

Reference

April 1986

A.E. Res. 86-7

FIELD CROP ENTERPRISE BUDGETS

1986 PROJECTIONS New York State

Darwin P. Snyder

William F. Lazarus

Department of Agricultural Economics
Cornell University Agricultural Experiment Station
New York State College of Agriculture and Life Sciences
A Statutory College of the State University
Cornell University, Ithaca, New York, 14853

It is the policy of Cornell University actively to support equality of educational and employment opportunity. No person shall be denied admission to any educational program or activity or be denied employment on the basis of any legally prohibited discrimination involving, but not limited to, such factors as race, color, creed, religion, national or ethnic origin, sex, age or handicap. The University is committed to the maintenance of affirmative action programs which will assure the continuation of such equality of opportunity.

TABLE OF CONTENTS

	<u>Page</u>
Introduction	1
Purpose	2
The Budget Procedure	2
Sources of Data	4
Suggestions for Use	4
Product Prices and Input Costs	5
Budget Format	7
Budgets	10
Appendix	21
Budget Worksheet	25

ACKNOWLEDGEMENTS

The authors wish to recognize the assistance of members of the Departments of Agronomy and Agricultural Engineering at Cornell University and various industry sources in gathering data on which this study is based. We also appreciate the help of our support staff in processing, printing, and distributing this publication.

LIST OF TABLES

<u>Table</u>		<u>Page</u>
1	Product Prices and Input Costs	6
 <u>FIELD CROP ENTERPRISE BUDGETS</u>		
<u>500 Acre Dairy Farm</u>		
2	Variable Costs	10
3	Comparison of Returns Over Variable Costs	11
 <u>1,200 Acre Crop Farm #1</u>		
4	Variable Costs	12
5	Comparison of Returns Over Variable Costs	13
 <u>1,200 Acre Crop Farm #2</u>		
6	Variable Costs	14
7	Comparison of Returns Over Variable Costs	15
 <u>Comparisons of Farm Total Costs and Returns</u>		
8	Dairy Farm and Crop Farms #1 and #2	17
9	Crop Farm #1 - various crops	18
10	Crop Farm #2 - various crops	19
 <u>APPENDIX</u>		
<u>Crop Machinery Investment</u>		
1A	500 Acre Dairy Farm	21
2A	1,200 Acre Crop Farm #1	22
3A	1,200 Acre Crop Farm #2	23
4A	Machinery Operating Factors	24
	Budget Worksheet	25

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 its operations. One 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 the interactions between them. With a farm, the parts of the business are the various crop and livestock enterprises. Enterprise analysis 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 examining forage, grain, livestock, and cash crop enterprises and the interactions between them. By examining receipts, expenses, and labor requirements for each enterprise, the strengths and weaknesses of the business can be brought into sharper focus.

Because no two farms have identical resources available, the 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 size of an enterprise is determined specifically for that farm through enterprise analysis.

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. 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 construct budgets for field crop enterprises typically found on dairy and cash crop farms in New York State. These are partial budgets which include only the operating costs for each crop and the returns that might be expected from current prices for somewhat better than average yields.

The results of these budgets will help the user to assess current relative economic advantages of the crops considered. With this information, researchers and farm managers will have a base of information that will help them to advise and make better informed decisions about profitable combinations of crop enterprises. The results can be used as presented or as adapted to meet the conditions of a specific farm business in the budgeting process.

The Budget Procedure

The crop enterprise budgets in this publication are constructed using the economic-engineering approach. This procedure uses current prices for operating costs such as seed, fertilizer, chemicals, and supplies. Other variable costs such as machinery repairs and fuel are calculated using engineering data for the operation of the machinery complements assumed for the farm operation.

Although all costs of production need to be considered to determine enterprise profits, these budgets are designed to aid in making short run, annual decisions about enterprise size and mix. With relatively stable fixed costs to spread over the crop acreage, the variable costs, considered here, will provide an estimate of the annual operating costs for each crop. These costs and assumed crop values are used to estimate the net contribution each

crop will make toward meeting the fixed costs and other obligations of the farm operator.

The budgets are developed within the context of either a dairy farm or a crop farm. Dairy farms of various sizes are common throughout New York State. The Central and Western New York counties are the most likely locations for crop farms and the larger dairy farms. Budget results should be interpreted and applied in the light of the assumptions made. They can be used for specific farm situations if differences related to enterprise size and yield, and machinery complements are recognized.

Crops common to a dairy farm are budgeted for a 500 acre, 200 cow dairy farm. The crop mix includes 200 acres of hay crops harvested as 50 acres of dry hay and 150 acres of hay crop silage. Three hundred acres of corn are harvested as 180 acres of corn silage and 120 acres of high moisture ear corn. Horizontal silos are used to store silage and a tower silo is used for the high moisture corn.

A 1,200 acre cash crop farm is used as the framework to develop budgets for various field crops common to New York State. The basic crop mix for this farm includes 100 acres of dry hay, 750 acres of corn grain, 200 acres of a row crop, and 150 acres of a small grain crop.

