dollars		$ 1,525	$ 15.25
Land	$/Acre	$ 1,250		
Interest at	Dollars	2.00%	$ 25,000	$ 250.00
Taxes at	Dollars	0.23%	$ 2,875	$ 28.75
Total Fixed Costs			**$ 41,976**	**$ 419.76**
Total Costs (Operating + Fixed):			**$93,842**	**$ 938.42**
Returns Above All Specified Costs			**$(26,225)**	**$ (262.25)**

Figure 2. Dryland Wheat Enterprise Budget- Grain Only

(sample only)

See www.agecon.okstate.edu/budgets for information on OSU Enterprise Budget Software.

Prices based on 2021 market projections
Garfield County- North Central OK
Custom Fieldwork
1,000 acres farmed, 160 acres for this budget
Low-till rotation

				Total
PRODUCTION	**Units**	**Price**	**Quantity**	**$/Acre**
Wheat	Bu.	$ 4.50	35.00	$157.50
Small Grain Pasture	Acre	-	0	-
Other Income	Acre	$ -	0	$ -
Total Reciepts				**$157.50**
OPERATING INPUTS	**Units**	**Price**	**Quantity**	**$/Acre**
Wheat Seed	Bu./Acre	$ 11.50	1.00	$ 11.50
Fertilizer	Acre	$ 35.35	1	$ 33.35
Custom Harvest	Acre	$ 35.06	1	$ 35.06
Pesticide	Acre	$ 18.79	1	$ 18.79
Crop Insurance	Acre	$ 13.00	1	$ 13.00
Annual Operating Capital	Dollars	5.50%	73.34	$ 4.03
Machinery Labor	Hrs	$ 15.00	0	$ -
Custom Hire	Acre	$ 57.95	1	$ 57.95
Machinery, Fuel, Lube, Repairs	Acre	$ -	0	$ -
Other Expense	Acre	-	0	-
Total Operating Costs		-		**$175.68**
Returns Above Total Operating Costs				**$(18.18)**
FIXED COSTS	**Units**	**Rate**		**$/Acre**
Machinery/Irrigation	$/Value			
Interest at	Dollars	5.75%		$ -
Taxes at	Dollars	1.00%		$ -
Insurance	Dollars	0.85%		$ -
Depreciation	Dollars			$ -
Land	$/Acre	$ 2,000		
Interest at	Dollars	2.00%		$ 40.00
Taxes at	Dollars	0.23%		$ 4.60
Total Fixed Costs				**$ 44.60**
Total Costs (Operating + Fixed):				**$ 220.28**
Returns Above All Specified Costs				**$(62.78)**

Grain Break Even (B-E) Analysis			
B-E Yield at $/bu.	**4.50**	**B-E Price at bu./acre**	**35.00**
Above Operating Costs	39	Above Operating Costs	$5.02
Above Total Costs	49	Above Total Costs	$6.29

Break-even yield is the yield needed to cover costs given the expected price, pasture income, and and other income, such as government payments. Break-even price is the price needed to cover costs given the expected yield, pasture income, and other income.

The Oklahoma Cooperative Extension Service

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The Cooperative Extension Service is the largest, most successful informal educational organization in the world. It is a nationwide system funded and guided by a partnership of federal, state, and local governments that delivers information to help people help themselves through the land-grant university system.

Extension carries out programs in the broad categories of agriculture, natural resources and environment; family and consumer sciences; 4-H and other youth; and community resource development. Extension staff members live and work among the people they serve to help stimulate and educate Americans to plan ahead and cope with their problems.

Some characteristics of the Cooperative Extension system are:

- The federal, state, and local governments cooperatively share in its financial support and program direction.
- It is administered by the land-grant university as designated by the state legislature through an Extension director.
- Extension programs are nonpolitical, objective, and research-based information.
- It provides practical, problem-oriented education for people of all ages. It is designated to take the knowledge of the university to those persons who do not or cannot participate in the formal classroom instruction of the university.
- It utilizes research from university, government, and other sources to help people make their own decisions.
- More than a million volunteers help multiply the impact of the Extension professional staff.
- It dispenses no funds to the public.
- It is not a regulatory agency, but it does inform people of regulations and of their options in meeting them.
- Local programs are developed and carried out in full recognition of national problems and goals.
- The Extension staff educates people through personal contacts, meetings, demonstrations, and the mass media.
- Extension has the built-in flexibility to adjust its programs and subject matter to meet new needs. Activities shift from year to year as citizen groups and Extension workers close to the problems advise changes.

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