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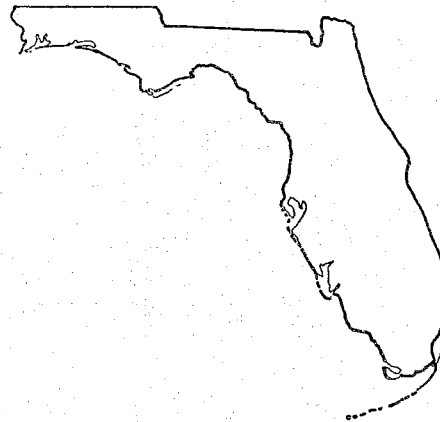
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**Economic Information
Report 119**

Enterprise Budget for Sugarcane Production in South Florida 1978-79



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ABSTRACT

An enterprise budget for sugarcane production in south Florida during the 1978-79 season was developed from data provided by local producers. An efficient 640-acre farm was assumed. Results show a cost per net ton of sugarcane of \$18.12, and of \$16.64 per net standard ton. Costs per gross, net and harvested acre were \$466, \$518 and \$690, respectively. Net returns to management and risk were \$37 per acre.

Key words: Everglades, sugarcane, enterprise budget, production costs.

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ENTERPRISE BUDGET FOR SUGARCANE PRODUCTION
IN SOUTH FLORIDA, 1978-79

Rigoberto A. Lopez, Jose Alvarez and Gerald Kidder

INTRODUCTION

Sugarcane production is the most important segment of the agricultural economy of the Lake Okeechobee region of south Florida. In a recent study [4] it was estimated that the sugarcane production and processing sectors provided approximately 12 percent of local employment and 8 percent of local gross output. A detailed budget for this important crop was published in 1972 [6] and updated in 1976 [3], and an industry-wide cost study was published in 1977 [2]. Inflation and changing agricultural practices have made the published values obsolete. The purpose of this study is to update the budget figures for Florida sugarcane.

An enterprise budget is a systematic listing of income, expenses, capital, labor, and machinery requirements for a given crop. Enterprise budgets have several important applications. Sugarcane producers may use current budgets to gauge their costs and practices against the model farm. Budgets allow comparison of production costs and revenue between different regions of the country and between crops in the same region. Since enterprise budgets are useful in land appraisals, the value of agricultural land is closely related to the potential net revenue from the crop being produced on that land. Finally, published

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budgets document costs for historical purposes and serve as a ready reference to those requiring general economic statistics on the crop in question.

The present study was performed in early 1979 and reflected the costs of agricultural practices common in the sugarcane growing region of south Florida during the 1978-79 season. Detailed discussion of the data was not included since the purpose of the study was to update previously published budget figures and to express the results in forms convenient to the assorted needs of the users.

ASSUMPTIONS OF THE STUDY

Many variables influence sugarcane production in south Florida. Variations in management, size of farm, soils, and all other factors affecting production, result in different systems of production with corresponding input and output levels. Budgeting a sugarcane operation thus requires the stating of several assumptions.

Management

This study assumes: a) a high level of farm management, b) the manager is a profit maximizer, c) use of the latest technology, and d) the operator is either an independent producer or a mill coop member, but is not a grower-processor.

Farm Characteristics

Sugarcane farms in south Florida vary in size from small, owner-operated to large, corporate-run farms. In this study, a 640-acre (one section) farm is assumed. Since the per-acre cost and yield figures obtained are considered representative of the best managed farms in the region, larger operations can use multiples of the basic unit.

The farm assumed is already established and its land subdivided into 16, 40-acre blocks. The land is distributed as shown in Table 1. There are 14 one-half mile long field ditches (7 miles total) and

2 one-mile long seepage canals. The farm is assumed to be located less than 15 miles from the mill, thus no extra charges for transportation of cane to the mill are made.

Machinery and Equipment

The machinery and equipment assumed (Table 2) can perform all necessary operations in the time required and is efficiently used. Equipment usage time is assumed to be 90 percent of tractor time, allowing for time lost in activities such as refueling, etc.

Labor

The farm has one full-time employee. Outside labor as well as custom services are assumed to be available in the area when needed.

Yields and Prices

Yields of 50, 38 and 30 gross tons per acre and sucrose contents of 14.5, 13.5 and 13 percent (normal juice sucrose) are assumed for plant, first ratoon and second ratoon cane, respectively. For seed cane, a 48 gross ton yield is assumed. Prices assumed for inputs were obtained from local businesses. Guidelines for computing prices of output were given by a local processor and are contained in The United States Sugar Program [5]. Although the Sugar Act expired at the end of 1974, its principles are still generally used for determining methods of payment to growers.

METHODOLOGY

Data Sources

Data for activities performed and equipment used were obtained through personal interviews with producers. Prices of inputs were provided by local companies servicing the growers.