Each of these two types of farms has a field machinery complement typical of what might be expected to grow and harvest the crops grown on that farm. Tractors and equipment used directly for livestock care are not included in the machinery complement. Engineering data for each piece of machinery are used to calculate operating and ownership costs for use in the budgets.

The budgets are developed for a given yield level and enterprise size for each crop enterprise. Annual operating costs are included to grow and harvest the crop. Harvest costs for the feed crops on the dairy farm include costs associated with placing the crop in farm storage. Harvest costs for

the cash crop enterprises include costs necessary to prepare the crop for sale at the farm gate at harvest time. Costs to store the crops are not included for either farm.

Returns for each crop are based on current values at harvest time and somewhat better than average yields. Cultural practices and input costs are reflective of good yield expectations. The budget results indicate the net returns over annual variable costs on both a per acre and per unit basis.

This budgeting procedure has included the use of a computer spreadsheet program in the form of templates developed primarily to calculate operating costs for tractors and equipment used to produce the crops. Machinery related assumptions such as price, life, amount of annual use, and other factors will have an effect on operating costs charged to the crops. The assumptions used in the templates are believed to be reasonably indicative of the experience of New York crop producers.

Sources of Data

Many sources of data have been used in the construction of the budgets. Cultural practices and input levels were assumed with reference to 1986 Cornell Recommends for Field Crops. These practices were adapted to the budgets with the help of members of the Department of Agronomy at Cornell. Several commercial sources provided current prices on crop inputs and farm machinery. Engineering formulas and data used to calculate machinery costs were obtained from agricultural engineering sources. Contact with farm operators enhanced the judgment of the authors in compiling reasonable machinery complements and enterprise combinations.

Suggestions For Use

The field crop budgets presented in this publication have several applications. One obvious use is to provide an estimate of current operating costs for a variety of field crops commonly grown in the State. The results

can be used to determine relative direct costs to grow and harvest the budgeted crops.

The budgets can also be used to plan annual crop acreage combinations. As a starting point, they can be adapted to an individual set of practices and prices to provide estimates of cash flow needs and potential profits for a new year.

Finally, the budgeting process can help explore implications for major changes in enterprise size. Most variable costs included in the budgets will not change significantly with changes in enterprise size. However, as changes in enterprise size or practices dictate changes in equipment size and mix, operating costs per acre for repairs and fuel are likely to change to some degree.

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. A budget worksheet is provided at the end of this publication for application of these procedures to a specific farm situation.

Product Prices and Input Costs

The prices and costs used in the budgets are shown in Table 1. The product prices are believed to be reasonable expectations for the 1986 crop year in New York State. Crop returns do not include consideration for participation in government programs. The user should include the effects of

participation on enterprise costs and returns and on the whole farm business as he makes decisions about his cropping program.

Input costs are representative of what producers can expect to pay for seed, fertilizer, chemicals, supplies, and other costs in 1986.

Table 1. Product Prices and Input Costs

PRICES					
Product	Unit	Price			
Hay - alfalfa, grass	ton	\$80.00			
Corn silage	ton	24.00			
Corn grain	bushel	2.50			
Soybeans	bushel	6.00			
Wheat	bushel	3.00			
Red kidney beans	pound	0.20			
Oats	bushel	1.50			
COSTS					
Item	Unit	Cost	Item	Unit	Cost
<u>Seed</u>			<u>Chemicals</u>		
Alfalfa	lb	\$2.90	Atrazine 4L	gl	\$ 8.45
Timothy	lb	.80	2,4-D amine	gl	8.90
Corn	unit	60.00	Benlate 50WP	lb	13.20
Soybean	bu	9.50	Dual 8E	gl	47.25
Wheat	bu	6.25	Eptam 7EC	gl	21.00
Soybean	bu	9.50	Lasso	gl	19.50
Wheat	bu	6.25	Lorox L	gl	46.95
Red kidney beans	lb	0.62	Paraquat	gl	45.00
Oats	bu	4.00	Premerge	gl	13.00
<u>Fertilizer</u>			Thimet 15G	lb	1.29
N	lb	\$0.24	Treflan	gl	43.00
P	lb	0.22	Methoxychlor 2E	gl	11.88
K	lb	0.14	Malathion 5E	gl	18.75
<u>Lime</u>			Furadan 15G	lb	1.38
ton \$25.00			<u>Other</u>		
<u>Labor</u>			Twine (9,000 ft)	bale	\$20.00
Regular	hour	7.00	Diesel fuel	gl	1.10
Hourly	hour	5.00	Gasoline	gl	1.00
<u>Capital</u>			Gasoline (road)	gl	1.15
		12%			

Budget Format

Because these budgets are intended to aid in making short-run management decisions, the format includes provision for only variable costs for each crop. Budgets are presented for three situations on two types of farms.

The dairy farm and cash crop farm include the crop enterprise mix described earlier. The corn grain enterprise Crop Farm #1 (the base farm) is grown using conventional tillage practices. For comparison purposes, a third situation is budgeted in which the corn grain crop is grown using no-till practices. The budgets for Crop Farm #2 are based on a machinery complement designed specifically with no-till corn in mind. That is, it is not based on an adaptation of the machinery complement used for Crop Farm #1. Other management practices are assumed to be the same for both crop farms.

