

USING ENTERPRISE BUDGETS TO IMPROVE CUSTOMER'S PROFITS

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Introduction

Assisting farmer clients determine their cost of production and per-acre profits is something many crop input supply dealers and consultants do. But as the economics of both farming and the input and service industry become more and more challenging it seems important to review these methods for helping crop producers know their true costs of production and evaluate and improve their profitability. This presentation will review the objectives of crop enterprise budgeting, the components of an enterprise budget, how the value of each component is determined and will briefly describe the Agricultural Budget Calculation Software (ABCS) for use in preparing crop enterprise budgets.

Enterprise budgeting can be used as a tool for determining and evaluating profitability from any agricultural production enterprise. An enterprise is any distinct component of the over-all farm business such as the corn production enterprise or the milk production enterprise. While these components are usually inter-related, they can and should be evaluated individually for their economic merits. In developing an enterprise budget, the costs of production are determined and then subtracted from the revenue received to determine the amount of profit or loss. For crop enterprise budgets, costs and returns are usually assigned on a per-acre basis, but can also be calculated on a per-unit of yield basis such as per-bushel or per-ton.

The University of Wisconsin Cooperative Extension Crop Enterprise Profitability Workgroup works to educate farmers, consultants, Extension Agents and Research Specialists on methods for determining and evaluating profitability from crop production enterprises.³ A secondary objective is to provide information to the general public and makers of public policy regarding the economics of crop production on farms in Wisconsin. Since it's start in 1999, the workgroup has developed "template" enterprise budgets for corn and soybeans in cash grain farm scenarios and high moisture shell corn, corn silage, oats and alfalfa in dairy farm scenarios. These budgets can be used by professionals in agricultural consulting and education as examples for clients and students or as "templates" for creating actual farm-specific enterprise budgets. They are available on the website <http://www.wisc.edu/dairy-profit/crop.html>. The budgets were created

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using the Agricultural Budget Calculation Software (ABCS) developed by Professor Gary Frank at the University of Wisconsin Center for Dairy Profitability.

Objectives of Budgeting

Crop enterprise budgets can be used for both analysis and planning. Analysis budgets will use actual costs for variable inputs, actual yields attained and market prices received to compute net profit. Planning budgets will use estimated or expected costs, yields and market prices.

Uses for Analysis and Planning Budgets:

- a. Measure profitability of crop production enterprises;
- b. Help improve a farm's crop production methods by identifying high-cost areas where efficiency may be improvable;
- c. Compare profitability of a single crop grown in different rotational phases or under different levels of input or technology (must be able to predict or measure yield or quality impacts associated with different production and expenditure scenarios);
- d. Provide the information necessary to compute the break-even market price, cost of production or yield. Sensitivity analyses (effect on profit from variations in price, costs or yields) can also be conducted.

Approaches to crop budgeting:

1. Partial budgeting
Useful for comparing the impact of only those things that are changed between production systems for one commodity (eg, different fertilizer rates compared within a corn enterprise);
2. Enterprise budgeting

Components of an Enterprise Budget

1. Income
 - a. Yield * Market price (received or expected), or;
 - b. Value of feed produced, yield * market price (opportunity cost), and;
 - c. Farm program and other governmental payments.
2. Costs
 - a. Operating or Variable Costs
Annual costs that are incurred specifically as a result of planting the crop this year. For example:

a. Operating or Variable Costs (cont.)

- ✓ **Fertilizer & lime**
- ✓ **Soil testing**
- ✓ **Seed**
- ✓ **Pesticides**
- ✓ **Custom work and application**
- ✓ **Drying**
- ✓ **Land rent**
- ✓ **Crop insurance**
- ✓ **Fuel and repairs associated with field operations***
 - a. Derived from whole-farm accounts: total expenses allocated to each crop based on estimated use, then divided by acres in each crop enterprise, or;
 - b. By estimating per-acre fuel use and repairs for each field operation.
- ✓ **Labor (operator's and/or hired) and fringe benefits***
 - a. Derived from whole-farm accounts: total expenses allocated to each crop based on estimated use, then divided by acres in each crop enterprise, or;
 - b. By estimating per-acre labor requirement for each operation.
- ✓ **Overhead or administrative fees:** Accounting, legal fees, etc.
- ✓ **Operating interest:** total variable costs * short-term interest rate / time period (eg, 6 months)

* See UWEX publication A3510 *Estimating Agricultural Field Machinery Costs*. Custom rates can also be used to represent field operation costs alternatively to estimating labor, fuel and repair costs, but tends to be less accurate.

b. Capital or Fixed Costs

Costs of owning and maintaining assets with a productive life greater than one year that are owned in association with and used for the crop production business. Fixed costs must be accounted for regardless of whether a crop is planted this year:

- ✓ **Equipment ****
- ✓ **Buildings** (shop, machine shed, grain storage)**
- ✓ **Land** (if owned – opportunity interest cost, or market rental rate)**
- ✓ **Insurance** (liability, fire and casualty)
- ✓ **Property taxes**

b. Capital or Fixed Costs (cont.)

