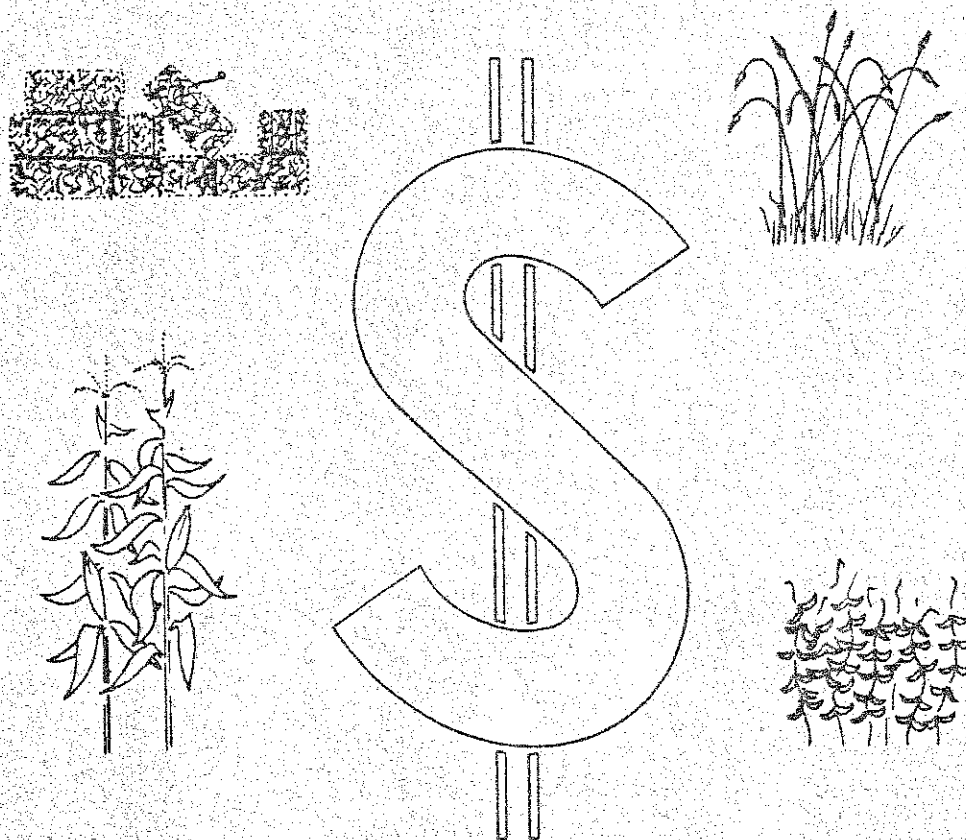


AN ECONOMIC ANALYSIS OF FIELD CROP ENTERPRISES IN NEW YORK



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FOREWARD

This publication is an update of the field crops portion of A.E. Research 80-6, "An Economic Analysis of New York Field Crop Enterprises". Contained herein are detailed budgets for selected field crop enterprises grown in New York State, including forage crops and grain crops for livestock feed and crops for cash sale.

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INTRODUCTION

The profitability of a farm business is determined by many production and management factors. Perhaps the most elusive of these factors is business management. In order to better manage and improve the profitability of a business, a manager must use many tools to assist in planning, organizing and controlling a business. One tool, and a very powerful tool, that can assist in determining business strengths and weaknesses and in planning the organization and operation of the business is enterprise analysis. Enterprise analysis involves examining the parts which comprise the business and analyzes the interactions between them. With a farm business, the parts of the business are the various crop and livestock enterprises. Enterprise analysis initially involves viewing each crop and livestock activity as a separate unit with their respective receipts, expenses and labor requirements. Thus, rather than scrutinizing only the total farm business, the emphasis is placed on managing for-age and grain production enterprises, livestock enterprises, cash crop enterprises and the interactions between enterprises. By examining receipts, expenses and labor requirements for each enterprise in the farm business, the strengths and weaknesses of a particular farm can be brought into sharper focus.

Because no two farms have identical resources available, the resulting most profitable combination of enterprises will be unique to each farm. The impact on the business of changes such as adding or deleting an enterprise, increasing rates of production, or altering the level of an enterprise is determined specifically for that farm.