Variable costs are divided into four categories: cash costs for growing and harvesting the crop, interest on these operating costs, and labor costs. Labor is included as a variable cost because of the varying requirements for the different crops.

The first table for each farm situation (Tables 2, 4, and 6) provide some detail for the various categories as well as the total of these variable costs. Numbers in parentheses indicate physical quantities of those inputs.

The second table for each situation (Tables 3, 5, and 7) compares the variable costs and returns for each crop. The tables also illustrate the effects of crop price or yield changes on enterprise returns.

In analyzing the short-run income and profitability of each crop, the net returns per acre over variable costs provides a basis for comparison. This factor shows how much each crop is able to contribute to fixed or overhead costs for each enterprise relative to investments necessary to produce the crop. That includes the ownership costs (depreciation, interest, taxes, insurance, and housing) for the machinery complement and land costs.

It does not include a contribution toward the costs of marketing the crop since the assumption has been made that the crop is priced at harvest.

An analysis that included the marketing activity would involve assumptions related to the average crop price received during the marketing period and the costs associated with the marketing effort. These costs would include storage, interest on the stored crop, processing, packaging, transportation, and any other items that had an effect on the price received for the crop. Marketing practices vary widely between farms and are best analyzed apart from production practices and on a farm specific basis.

Tables 2 through 7 show budgeted variable costs for typical crops in the three farm situations. The next three tables (Tables 8, 9, and 10) provide comparisons of total costs and returns for the farms in each situation. Each table includes the fixed costs for machine ownership and a charge for the use of the land. Land is charged at the current average rental rate paid for cropland by New York farmers.¹ At \$30 per acre, actual costs of ownership are understated. However, a common rental rate applied consistently to each enterprise and farm situation prevents differences in taxes and land values from affecting enterprise result comparisons.

Tables 8, 9, and 10 show the total value of the crops grown in each combination of field crop enterprises. It should be noted that these values represent harvest time values and the budget costs do not include storing or marketing costs. To be successful, marketing efforts should result in crop prices enough higher than harvest time values to more than offset storing and marketing costs.

Total variable costs for the farm situations shown in the tables will provide some indication of the cash flow needs to grow and harvest the crops.

¹D.P. Snyder, Real Estate Rental Rates, New York State, 1984, A.E. Ext. 85-21, Department of Agricultural Economics, Cornell University, Ithaca, NY 14853-7801.

These needs can be compared for the various crop enterprise combinations shown.

Tables 8, 9, and 10 also indicate levels of net returns over variable costs for each farm situation for the crop costs detailed in previous tables. This factor provides an indication of the amount available from the current year's crop proceeds to meet fixed costs, debt service, capital purchases, and management expectations of the farm operator. The farm operator's labor cost is included with other labor.

Net returns over total costs for each farm situation in the tables provides a comparison of returns to management and profit for the operator of the farm business. The dairy farm has income from livestock in addition to the value of crops fed on the farm. Therefore, it is not easily compared with the cash crop farm situations. However, various combinations of crop enterprises and their machinery needs provide a basis of comparing net return results on the crop farms. The results shown in Tables 8, 9, and 10 would indicate conventional corn has a significant advantage over no-till corn under the assumptions used. Table 9 shows an advantage to soybeans over oats and both of these crops contribute to higher farm net returns than red kidney beans. Table 10 shows a decided advantage to harvest straw rather than to leave it in the field.

Reference is made to Appendix Tables 1A through 4A which show data for the crop machinery complements used for the dairy farm and each of the two crop farm budgets. Finally, a budget worksheet is shown to provide a guide to use in adapting these procedures to specific field crop enterprise analysis.

Table 2.

Field Crop Enterprise Budgets
Variable Costs
500 Acre, 200 Cow Dairy Farm - 1986 Projected

Crop	Hay	Hay Crop Silage	Corn Silage	High Moist. Ear Corn
Acres	50	150	180	120
Yield Per Acre	3.0 tons	3.0 tons (HE)	17 tons	5.3 tons
	\$	\$	\$	\$
<u>Variable Costs</u>				
<u>Growing</u>				
Seed	9.70	9.70	19.80	18.00
Fert. -N (lb)	(7)	(7)	(40)	(125)
P (lb)	(35)	(35)	(40)	(40)
K (lb)	(57)	(57)	(40)	(40)
Lime (tn)	(0.5)	(0.5)	(0.5)	(0.5)
Chemicals	15.60	15.60	27.73	27.73
P/E - fuel, oil	2.93	2.93	7.85	7.85
repair, maint.	2.15	2.15	6.63	6.63
Other	<u>2.00</u>	<u>2.00</u>	<u>2.00</u>	<u>2.00</u>
Total Growing	62.24	62.24	100.51	119.11
<u>Harvesting</u>				
P/E - fuel, oil	10.23	14.73	9.10	8.91
repair, maint.	9.87	18.64	11.56	11.13
Twine	6.00	0.00	0.00	0.00
Other	<u>3.00</u>	<u>3.00</u>	<u>5.00</u>	<u>5.00</u>
Total Harvesting	29.10	36.37	25.66	25.04
Interest - operating	<u>5.48</u>	<u>5.92</u>	<u>5.06</u>	<u>5.77</u>
Total Selected Variable Costs	96.82	104.53	131.23	149.92
<u>Labor (hours)</u>	(5.9)	(4.4)	(4.1)	(3.3)
Total Variable Costs	134.87	135.62	159.70	173.15

See notes on page 16.