- ✓ **Repairs** - that do not vary with use, eg. paint, roofs
- ✓ **Operator’s labor and management** (management usually estimated at 6% of gross income from the enterprise)

** Costs for buildings and equipment are calculated according to estimates of their annual loss in value (obsolescence and depreciation) plus interest on the capital invested. One method used by economists is the “capital recovery charge” (CRC), which plugs-in to an amortization formula (similar to that used to calculate annual payments on a loan) the asset’s beginning or current value, expected useful life, expected salvage value and the average interest rate (time value of money) expected over that time. The CRC formula then adds this “annualized loss in value” to a value for interest on the capital invested (interest rate times salvage value) to calculate the annual cost of the fixed asset. See UWEX publication A3334 *Wisconsin Farm Enterprise Budgets – Crops* for a full description.

As an alternative to hand calculating the CRC for each capital asset, estimates can be made according to the following general guidelines. A general guideline can also be used to estimate insurance costs:

	Estimate CRC (annual fixed cost) as a percentage of beginning (or current) <u>market value for equipment, buildings and land</u>		
	Machines	Buildings	Land
	----- % -----		
Estimated CRC =	12–16	10-14	3-5
Est. Insurance Cost =	0.5–1	0.5-1	0

When capital assets are used for more than one enterprise, their total annual cost must be allocated to each enterprise based on the percentage use of the asset by each enterprise, then divided by acres in that enterprise to get a cost per acre.

3. Returns

- a. Return to Operating Costs (Gross Margin):
Income - Variable Costs
- b. Return to Labor and Management:
Income – (Fixed Costs and Variable Costs Excluding Operator’s Labor and Management)
- c. Net Return (Profit or Loss):
Income – All costs

Agricultural Budget Calculation Software (ABCS) for preparing crop enterprise budgets

The ABCS computer program can be used to generate enterprise budgets of almost any type. It is especially useful for crop budgets because of its data sets used for calculating labor, repair and energy costs associated with both field operations and fixed assets as well as the depreciation, interest and insurance costs associated with equipment and facilities. The data sets contain default values for calculating all costs, but can be easily modified to use actual, farm specific values.

The following pages show three enterprise budget reports that can be generated with the ABCS program: Detailed Summary, Machinery Expenses and Risk and Sensitivity Analysis. The example budget shows per-acre costs and returns for a 400-acre corn for grain, following soybean, enterprise on a 1000 acre cash grain farm.

Detailed Summary

1000 acre grain farm, Corn After Soybean – 1000DATA

Created : 12/28/00

<u>Item</u>	<u>Price</u>	<u>Quantity</u>	<u>Times</u> <u>Over</u>	<u>1 Acre</u>	<u>400.00 Acres</u>
<u>Gross Value of Production</u>					
<i>Products</i>					
CORN, SHELLED – BU (400)	\$2.00 per bu	165.00		330.00	132,000.00
Total				330.00	132,000.00
<u>Operating Costs</u>					
<i>Input Expenses</i>					
<i>FERTILITY</i>					
N,P,&K 7-21-7 LB	\$0.090 per lb	110.00	1.00	9.90	3,960.00
NITROGEN SOLUTION 28% LB	\$0.060 per lb	210.00	1.00	12.60	5,040.00
DIAMMONIUM PHOSPHATE	\$0.127 per lb	80.00	1.00	10.16	4,064.00
POTASSIUM 0-060 LB	\$0.080 per lb	60.00	1.00	4.80	1,920.00
UREA 46-0-0	\$0.105 per lb	105.00	1.00	11.02	4,410.00
<i>SEED PLANTS</i>					
CORN SEED – BAG	\$90.000 per bag	0.38	1.00	33.75	13,500.00
<i>MISCELLANEOUS</i>					
CUSTOM FERT SPREADING	\$4.000 per acre	0.50	1.00	2.00	800.00
SOIL TEST	\$1.300 per acre	1.00	0.33	0.43	173.16
GRAIN DRYING	\$0.120 per bu	165.00		19.80	7,920.00
CROP INSURANCE – CORN	\$11.000 per acre	1.00		11.00	4,400.00
LAND RENT	\$90.000 per acre	1.00		90.00	36,000.00
<i>WEED CONTROL</i>					
HARNESS-GAL	\$76.510 per gal	0.19	1.00	14.35	5,738.24
MARKSMAN-GAL	\$28.310 per gal	0.31	1.00	8.85	3,538.76
				229.74	91,896.16
<i>Labor Expenses</i>					
LABOR BENEFITS	\$15.000 per hour	0.27		4.00	1,601.46
				0.00	-0.02
				4.00	1,604.44
<i>Energy Expenses</i>					
DIESEL FUEL	\$0.850 per gal	6.91		5.88	2,350.18
LP GAS (GRAIN DRYING)-GAL	\$0.070 per KW hr	1.70		0.12	47.60
ENGINE LUBRICATION	\$0.500 per gal	2.50		1.25	500.00
				1.07	427.00
				8.31	3,325.34
<i>Repair & Maintenance Expenses</i>					
POWER UNIT				2.99	1,194.62
IMPLEMENT				1.36	545.62
DURABLE				2.78	1,110.00
				7.13	2,504.24
<i>Input Interest Expenses</i>					
	\$249.18	0.08		18.69	7,475.48
<i>Total Operating Costs</i>				267.87	107,148.66
<i>Value of Prod. Less Total Operating Costs</i>				62.13	24,851.34