Calculation of Costs

In Table 3 are listed all the activities performed in producing sugarcane on the model farm, along with the machinery and equipment needed. Typical machinery and equipment usage was then determined and the fixed and variable costs computed (Table 2). Variable costs per hour were then used to complete the cost section of Table 3. Detailed discussion of Table 3 is omitted because, along with the footnotes contained, it is self-explanatory.

Total Variable Costs

Variable costs are the costs that may be changed during the production period by producing more or less of a product or using more or less of a resource. Besides the costs incurred in different activities, labor benefits, miscellaneous costs, and interest on the investment are also included.

Total Fixed Costs

Fixed costs are those that cannot be changed during the production period; they must be paid whether production takes place or not. Fixed costs in cane production are those associated with owning machinery and equipment, land charges, and land and drainage district taxes. Machinery and equipment costs are listed in Table 3, the land charge corresponds to a typical cash rent in the area [2], and typical taxes were obtained from the interviews.

Calculation of Revenues

Revenues to the cane producer include the opportunity cost of the seed cane he produced, the sugarcane sold to the mill, and the molasses payment. Since most producers are paid in terms of net standard tons, the gross tons delivered to the mill must be converted to net standard tons as follows:

Dividing total costs of \$298,210 (Table 5, variable plus fixed) by total net tons of 16,460 gives a total cost of \$18.12 per net ton of cane produced.

Cost Per Net Standard Ton

The same procedure is used to determine the cost per net standard ton. Total net standard tons are computed as follows:

<u>(Net tons/acre)</u>	x	<u>(Quality factor)</u>	=	<u>(Net std. tons/acre)</u>	x	<u>(Acres)</u>	=	<u>(Net std. tons)</u>
Plant cane	48.50	1.2001		58.20	132			7,680
1st ratoon cane	36.86	1.1004		40.54	144			5,840
2nd ratoon cane	29.10	1.0505		30.55	144			<u>4,400</u>
								17,920

Dividing the \$298,210 total cost figure by total net standard tons results in a total cost of \$16.64 per net standard ton.

Costs Per Acre

Per acre costs can be computed considering gross, net and harvested acreage. Gross acreage is the total farm acreage. Net acreage is total acreage minus roads, ditches and canals. Harvested acreage is the net acreage minus acreage fallowed. Dividing total costs by 640 acres gives a cost per gross acre of \$466. Since net acreage equals 576, \$518 is the cost per net acre. Dividing by the 432 harvested acres results in a cost of \$690 per harvested acre.

Returns Per Acre

The returns to various factors of production are presented in Table 6. The break-down facilitates the estimation of the value of the resources used in sugarcane production. If land, management and risk are considered as the residual claimants (or unpaid factors of production), the net returns per acre are \$127. If only management and risk are left out, returns are \$37 per gross acre.

SENSITIVITY OF COSTS AND RETURNS

There are important qualifiers to the results that need to be pointed out. In general, yields, product prices and input costs are pretty much the same across the area. In the case of fuel and petroleum-based products, costs will increase next year due to the recent price increase.

One item that deserves special consideration is the land charge. A \$90 per acre cash rent was assumed in this study since it represents an average for the area. Variations in this charge will have a significant impact on the cost and return figures.

On the revenue side, the possibility of growing one or two crops of rice or one crop of field corn during the fallow period greatly enhances the possibility of increasing net returns. These rotations have become quite popular in recent years.

SUMMARY AND CONCLUSIONS

Costs and returns figures for sugarcane production in south Florida were updated based on 1978-79 figures. Results show that, under the conditions assumed in this study, it cost about \$18.12 per net ton and \$16.64 per net standard ton to produce cane in Florida in the 1978-79 season. Costs per gross, net and harvested acre were \$466, \$518 and \$690, respectively. Return to management and risk were about \$37 per acre. Variation in any one of an array of factors can significantly change these figures.

Table 1.--Land use distribution of the assumed 640-acre sugarcane farm in south Florida

Land use	Acres	Percent
Road, ditches and canals	64	10.0
Seed cane	12	1.9
Plant cane	132	20.6
1st ratoon	144	22.5
2nd ratoon	144	22.5
Fallow	<u>144</u>	<u>22.5</u>
Total	640	100.0

Table 2.--Estimated initial investment and annual and hourly operating costs of machinery and equipment used on a 640-acre sugarcane farm in south Florida, 1978-79