Table 3.

Field Crop Enterprise Budgets
Comparison of Returns Over Variable Costs
Dairy Farm - 1986 Projected

Crop	Hay	Hay Crop Silage	Corn Silage	High Mois. Ear Corn
Acres	50	150	180	120
Yield Per Acre	3.0 tons	3.0 tons (HE)	17 tons	5.3 tons
Price Per Unit	\$80.00	\$80.00	\$24.00	\$60.00
	\$	\$	\$	\$
<u>Returns per acre</u>				
Crop	240.00	240.00	408.00	318.00
Other	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>
Total returns	240.00	240.00	408.00	318.00
Total variable costs	134.87	135.62	159.70	173.15
Net returns per acre over variable costs	105.13	104.38	248.30	144.85
Break-even price per unit of primary product to cover variable costs	44.96	45.21	9.39	32.67
----- <u>SENSITIVITY TO CROP PRICE OR YIELD CHANGES:</u> -----				
<u>20% Lower Crop Price or Yield</u>				
Total returns per acre	192.00	192.00	326.40	254.40
Net returns per acre over variable costs	57.13	56.38	166.70	81.25
<u>20% Higher Crop Price or Yield</u>				
Total returns per acre	288.00	288.00	489.60	381.60
Net returns per acre over variable costs	153.13	152.38	329.90	208.45

Table 4. Field Crop Enterprise Budgets
Variable Costs
1,200 Acre Crop Farm #1 - 1986 Projected

Crop	Hay	Corn Grain (conv.-till)	Soybeans	Winter Wheat	Substituted For Soybeans RK Beans	Oats
Acres	100	750	200	150	200	200
Yield Per Acre	3 tons	120 bu.	30 bu.	60 bu.	1,200 lb.	80 bu.
	\$	\$	\$	\$	\$	\$
<u>Variable Costs</u>						
<u>Growing</u>						
Seed	9.70	(24M K) 18.00	(1 bu) 9.50	(2 bu) 12.50	(84 lb) 52.08	(2.5 bu) 10.00
Fert. - N (lb)	(7) 1.68	(125) 30.00	(10) 2.40	(50) 12.00	(25) 6.00	(50) 12.00
P (lb)	(35) 7.70	(40) 8.80	(20) 4.40	(40) 8.80	(62) 13.64	(30) 6.60
K (lb)	(57) 7.98	(40) 5.60	(20) 2.80	(20) 2.80	(43) 6.02	(20) 2.80
Lime (tn)	(0.5) 12.50	(0.5) 12.50	(0.5) 12.50	(0.5) 12.50	(0.5) 12.50	(0.5) 12.50
Chemicals	15.61	27.73	23.56	0.83	27.90	0.83
P/E - fuel, oil	2.20	6.16	6.16	6.45	7.20	6.45
repair, maint.	1.84	6.46	6.46	5.37	7.13	5.76
Other	2.00	2.00	3.00	1.00	5.00	2.00
Total Growing	61.21	117.25	70.78	62.25	137.47	58.94
<u>Harvesting</u>						
P/E - fuel, oil	11.06	5.14	3.59	5.75	3.53	5.85
repair, maint.	10.55	10.73	9.54	8.63	9.49	9.07
Drying	0.00	36.00	0.00	0.00	0.00	0.00
Twine	6.00	0.00	0.00	2.00	0.00	2.00
Other	3.00	5.00	5.00	3.00	6.00	3.00
Total Harvesting	30.61	56.87	18.13	19.38	19.02	19.93
Interest - operating	5.51	6.96	3.56	7.35	6.26	3.15
Total Selected Variable Costs	97.33	181.08	92.47	88.98	162.75	82.02
Labor (hours)	(6.2) 40.59	(2.6) 17.87	(2.3) 15.98	(4.0) 26.73	(2.6) 18.10	(4.0) 27.03
Total Variable Costs	137.92	198.95	108.45	115.71	180.85	109.05

See notes on page 16.

Table 5.