The objective of this publication is to provide a data base to assist New York farmers in analyzing field crop enterprises. Enterprise budgets for selected New York field crops are presented and discussed on pages 7 through 9. These budgets are useful for cash crop and livestock farms in New York as well as other states, particularly in the Northeast. Because resources and cost structures in many areas of the Northeast are similar to New York, a budget constructed for other areas of the Northeast would be very similar to the budgets in this publication.

Purpose

The purpose of this publication is to assist farmers in comparing alternatives. There are two specific means for using the budgets when comparing alternatives.

The first is through a NEWPLAN computer assisted decision aid. The data contained in these budgets are stored in data files for use in NEWPLAN Programs 65 and 36. Program 65, Profitable Organization of Dairy Farm Enterprises, is a linear programming model used to more profitably select enterprises and enterprise levels on dairy farms. Program 36, Financial Long-Range Whole Farm Budgeting, analyzes the long-run economic cash flow consequences of proposed changes in the operation of a dairy farm.

This budget data can also be used when determining crop inputs for NEWPLAN Program 18, Profitable Combination of Cash Crop Enterprises, and when budgeting a change in cropping program in NEWPLAN Program 50, Major Capital Investment.

The second purpose is to be of assistance in conventional budgeting. Specific items from an enterprise budget or an entire enterprise budget can be used in the budgeting process. Variable costs and some or all of the fixed costs can be used depending on the budgeting objective.

Construction Procedure

The crop enterprise budgets in this publication are constructed using the economic engineering approach. Prices and costs which existed during 1982 are related to a specified land base and corresponding building and machinery complement. The land base consists of 500 tillable acres, with 100 acres each of hay crop, corn silage, corn grain for feed, a row cash crop and a non-row cash crop. For each crop, a machinery complement is specified that is also consistent with the total land base and machinery complement for the farm.

Budgets are presented for one yield level for each crop enterprise. Fixed costs are calculated for the machinery complement necessary for each crop and a land rental charge.

For those crops to be fed, the enterprise budgets do not include costs associated with moving the crop into storage. For cash crops, the crop enterprise budgets include selling costs. Cash crop prices and costs are for sale at harvest.

The use of 500 acres does not imply that the budget should be discarded for farms with other than 500 acres. In many situations, the variable costs will not vary significantly as acreages change. The farmer using these crop enterprise budgets should check his machinery complement, seeding, liming and fertilizer rates against those used to construct the budgets. In situations with different circumstances, adjustments may have to be made in variable expenses and/or labor hours spent per crop acre. In terms of fixed costs, the base farm is not as specialized as it may appear because five enterprises are included. Again, in situations with very different circumstances, appropriate machinery complements can be specified and the associated fixed costs determined. The enterprise budgets in this publication then, are best used as a "starting point" for constructing one's own enterprise budgets.

Sources of Data

Many sources of data have been used in the construction of the budgets. Crop seeding, fertilization and herbicide application rates are

taken from Cornell Recommends for Field Crops¹ with assistance from W. Shaw Reid and Russell Hahn of the Department of Agronomy, Cornell University. Field crop machinery costs were calculated using engineering formulas from Profitable Combination of Cash Crop Enterprises². Many commercial agricultural suppliers provided 1979 prices on crop inputs such as seed, fertilizer, herbicide and lime.

Suggestions for Use

The crop enterprise budgets can be used for farm analysis and planning in many ways. Three general suggestions are offered. The first is as a reference for use in day to day decisions, partial budgeting or simply for informational purposes.

The second use is for the yearly planning of crop acreage combinations. Variable cost sections of these enterprise budgets can be used as a guideline or a starting point. Adjustments on various variable expenses can then be made to better represent conditions on a particular farm. The adjusted budgets can then be analyzed with NEWPLAN Program 65. NEWPLAN Program 18, Profitable Combination of Cash Crop Enterprises, also utilizes variable cost information from crop enterprise budgets. Both computer programs can be invaluable assets in determining a more profitable combination of farm enterprises.

The third suggested use is for budgeting expansion alternatives. The enterprise budgets, including all or part of the fixed costs, can again be used as a starting point. The budgets can then be adjusted to better represent the resources available and the alternative being budgeted. The final budgets can be used to help determine whether expansion should be undertaken and/or which alternative expansion plan should be implemented. NEWPLAN Program 36, Financial Long-Range Whole Farm Budgeting, and NEWPLAN Program 50, Major Capital Investment Program, can be used to complement the budgets when considering and planning expansion.