Item	Initial list price	New purchase price ^a	Years owned	Salvage value ^b	Annual usage	Fixed cost ^c		Variable cost/hr. ^d
						Annual	Per gross acre	
	-----Dollars-----			Dollars	-Hrs.-	-----Dollars-----		
Tractor, 110 HP	22,500	20,250	10	6,644	560	2,908	4.54	4.92
Tractor, 60 HP	12,500	11,250	10	3,691	566	1,615	2.52	2.54
Tractor, 60 HP	12,500	11,250	10	3,691	566	1,615	2.52	2.54
Disk, offset, 12', 24"	6,000	5,400	10	1,061	116	811	1.27	2.09
Disk, harrow, 21', 21"	5,200	4,680	10	919	190	703	1.10	2.05
Chisel plow, 12', 20"	1,600	1,440	10	283	51	216	0.34	0.43
Land leveler, 8-row, 30"	4,900	4,410	10	866	58	662	1.03	0.93
Mole drain	1,550	1,395	10	274	20	209	0.33	0.31
Furrow plow, 3-row	1,500	1,350	10	265	26	203	0.32	0.33
Covering rig	2,500	2,250	10	442	52	338	0.53	0.68
Scratcher, 3-row	2,000	1,800	10	354	303	270	0.42	0.93
Rolling cultivator	1,500	1,350	10	265	520	203	0.32	0.71
Rotary mower, 7'	1,700	1,530	10	300	45	230	0.36	0.44
Disk, 8', 24"	2,480	2,232	10	438	144	335	0.52	0.92
Pick-up truck	7,800	7,020	10	1,380	400	1,054	1.65	4.76
Pump, 36" pipe, 92 HP	17,000	15,300	10	3,000	500	2,298	3.59	1.78
Total						13,670	21.36	

^aAt 90% of initial list price.

^bComputed with the formula given in [7].

^cIncludes straight line depreciation; interest on average investment at 10% calculated by adding purchase price to salvage value divided by two; taxes and insurance at 1% of purchase price.

^dCalculated from [1] for the fifth year to reflect average variable costs over the ten year period.

Table 3.--Total costs of different activities performed on a 640-acre sugarcane farm in south Florida, 1978-79

Activity and equipment	Acres per day ^a	Hrs. per acre	Cost per hr.	Number acres per yr.	Times over	Amount	Total
			---\$---			---- Dollars ----	
I-LAND PREPARATION							
Heavy disking (offset)	45			144	4		
110 HP tractor		0.22	4.92			623	
24" disk 12' wide		0.20	2.09			241	
Operator		0.22	3.60			456	
Total						1,320	
Light disking (harrow)	75			144	10		
110 HP tractor		0.13	4.92			921	
21" disk 21' wide		0.12	2.05			354	
Operator		0.13	3.60			674	
Total						1,949	
Chiseling ^b	40			77	1		
110 HP tractor		0.25	4.92			95	
12' chisel plow, 20" deep		0.23	0.43			8	
Operator		0.25	3.60			69	
Total						172	
Ditch cleaning ^c							
Custom hired						875	

10

Continued

Table 3.--Total costs of different activities performed on a 640-acre sugarcane farm in south Florida, 1978-79--Continued

Leveling	45			144	2		
110 HP tractor		0.22	4.92			312	
8-row leveler, 30"		0.20	0.93			54	
Operator		0.22	3.60			<u>228</u>	
Total						594	
Mole draining ^d	36			77	1		
110 HP tractor		0.28	4.92			106	
Mole drain		0.25	0.31			6	
Operator		0.28	3.60			<u>78</u>	
Total						190	
Fertilization ^e				144	1		
Fertilizer						3,960	
Custom application						252	
Incorporation:	75				1		
110 HP tractor		0.13	4.92			92	
21" disk 21' wide		0.12	2.05			35	
Operator		0.13	3.60			<u>67</u>	
Total						4,406	<u>9,506</u>
II-PLANTING							
Furrowing	50			144	1		
110 HP tractor		0.20	4.92			142	
3-row furrower		0.18	0.33			9	
Operator		0.20	3.60			<u>104</u>	
Total						255	

Table 3.--Total costs of different activities performed on a 640-acre sugarcane farm in south Florida, 1978-79--Continued

Cutting cane							
Custom hired ^f				12		2,765	
Seed cost ^g						11,520	
Loading, hauling, dropping							
Custom hired ^h				144		<u>12,600</u>	
Total						26,885	
Seed covering and insect. appl.	25			144	1		
110 HP tractor		0.40	4.92			283	
Covering rig		0.36	0.68			35	
Operator		0.40	3.60			207	
Insecticide ⁱ						<u>1,901</u>	
Total						2,426	<u>29,566</u>
III-PLANT CANE CULTIVATING							
Scratching	60			144	14		
60 HP tractor		0.17	2.54			871	
3-row scratcher		0.15	0.93			281	
Operator		0.17	3.60			<u>1,234</u>	
Total						2,386	
Mechanical cultivation	50			144	8		
60 HP tractor		0.20	2.54			585	
Rolling cult.		0.18	0.71			147	
Operator		0.20	3.60			<u>829</u>	
Total						1,561	