Field Crop Enterprise Budgets
 Comparison of Returns Over Variable Costs
 1,200 Acre Crop Farm #1 - 1986 Projected

Crop	Hay		Corn Grain (conv. till)		Soybeans		Winter Wheat		Substituted For Soybeans	
	Acres	Price Per Unit	Acres	Price Per Unit	Acres	Price Per Unit	Acres	Price Per Unit	RK Beans	Oats
	100	\$80.00	750	\$2.50	200	\$6.00	150	\$3.00	200	150
Yield Per Acre	3 tons		120 bu.		30 bu.		60 bu.		1,200 lb.	80 bu.
Price Per Unit		\$80.00		\$2.50		\$6.00		\$3.00		\$1.50
		\$		\$		\$		\$		\$
<u>Returns per acre</u>										
Crop		240.00		300.00		180.00		180.00		120.00
Other		<u>0.00</u>		<u>0.00</u>		<u>0.00</u>		<u>60.00</u>		<u>41.25</u>
Total returns		240.00		300.00		180.00		240.00		161.25
Total variable costs		137.92		198.95		108.45		115.71		109.05
Net returns per acre over variable costs		102.08		101.05		71.55		124.29		52.20
Break-even price per unit of primary product to cover variable costs		45.97		1.66		3.61		0.93		0.85
----- SENSITIVITY TO CROP PRICE OR YIELD CHANGES: -----										
<u>20% Lower Crop Price or Yield:</u>										
Total returns per acre		192.00		240.00		144.00		192.00*		129.00*
Net returns per acre over variable costs		54.08		41.50		35.55		76.29		19.95
<u>20% Higher Crop Price or Yield:</u>										
Total returns per acre		288.00		360.00		216.00		288.00*		193.50*
Net returns per acre over variable costs		150.08		161.05		107.55		172.29		84.45

*Includes straw at adjusted price and yield.

Table 6.

Field Crop Enterprise Budgets
Variable Costs
1,200 Acre Crop Farm #2 - 1986 Projected

Crop	Hay	Corn Grain (no-till)	Soybeans	Winter Wheat
Acres	100	750	200	150
Yield Per Acre	3 tons	110 bu.	30 bu.	60 bu.
	\$	\$	\$	\$
<u>Variable Costs</u>				
<u>Growing</u>				
Seed	9.70	18.00	9.50	12.50
Fert. -N (lb)	(7)	(24M K)	(1 bu)	(2 bu)
P (lb)	(35)	(145)	(10)	(50)
K (lb)	(57)	(40)	(20)	(40)
Lime (tn)	(0.5)	(40)	(20)	(20)
Chemicals	12.50	(0.75)	(0.5)	(0.5)
P/E - fuel, oil	15.60	40.42	23.56	0.83
repair, maint.	1.93	1.95	5.77	5.41
Other	1.70	4.23	7.07	4.70
	<u>2.00</u>	<u>2.00</u>	<u>3.00</u>	<u>1.00</u>
Total Growing	60.79	134.55	71.00	60.54
<u>Harvesting</u>				
P/E - fuel, oil	12.41	5.13	3.60	6.32
repair, maint.	11.50	10.71	9.57	9.06
Drying	0.00	33.00	0.00	0.00
Twine	6.00	0.00	0.00	2.00
Other	<u>3.00</u>	<u>5.00</u>	<u>5.00</u>	<u>3.00</u>
Total Harvesting	32.90	53.84	18.17	20.38
Interest - operating	<u>5.63</u>	<u>7.54</u>	<u>3.56</u>	<u>7.28</u>
Total Selected Variable Costs	99.32	195.93	92.73	88.20
Labor (hours)	(6.2)	(1.8)	(2.5)	(4.0)
Total Variable Costs	139.91	208.37	110.06	115.04

See notes on page 16.

Table 7. Field Crop Enterprise Budgets
 Comparison of Returns Over Variable Costs
 1,200 Acre Crop Farm #2 - 1986 Projected

Crop	Hay	Corn Grain (no-till)	Soybeans	Winter Wheat
Acres	100	750	200	150
Yield Per Acre	3 tons	110 bu.	30 bu.	60 bu.
Price Per Unit	\$80.00	\$2.50	\$6.00	\$3.00
	\$	\$	\$	\$
<u>Returns per acre</u>				
Crop	240.00	275.00	180.00	180.00
Other	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>	<u>60.00</u>
Total returns	240.00	275.00	180.00	240.00
Total variable costs per acre	139.91	208.37	110.06	115.04
Net returns per acre over variable costs	100.09	66.63	69.94	124.96
Break-even price per unit of primary product to cover variable costs	46.64	1.89	3.67	0.92
<u>SENSITIVITY TO CROP PRICE OR YIELD CHANGES:</u>				
<u>20% Lower Crop Price or Yield</u>				
Total returns per acre	192.00	220.00	144.00	192.00*
Net returns per acre over variable costs	52.09	11.63	33.94	76.96
<u>20% Higher Crop Price or Yield</u>				
Total returns per acre	288.00	330.00	216.00	288.00*
Net returns per acre over variable costs	148.09	121.63	105.94	172.96

*Includes straw at adjusted price and yield.

Notes to Tables 2, 4, and 6.

- a. Seed - Cost for hay crops represents the annual cost for 12 pounds of alfalfa and five pounds of timothy allocated over a four year life of the stand.

Corn seed: 24-26 thousand kernels per acre.

- b. Fertilizer - hay - Includes 25 percent of fertilizer required for seeding.