Limitations of Use

If assumptions used in constructing a budget do not reflect a particular situation, the budget probably will not be accurate for that situation. As indicated above, it is unlikely the budget will completely reflect a given farm situation without at least minor adjustments. As the fixed costs of machinery and storage are based on prices over the past 7 years, they should be viewed as estimates of costs for ongoing farm operations. The machinery prices in Tables 2 through 5 are estimates of costs for new purchases. They should not be interpreted

¹Cornell Recommends for Field Crops, 1983, New York State College of Agriculture and Life Sciences, Cornell University, Ithaca, New York.

²P. R. Sprague et al., Profitable Combinations of Cash Crop Enterprises, A.E. Extension 80-7, Department of Agricultural Economics, Cornell University, Ithaca, New York.

as average cost of any technology or of all technologies. If a different technology is used from that assumed in this publication, large variations in fixed costs could occur. Even with a given technology, investment costs can be much different.

Care must be exercised in using the enterprise budgets, for they are only one estimate of costs and returns. They are not designed to represent average New York State conditions; instead they represent a specific set of conditions specified in the footnotes and accompanying tables. It is difficult for a user to compare his situation with an "average" so that he can make necessary adjustments. With a specified set of conditions, the user has a basis for comparison. The user should compare his conditions with those assumed in the budgets. Whenever the farm situation differs significantly from the assumed conditions, the budgeted values must be critically analyzed and often changed.

Product Prices and Input Costs

The same input and output prices are used throughout this publication (Table 1). In general, the prices are an estimate of the average price paid or received by New York farmers in 1982; however, some qualifications and adjustments are necessary.

Format of Field Crop Enterprise Budgets

The purpose of this section is to describe in more detail the format used in the crop enterprise budgets. The top headings describe the enterprise, indicate the yield level and provide the enterprise number for use in NEWPLAN programs. The enterprise budget information is provided in the following four categories:

VARIABLE EXPENSES
 FIXED EXPENSES
 TOTAL VARIABLE AND FIXED EXPENSES
 INCOME

The budgets are presented in two parts. Expenses are shown on page 7. Income and profitability measures and breakeven crop prices are shown on page 9.

The VARIABLE EXPENSES are separated into growing, harvesting, selling, interest on operating expenses and family and hired labor. Growing expenses include the input costs and variable costs associated with tillage. Harvesting costs include the variable costs associated with harvest and the variable costs associated with moving feed crops from the field. Selling costs include any variable costs associated with preparing the production for sale and the variable costs of transporting the crop from the farm to market. There are no selling costs associated with crops grown for feed. Interest on operating expenses is the charge for the use of the capital required for growing, harvesting and selling the crop. Operating capital is tied up for six months and the annual interest rate is 13 percent. The total of the above four costs represents variable

Table 1. Product Prices and Input Costs

PRICES			
<u>Crops</u>	<u>Dollars</u>	<u>Forage Crops</u>	<u>Dollars</u>
Corn Grain (bu.)	\$ 2.50	Alfalfa-Grass	\$65.00
Soybeans (bu.)	5.10	Corn Silage (T.)	20.00
Wheat (bu.)	3.30		
Oats (bu.)	1.50		
Red Kidney Beans (cwt.)	13.00		
Black Turtle Soup Beans (cwt.)	8.00		
COSTS			
<u>Fertilizer</u>	<u>Dollars</u>	<u>Herbicides/Chemicals</u>	<u>Dollars</u>
Nitrogen (lb.)	\$ 0.32	Atrazine 80W (gal.)	\$12.32
Phosphorus (lb.)	0.28	Eptam 7E (gal.)	29.24
Potassium (lb.)	0.16	Furadan (10% granular) (lb.)	1.05
		Lasso (gal.)	19.28
		Lorox (gal.)	56.32
<u>Seed</u>		Methoxychlor (lb.)	3.15
Alfalfa (lb.)	2.50	Premerge (gal.)	11.28
Timothy (lb.)	0.73	Temik (lb.)	2.67
Corn (80,000 ker.)	55.00	Treflan (gal.)	47.92
Wheat (bu.)	7.70	2,4-D (gal.)	12.32
Oats (bu.)	5.70		
Soybeans (bu.)	14.40	<u>Miscellaneous Costs</u>	
Red Kidney Beans (lb.)	0.50	Twine (9000 ft. bale)	25.00
Black Turtle Soup Beans (cwt.)	0.50	Diesel fuel (gal.)	1.24
		Gasoline (gal.)	1.24
<u>Labor</u>			
All labor, per hr.	5.00		
<u>Capital</u>	13%		

expenses as required in NEWPLAN programs and referred to as total selected variable expenses. The final variable cost is family and hired labor. Labor costs are always difficult to allocate since they are both fixed and variable costs; however, for enterprise budgeting they are best included as a variable cost. The hours required per acre are indicated in parentheses to the left of the cost figure. Labor is charged at \$5.00 per hour.