Allocated Overhead

Item	Price	Quantity	Times Over	1 Acre	400.00 Acre
<i>Input Expenses</i>					
MISCELLANEOUS MANAGEMENT	6.000% per \$ Inc	1.00		19.80	7,920.00
				19.80	7,920.00
<i>Labor Expenses</i>					
OPERATOR	\$15.000 per hour	1.05		15.79	6,317.74
				15.79	6,317.74
<i>Interest & Insurance Expenses</i>					
POWER UNIT IMPLEMENT DURABLE				7.27	2,908.52
				6.29	2,515.56
				5.74	2,296.00
				26.94	10,774.96
<i>Depreciation Expenses</i>					
POWER UNIT IMPLEMENT DURABLE				7.27	2,908.52
				6.29	2,515.26
				5.74	2,296.00
				19.30	7,720.08
<i>Total Allocated Overhead</i>				81.83	32,732.78
<i>Total Gross Value of Production</i>				330.00	132,000.00
<i>Total Operating Costs</i>				267.87	107,148.66
<i>Value of Production Less Total Operating Costs</i>				62.13	24,851.34
<i>Residual Return to Operator Labor & Management</i>				15.89	6,356.30
<i>Total Costs Listed</i>				347.70	139,881.45
<i>Value of Production Less Total Costs Listed</i>				-19.70	-7,881.45

Machinery Expenses

1000 ACRE GRAIN FARM, Corn After Soybean – 1000DATA

Created : 12/28/00

Power Unit	<u>Main Implement</u>	Add. Imps	Deprec.	Interest	Labor	Energy	Repair	Times Over	Cost Per Acre
TRACTOR 140 HP	PLANTER 06-30 MIN-TILL	0	3.15	3.50	2.36	0.90	0.88	1.00	10.79
TRACTOR 100 HP	SPRAYER 30 FT	0	0.63	0.71	1.48	0.33	0.19	1.00	3.34
COMBINE, 220 HP	HEAD, CORN GRAIN 6-30	0	4.82	8.62	2.77	1.38	2.27	1.00	19.85
TANDEM TRUCK	GRAIN HAULING	0	0.31	0.42	0.83	0.41	0.07	0.50	4.06
TANDEM TRUCK	NURSE TANK 2000 GAL	0	0.72	0.88	1.82	0.82	0.16	1.00	4.40
TRACTOR 100 HP MFWD	CULTIVATOR, FIELD 24 FT	0	2.08	2.91	3.01	0.74	0.34	1.00	9.08
TRACTOR 100 HP	CULTIVATOR 06-30	0	1.01	1.15	2.35	0.53	0.20	1.00	5.23
TRACTOR 100 HP	GRAVITY BOX #4A 240 BU	1	0.44	0.40	0.99	0.20	0.10	0.50	4.26
TRUCK, ¾ TON DPICKUP		0	0.41	0.51	3.30	0.56	0.14	1.00	4.91
ENGINE LUBRICATION						0.88			
			13.56	19.09	18.90	6.76	4.35		
Total Machinery Expenses								62.66	

Risk & Sensitivity Analysis

1000 acre grain farm, Corn After Soybean – 1000DATA

Created : 12/28/00

Risk Analysis

(Value of Production less Total Costs as Price and Yield Vary)

		-20%	-10%	Price	+10%	+20%
		\$1.60	\$1.80	\$2.00	\$2.20	\$2.40
-20%	132.00	\$-138.50	\$-112.10	\$-85.70	\$-59.30	\$32.90
-10%	148.50	\$-112.10	\$-82.40	\$-52.70	\$-23.00	\$6.70
Yield	165.00	\$-85.70	\$-52.70	\$-19.70	\$13.30	\$46.30
+10%	181.50	\$-59.36	\$-23.00	\$13.30	\$49.60	\$85.90
+20%	198.00	\$-32.90	\$6.70	\$46.30	\$85.90	\$125.50

Sensitivity Analysis

(Break-Even Yields as Price and Total Costs Vary)

		-20%	-10%	Price	+10%	+20%
		\$1.60	\$1.80	\$2.00	\$2.20	\$2.40
-20%	\$132.00	174.85	155.42	139.88	127.16	116.57
-10%	\$312.93	196.71	174.85	157.37	143.06	131.14
Total	\$347.70	218.56	194.28	174.85	158.96	145.71
Costs	\$382.47	240.42	213.71	192.34	174.85	160.28
+10%	\$417.24	262.28	233.14	209.82	190.75	174.85
+20%						