Corn silage - Nitrogen reduced because of manure application.

- c. Lime - Application should be based on soil test results. One-half ton of lime per acre is assumed for annual pH maintenance except for a somewhat higher requirement for no-till corn to maintain pH in the seed zone.

- d. Chemicals - materials and rates per acre.

Hay crops - Premerge (1.3 qt) for seeding. Methoxychlor 2E (0.75 gal), Malathion 5E (0.3 gal) annually.

Corn - Conventional tillage - Furadan 15G (10 lb), Dual 8E (2 pt), and Atrazine 4L (1 qt).

Corn - no-till - Furadan 15G (10 lb), Paraquat (1 qt), Lasso (2.5 qt), Atrazine 4L (1.5 qt).

Soybeans - Dual 8E (2 pt), Lorox L (1 qt).

Red Kidney Beans - Thimet 15G (8 lb), Eptam 7EC (3.5 pt), Treflan 4EC (1 pt), Diazinon - Captan seed treatment (6 oz per cwt).

Winter Wheat and Oats - 2, 4-D (0.75 pt).

- e. Interest - Calculated on growing and harvesting expenses at 12 percent for the crop production period.

- f. Labor - Hours based on 1.3 times machinery hours. Additional hours added for handling hay and straw.

Table 8. Field Crop Enterprise Budgets
Comparison of Farm Total Costs and Returns
1986 Projected

Item	500 Acre Dairy Farm	1,200 Acre Crop Farm	
		#1 Conventional Corn	#2 No-till Corn
	\$	\$	\$
Total Crop Returns*	159,600	321,000	302,250
<hr/>			
<u>Variable Costs</u>			
Growing:			
Seed	7,664	18,245	18,245
Fertilizer, lime	19,370	55,496	63,784
Chemicals, other	12,441	29,646	39,159
Machinery - fuel, repairs	<u>5,360</u>	<u>14,169</u>	<u>9,083</u>
Total Growing	44,835	117,556	130,271
Total Harvesting	14,534	52,244	50,362
Interest - operating	2,761	7,587	8,019
Labor	<u>14,479</u>	<u>24,663</u>	<u>20,882</u>
Total Variable Costs	76,609	202,050	209,534
 <u>Fixed Costs</u>			
Machine ownership	39,022	60,849	54,179
Land	<u>15,000</u>	<u>36,000</u>	<u>36,000</u>
Total Fixed Costs	54,022	96,849	90,179
Total Crop Costs**	130,631	298,899	299,713
<hr/>			
Net Returns Over:			
Variable Costs	82,991	118,950	92,716
Total Costs (Return to mgmt. & profit)	28,969	22,101	2,537

*Value at harvest time at the farm. Returns include straw.

Crop acres - Dairy Farm - Hay (50), HCS (150), Corn Silage (180),
HMEC (120).

Crop Farms - Hay (100) Corn grain (750), Soybeans (200),
Winter wheat (150).

**Includes drying; excludes hauling, storage, marketing, and management.

Table 9. Field Crop Enterprise Budgets
 Comparison of Farm Total Costs and Returns
 1,200 Acre Crop Farm #1 - 1986 Projected

Item	Hay (100), Corn Grain (750), W. Wheat (150) plus - Soybeans (200) or RK Beans (200) or Oats (200)		
	\$	\$	\$
Total Crop Returns*	321,000	333,000	317,250
<hr/>			
<u>Variable Costs</u>			
Growing:			
Seed	18,245	26,761	18,345
Fertilizer, lime	55,496	58,708	57,856
Chemicals, other	29,646	30,914	24,900
Machinery - fuel, repairs	<u>14,169</u>	<u>14,549</u>	<u>14,041</u>
Total Growing	117,556	130,932	115,142
Total Harvesting	52,244	52,452	52,411
Interest - operating	7,587	8,132	7,505
Labor	<u>24,663</u>	<u>25,117</u>	<u>26,675</u>
Total Variable Costs	202,050	216,633	201,733
 <u>Fixed Costs</u>			
Machine ownership	60,849	60,849	58,691
Land	<u>36,000</u>	<u>36,000</u>	<u>36,000</u>
Total Fixed Costs	96,849	96,849	94,691
Total Crop Costs**	298,899	313,482	296,424
<hr/>			
Net Returns Over:			
Variable Costs	118,950	116,367	115,517
Total Costs (Return to mgmt. & profit)	22,101	19,518	20,826

*Value at harvest time at the farm. Returns include straw.

**Includes drying; excludes hauling, storage, marketing, and management.

Table 10.