The FIXED EXPENSES section includes the usual fixed costs associated with owning land, buildings and equipment. A 13 percent opportunity cost of capital invested in equipment is included. Insurance on equipment is

charged at 0.5 percent of the average investments over its useful life. Housing costs are charged at 1.5 percent of the initial value. The land charge of \$24 per acre is the average rental charge per acre paid by New York farmers reported in Cropland Rental Rates in New York State, 1981.³ Twenty-five percent of the capital cost of the large tractor is allocated to livestock enterprise. All of the equipment capital costs are charged to the crop enterprises. If land is owned or operations custom hired, appropriate changes should be made in fixed and/or variable expenses.

TOTAL VARIABLE AND FIXED EXPENSES is simply the sum of total variable expenses and total fixed expenses. This figure represents the total cost of producing one acre of the crop at the indicated yield under the specified conditions. It is not an average cost of production figure. The only expense item that is not charged is management. Value of production minus total variable and fixed expenses would be return to management.

In the INCOME section, total income is yield per acre times price. Yield per acre, in the indicated unit of measure, is the quantity harvested. The price is the amount that could be received for the product if it were to be sold at harvest. The two profitability measures presented are return over variable expenses and return to management. Return over variable expenses is income minus variable expenses including labor and interest on operating expenses. Return to management is income minus total expenses, including variable expenses, machinery capital costs and a land rental charge.

³D. P. Snyder, Cropland Rental Rates in New York State, 1981, A.E. Research 82-5, Department of Agricultural Economics, Cornell University, Ithaca, New York.

Footnotes - Enterprise Budgets for Selected Field Crop Expenses, 1982

^aFor hay, twelve pounds of alfalfa and five pounds of timothy and all other growing expenses are allocated over the four year life of the stand.

^bReduce N quantity for corn following a legume crop.

^cEliminate lime expense for high-lime soils.

^dLasso (2 1/2 qts.), Atrazine (1 qt.) and Furadan (10 lbs.) are used for corn grain and corn silage. Lasso (2 1/2 qts.) and Lorox (1 qt.) are used for soybeans. 2,4-D (1/2 pt.) is used for wheat and oats. Premerge (1/3 qt.) and methoxychlor (3 lbs.) is used for hay. Treflan (1 pt.), Eptam (2 1/2 qts.) and Temik (5 lbs.) is used for red kidney and black turtle soup beans.

^eProduct prices are at the farmgate and thus transportation is not included as a cost. Cash crops are sold at harvest and no storage costs are incurred. Storage costs for corn silage and hay are charged to the livestock enterprise.

^fA 9,000 ft. bale of twine will tie 500 bales of hay. Assumes approximate 50 bales of hay per ton of hay.

^gInterest on operating expenses for 6 months at 13 percent.

^hThe labor requirement estimates are based on total man-hours of labor disappearance, not machinery use time.

ⁱRepresents 100 acres of each crop on a 500 acre farm, calculated with machinery purchased over average of last 7 years with a salvage value of 20 percent.

^jDepreciation is 11 percent of new cost. Interest at 13 percent on average investment (one-half of new cost plus salvage value). Insurance at 0.5 percent for power and equipment and 7 percent for truck on average investment.

^kMachinery storage is 1.5 percent on new cost.

^lThe land charge is the average rental charge per acre paid by New York farmers in 1981.

^mTake out dryer charge for high-moisture corn.

ⁿThe total variable and fixed expense estimate is for a specific farm size and technology, with all investments at 1982 price levels. This figure does not represent the cost of producing the crop in New York State.