Field Crop Enterprise Budgets
Comparison of Farm Total Costs and Returns
1,200 Acre Crop Farm #1 - 1986 Projected

Item	Hay (100), plus - Soybeans (200) w/straw	Corn Grain (750), or Oats (200) w/straw	W. Wheat (150) or Oats (200) w/o straw
	\$	\$	\$
Total Crop Returns*	321,000	317,250	300,000
<hr style="border-top: 1px dashed black;"/>			
<u>Variable Costs</u>			
Growing:			
Seed	18,245	18,345	18,345
Fertilizer, lime	55,496	57,856	57,855
Chemicals, other	29,646	24,900	24,900
Machinery - fuel, repairs	<u>14,169</u>	<u>14,041</u>	<u>13,973</u>
Total Growing	117,556	115,142	115,073
Total Harvesting	52,244	52,411	49,343
Interest - operating	7,587	7,505	7,314
Labor	<u>24,663</u>	<u>26,675</u>	<u>22,900</u>
Total Variable Costs	202,050	201,733	194,630
 <u>Fixed Costs</u>			
Machine ownership	60,849	58,691	58,692
Land	<u>36,000</u>	<u>36,000</u>	<u>36,000</u>
Total Fixed Costs	96,849	94,691	94,692
Total Crop Costs**	298,899	296,424	289,322
<hr style="border-top: 1px dashed black;"/>			
Net Returns Over:			
Variable Costs	118,950	115,517	105,370
Total Costs (Return to mgmt. & profit)	22,101	20,826	10,678

*Value at harvest time at the farm.

**Includes drying; excludes hauling, storage, marketing, and management.

Appendix
Table 1A.Crop Machinery Investment
500 Acre Dairy Farm^a
1986 Projected

Item	1986 List Price	Purchase Price ^b	Annual Ownership Cost ^c
	\$	\$	\$
Tractors - 125 hp	45,450	37,214	6,103
80 hp	27,250	22,312	3,659
60 hp	21,000	17,195	2,820
Trucks - Pick up	12,000	9,825	2,160
Large farm (2 used)	16,000	13,100	2,640
Plow (5-18")	9,950	8,147	1,401
Disc (13')	7,000	5,732	986
Drag (16')	2,200	1,801	310
Seeder w/cultipacker	3,600	2,948	507
Corn planter (6R)	12,800	10,481	1,803
Sprayer (15')	2,600	2,129	366
Cultivator (6R)	3,500	2,866	493
Mower-conditioner (12')	14,500	13,146	2,712
Rake	3,500	2,866	493
Baler w/kicker	12,000	10,879	1,871
Bale wagons (2)	4,600	3,766	618
Forage harvester	17,500	16,443	3,530
- Grass head	4,000	3,758	807
- Corn head (3R)	7,600	7,141	1,533
- Snapper head (2R)	7,700	7,235	1,553
Dump wagon	9,000	8,456	1,905
Grain wagons (2)	<u>5,600</u>	<u>4,585</u>	<u>752</u>
Totals	249,350	212,025	39,022
Per acre	499	424	78

^aDairy farm with 50 acres of hay, 150 acres of hay crop silage, 180 acres of corn silage, and 120 acres of high moisture ear corn. Complement does not include power or equipment needed for livestock.

^bPurchase price is based on the 1986 list price times an index value to reflect an average price paid over the average ownership period for each machine.

^cOwnership cost is based on purchase price and these assumptions: Forage harvester, heads, and dump wagon owned for six years with 30 percent trade-in value; mower owned for seven years; all other equipment, tractors, and trucks owned for ten years. Other trade-in values: trucks - 10 percent, wagons - 40 percent, all other power and equipment - 20 percent. Straight line depreciation, 12 percent interest on average investment, two percent of purchase price for insurance and storage; investment credit was not considered.

Appendix
Table 2A.Crop Machinery Investment
1,200 Acre Crop Farm #1^a
1986 Projected

Item	1986 List Price	Purchase Price ^b	Annual Ownership Cost ^c
	\$	\$	\$
Tractors - 125 hp	45,450	37,214	6,103
80 hp FWA	35,000	28,658	4,700
80 hp	27,250	22,312	3,659
60 hp	21,000	17,195	2,820
40 hp	15,000	12,282	2,014
Combine - Power unit	68,000	61,649	14,672
Corn head (4R)	10,000	9,066	2,158
Grain head (13')	6,000	5,440	1,295
Bean head (4R)	10,000	9,066	2,158
Trucks - Pick up	12,000	9,825	2,160
Large farm (2 used)	16,000	13,100	2,640
Plow (5-18") (2)	19,900	16,294	2,802
Disc (13') (2)	14,000	11,464	1,972
Drag (16') (2)	4,400	3,602	620
Cultipacker (14')	2,500	2,047	352
Drill-seeder	6,700	5,486	944
Corn planter (8R)	16,500	13,510	2,324
Sprayer (24')	3,150	2,579	444
Cultivator (8R)	5,000	4,094	704
Mower-conditioner (92')	10,500	9,519	1,964
Rake	3,000	2,456	422
Baler w/kicker	12,000	10,879	2,244
Bale wagons (3)	6,900	5,650	927
Grain wagons (2)	<u>5,600</u>	<u>4,585</u>	<u>752</u>
Totals	375,850	317,972	60,850
Per acre	499	424	78

^aFor a 1,200 acre cash crop farm with 100 acres of hay, 750 acres of corn grain, 200 acres of soybeans, and 150 acres of winter wheat.