INCOME AND PROFITABILITY MEASURES
FOR SELECTED FIELD CROP ENTERPRISE BUDGETS, 1982

	Corn Grain	Soybeans	Wheat	Alfalfa Timothy Hay	Corn Silage	Oats	Red Kidney Beans	Black Turtle Soup Beans
Yield per acre	100 bu.	30 bu.	45 bu.	4.0 T.	17 T.	80 bu.	15 cwt.	15 cwt.
Price per unit ¹	\$ 2.50	\$ 5.10	\$ 3.30	\$ 65.00	\$ 20.00	\$ 1.50	\$ 13.00	\$ 8.00
Total	\$250.00	\$153.00	\$148.50 ²	\$260.00	\$340.00	\$120.00	\$195.00	\$120.00
TOTAL VARIABLE EXPENSE ³	\$194.25	\$128.37	\$102.75	\$168.62	\$191.82	\$102.49	\$214.75	\$202.77
TOTAL EXPENSE	\$312.51	\$227.23	\$201.12	\$290.66	\$296.53	\$200.86	\$357.81	\$345.83
Return Over Variable Expense	\$ 55.75	\$ 24.63	\$ 45.75	\$ 91.38	\$148.18	\$ 17.51	\$-19.76	\$-82.77
Return to Management	\$-62.51	\$-74.23	\$-52.62	\$-30.66	\$ 43.47	\$-80.86	\$-162.81	\$-225.83
Breakeven Price to Cover Variable Expenses	\$ 1.94	\$ 4.28	\$ 2.28	\$ 42.16	\$ 11.28	\$ 1.28	\$ 14.32	\$ 13.52
Breakeven Price to Cover All Expenses	\$ 3.13	\$ 7.57	\$ 4.47	\$ 72.67	\$ 17.44	\$ 2.51	\$ 23.85	\$ 23.06

¹Sale during harvest season.

²Does not include value of straw.

³Includes labor.

Table 2. Power and Equipment Complements
and 1982 Investment Costs for Hay and Hay Crop Silage^a

Item	New Cost	Dry Hay		Hay Crop Silage	
		Proportion Charged to Hay	Proportional Cost	Proportion Charged to Hay Crop Silage	Proportional Cost
Tractor (125 hp. with cab)	\$43,550	0.26	\$11,323	0.26	\$11,323
Tractor (60 hp.)	18,500	0.32	5,920	0.32	5,920
Plow 5-18"	9,500	0.06	570	0.06	570
Disc Harrow (16')	8,900	0.06	534	0.06	534
Spring Tooth Harrow (16')	2,200	0.06	132	0.06	132
Cultipack Seeder	3,350	1.00	3,350	1.00	3,350
Baler with Bale Thrower	10,000	1.00	10,000	--	--
Forage Harvester	12,000	--	--	0.50	6,000
Pick-up Head	3,100	--	--	1.00	3,100
Mower-Conditioner Windrower (9')	8,500	1.00	8,500	1.00	8,500
Side Delivery Rake	3,000	1.00	3,000	1.00	3,000
Sprayer	2,950	0.20	590	0.20	590
Hay Wagons 2 @ \$2,150	4,300	1.00	4,300	--	--
Forage Wagons 2 @ \$10,000	20,000	--	--	0.50	10,000
Pick-up Truck	7,500	0.20	1,500	0.20	1,500
		Total	\$49,719		\$54,519
		Per Acre	\$497.19		\$545.19

^a500 tillable acres with 100 acres each of hay crop, corn silage, corn grain for feed, a row cash crop and a non-row cash crop.

Table 3. Power and Equipment Complements and 1982 Investment Costs for Corn Silage and for Corn Grain and Soybeans^a

Item	New Cost	Corn Silage		Corn Grain & Soybeans	
		Proportion Charged to Corn Silage	Proportional Cost	Proportion Charged to Corn & Soybeans	Proportional Cost
Tractor (125 hp. with cab)	\$43,550	0.18	\$7,839	0.07	\$3,049
Tractor (60 hp.)	18,500	0.22	4,070	0.14	2,590
Plow 5-18"	9,500	0.24	2,280	0.24	2,280
Disc Harrow (16')	8,900	0.24	2,136	0.24	2,136
Spring Tooth Harrow (16')	2,200	0.24	528	0.24	528
Planter	8,000	0.33	2,640	0.33	2,640
Sprayer	2,950	0.20	590	0.20	590
Cultivator, 4 row	2,530	0.33	842	0.33	842
Forage Harvester	12,000	0.50 ^b	6,000	--	--
2-Row Corn Head	3,350	1.00	3,350	--	--
Forage Wagons 2 @ \$10,000	20,000	0.50 ^b	10,000	--	--
Combine (diesel, cab, 4-row corn head or 13' grain head)	53,000	--	--	0.33	17,490
Grain Wagons @ \$2,500	5,000	--	--	0.33	1,650
Pick-up Truck	7,500	0.20	1,500	0.20	1,500
		Total	\$41,775		\$35,295
		Per Acre	\$417.75		\$352.95

^a500 tillable acres with 100 acres each of hay crop, corn silage, corn grain for feed, a row cash crop and a non-row cash crop.