^bPurchase price is based on the 1986 list price times an index value to reflect an average price paid over the average ownership period for each machine.

^cOwnership cost is based on purchase price and these assumptions: Combine and heads owned for five years with 30 percent trade-in value; mower and baler owned for seven years; all other equipment, tractors, and trucks owned for 10 years. Other trade-in values: trucks - 10 percent, wagons - 40 percent; all other power and equipment - 20 percent. Straight line depreciation, 12 percent interest on average investment, two percent of purchase price for insurance and storage; investment credit was not considered.

ERRATA SHEET for

A.E. Res. 86-7
April 1986

Page 22

Item	1986 List Price	Purchase Price ^b	Annual Ownership Cost ^c
Per acre	313	265	51

Appendix
Table 3A.Crop Machinery Investment
1,200 Acre Crop Farm #2^a
1986 Projected

Item	1986	Purchase	Annual
	List Price	Price ^b	Ownership Cost ^c
	\$	\$	\$
Tractors - 80 hp FWA (2)	70,000	57,316	9,400
60 hp (2)	42,000	34,390	5,640
Combine - Power unit	68,000	61,649	14,672
Corn head (4R)	10,000	9,066	2,158
Grain head (13')	6,000	5,440	1,295
Bean head (4R)	10,000	9,066	2,158
Trucks - Pick up	12,000	9,825	2,160
Large farm (2 used)	16,000	13,100	2,640
Plow (5-18")	9,950	8,147	1,401
Disc (13')	7,000	5,732	986
Drag (16')	2,200	1,801	310
Cultipacker (14')	2,500	2,047	352
Drill-seeder	6,700	5,486	944
Corn planter (8R no-till)	21,000	17,200	2,958
Sprayer (24')	3,150	2,579	444
Cultivator (4R)	2,500	2,050	352
Mower-conditioner (9')	10,500	9,519	1,964
Rake	3,000	2,456	422
Baler w/kicker	12,000	10,879	2,244
Bale wagons (3)	6,900	5,650	927
Grain wagons (2)	5,600	4,585	752
Totals	327,000	277,983	54,179
Per acre	273	232	45

^aFor a 1,200 acre cash crop farm with 100 acres of hay, 750 acres of no-till corn grain, 200 acres of soybeans, and 150 acres of winter wheat.

^bPurchase price is based on the 1986 list price times an index value to reflect an average price paid over the average ownership period for each machine.

^cOwnership cost is based on purchase price and these assumptions: Combine and heads owned for five years with 30 percent trade-in value; mower and baler owned for seven years; all other equipment, tractors, and trucks owned for 10 years. Other trade-in values: trucks - 10 percent, wagons - 40 percent; all other power and equipment - 20 percent. Straight line depreciation, 12 percent interest on average investment, two percent of purchase price for insurance and storage; investment credit was not considered.

Appendix
Table 4A.Machinery Operating Factors
Field Crop Enterprise Budgets
1986

Machine		Width	Speed	Field Efficiency	Tractor Size
		feet	mph	%	hp
Plow	(5-18")	7.5	4.0	80	125, 80FWA
Disc	(13')	13	4.5	80	125, 80FWA
Drag	(16')	16	5.5	80	80 FWA, 60
Cultipacker	(14')	14	6.0	80	40, 60
Drill-seeder		10.5	5.0	75	60
Corn planter	(6R)	15	4.5	65	60
Corn planter	(8R)	20	4.5	70	80
Corn planter	(8R-NT)	20	4.0	65	80 FWA
Sprayer	(15')	15	4.0	65	60
Sprayer	(24')	24	4.0	65	60
Cultivator	(4R)	10	4.5	80	60
Cultivator	(6R)	15	4.5	80	80
Cultivator	(8R)	20	4.5	80	80
Mower-conditioner	(9')	9	5.0	70	60
Mower-conditioner	(12')	12	4.5	70	80
Rake		12	4.5	80	60
Baler w/kicker		12	2.5	70	80

Crop _____ Year _____

Field Crop Enterprise Budget Worksheet
Variable Costs and Returns per Acre

Item	Quantity	Units	Per Unit	Average Per Acre
	no.		\$	\$
<u>Returns</u>				
Crop _____	_____	_____	_____	_____
Other _____	_____	_____	_____	_____
Total Crop Returns				(1)\$ _____
<u>Variable Costs</u>				
<u>Growing</u>				
Seed _____	_____	_____	_____	_____
Fert. _____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
Lime _____	_____	_____	_____	_____
Chem. _____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
P/E - Fuel, oil				_____
Repair, maint.				_____
Other				_____
Total Growing costs				\$ _____
<u>Harvesting</u>				
P/E - Fuel, oil				_____
Repair, maint.				_____
Drying				_____
Twine				_____
Other				_____
Total Harvesting Costs				_____
<u>Interest - operating</u>				
Total Selected Variable Costs				\$ _____
Labor _____	_____	hours	_____	_____
_____	_____	hours	_____	_____
Total Labor Costs				_____
Total Variable Costs				(2)\$ _____
Net Returns over Variable Costs				(1-2)\$ _____