^bHay is harvested as hay crop silage; otherwise, proportion charged to corn silage would be 1.0.

Table 4.

Power and Equipment Complement
and 1982 Investment Costs for Oats and Wheat^a

Item	New Cost	Proportion Charged to Oats and Wheat	Proportional Cost
Tractor (125 hp. with cab)	\$43,550	0.07	\$3,049
Tractor (60 hp.)	18,500	0.10	1,850
Plow 5-18" bottoms	9,500	0.24	2,280
Disc Harrow (16')	8,900	0.24	2,136
Spring Tooth Harrow (16')	2,200	0.24	528
Grain Drill, 18 x 7	6,500	1.00	6,500
Sprayer	2,950	0.20	590
Combine (diesel, cab, 4-row corn head or 13'grain head)	53,000	0.33	17,490
Grain Wagons 2 @ \$2,500	5,000	0.33	1,650
Pick-up Truck	7,500	0.20	1,500
		Total	\$37,573
		Per Acre	\$375.73

^a500 tillable acres with 100 acres each of hay crop, corn silage, corn grain for feed, a row cash crop and a non-row cash crop.

Table 5. Power and Equipment Complement
and 1982 Investment Costs for Red Kidney
Black Turtle Soup Beans^a

Item	New Cost	Proportion Charged to Beans	Proportional Cost
Tractor (125 hp. with cab)	\$43,550	0.16	\$6,968
Tractor (60 hp.)	18,500	0.23	4,255
Plow 5-18" bottoms	9,500	0.24	2,280
Disc Harrow (16')	8,900	0.24	2,136
Planter	8,000	0.33	2,640
Sprayer	2,950	0.20	590
Spring Tooth Harrow (16')	2,200	0.24	528
Cultivator (4 row)	2,550	0.33	842
Bean Combine ^b (44")	28,800	1.00	28,800
Puller & Divider ^b	2,700	1.00	2,700
Windrower ^b	5,700	1.00	5,700
Grain Wagons 2 @ \$2,500	5,000	0.33	1,650
Pick-up Truck	7,500	0.20	1,500
		Total	\$60,589
		Per Acre	\$605.89

^a500 tillable acres with 100 acres each of hay crop, corn silage, corn grain for feed, a row cash crop and a non-row cash crop.

^bIf a direct harvest head is used, substitute the self-propelled combine proportional cost of \$15,000 plus \$10,000 for the direct harvest head.

FIELD CROP ENTERPRISE BUDGET

Crop Enterprise _____	Yield Level _____			
Selected Variable Expense	Unit	Units Required	Cost Per Unit	19__ Expense
<u>Growing</u>				
Seed	_____	_____	_____	_____
Fertilizer:				
Nitrogen	lbs.	_____	_____	_____
Phosphorus, P ₂ O ₅	lbs.	_____	_____	_____
Potassium, K ₂ O	lbs.	_____	_____	_____
Lime	_____	_____	_____	_____
Chemicals	_____	_____	_____	_____
Power & Equipment:				
Fuel, Oil & Grease	_____	_____	_____	_____
Repairs & Maintenance	_____	_____	_____	_____
Other	_____	_____	_____	_____
Total Growing Cost				\$ _____
<u>Harvesting</u>				
Power & Equipment:				
Fuel, Oil & Grease	_____	_____	_____	_____
Repairs & Maintenance	_____	_____	_____	_____
Other ^a	_____	_____	_____	_____
Total Harvesting Cost				\$ _____
<u>Selling</u>				
Truck, Tractor & Equipment	_____	_____	_____	_____
Drying	_____	_____	_____	_____
Marketing & Transportation	_____	_____	_____	_____
Other	_____	_____	_____	_____
Total Selling Cost				\$ _____
Total Growing, Harvesting & Selling Costs				\$ _____
<u>Interest on Operating Capital</u>				
Total (from above)	=	_____		
Short-term interest rate 2	x	_____		
Interest on Operating Capital	=	_____		
TOTAL SELECTED VARIABLE EXPENSES				_____

^aExamples include twine for baled hay and urea for corn silage + NPN