Continued

Table 3.--Total costs of different activities performed on a 640-acre sugarcane farm in south Florida,
1978-79--Continued

Herbicide application ^j				144	1		
Custom hired airplane						238	
Materials						<u>815</u>	
Total						1,053	<u>5,000</u>
IV-STUBBLE CANE CULTIVATING							
Spreading fodder	36			144	1		
60 HP tractor		0.28	2.54			102	
7' rotary mower		0.25	0.44			16	
Operator		0.28	3.60			<u>145</u>	
Total						263	
Disk cultivation	36			288	2		
60 HP tractor		0.28	2.54			410	
24" disk 8' wide		0.25	0.92			132	
Operator		0.28	3.60			<u>581</u>	
Total						1,123	
Rolling cultivation	36			288	6		
60 HP tractor		0.20	2.54			878	
Rolling cult.		0.18	0.71			221	
Operator		0.20	3.60			<u>1,244</u>	
Total						2,343	
Fertilization ^k				288	1		
Custom appl.						504	
Materials						<u>6,840</u>	
Total						7,344	

Continued

Table 3.--Total costs of different activities performed on a 640-acre sugarcane farm in south Florida, 1978-79--Continued

Herbicide application ^j				288	1		
Custom hired airplane						475	
Materials						<u>1,630</u>	
Total						2,105	
Chiseling ^b	40			144	1		
110 HP tractor		0.25	4.92			177	
12' chisel plow, 20" deep		0.23	0.43			14	
Operator		0.25	3.60			<u>130</u>	
Total						321	<u>13,499</u>
V-HARVESTING ^l							
Plant cane				132	1	56,100	
1st ratoon cane				144	1	46,512	
2nd ratoon cane				144	1	<u>36,720</u>	
Total							<u>139,332</u>
VI-OVERHEAD ACTIVITIES							
Edging	640			640	1		
60 HP tractor		0.016	2.54			26	
Rotary mower		0.014	0.44			4	
Operator		0.016	3.60			<u>37</u>	
Total						67	

Continued

Table 3.--Total costs of different activities performed on a 640-acre sugarcane farm in south Florida, 1978-79--Continued

Rodent control ^m	432	1	
Custom hired airplane			648
Materials			<u>1,080</u>
Total			1,728
Borer control ⁿ			
Scouting	432		1,080
Custom hired	144		<u>1,477</u>
Total			2,557
Water control			
Pump 36" pipe			890
Labor ^o			<u>360</u>
Total			1,250
			<u><u>5,602</u></u>

^aA day is assumed to be 10 hrs. for labor and tractor and 9 hrs. for other machinery and equipment.

^bOnly to about half of the land due to variations in soil depth.

^cIncludes soil spreading and is done only to plant cane, 2.5 miles at \$350/mile.

^dOne 10" diameter mole plow pulled 2' deep every 20'.

^e500 lbs. of 0-10-40 plus micronutrients applied broadcast, at \$110/ton of material and \$7/ton for application.

^fTwelve acres of seed cane with a 48 ton yield at \$4.80/harvested ton. The 576 tons are planted in 144 acres at 4 tons per acre.

Continued

Table 3.--Total costs of different activities performed on a 640-acre sugarcane farm in south Florida, 1978-79--Continued

^gAt \$20/ton.

^hAt \$87.50/acre.

ⁱ40 lbs. of Furadan/acre at \$0.33/lb.

^j $\frac{1}{4}$ gal. of 2,4-D/A at \$4.25/gal. plus 2 lbs. of Atrazine/A at \$2.00/lb. plus surfactant at \$6/gal. (0.5% of sprayed volume). \$1.65/A for the airplane.

^k500 lbs./A of 0-10-40 without micronutrients, custom applied at \$95/T for material and \$7/ton for application.

^lCustom hired, at \$8.50 per gross ton, assuming yields of 50, 38 and 30 gross tons per acre for plant cane, first and second ratoon, respectively.

^m10 lb./A of zinc phosphide at \$0.25/lb., \$1.50/A for the airplane.

ⁿCharges for scouting are \$2.50 per acre for the season for 432 acres. Assumes two applications to 144 acres. Each chemical application costs an average of \$5.13 per acre and includes $\frac{1}{4}$ pint of Azodrin 5WM and the aircraft cost.

^o100 hrs./year @ \$3.60/hr.

Table 4.--Standard quality factor for converting net tons of cane to standard tons of cane, by various measures of sugar quality

For sugar quality expressed as:			
Percent Sucrose in normal juice ^a	Percent Sugar in cane ^b	Pounds sugar per ton of cane ^c	Multiply net tons per acre by
11.57	8.25	165	.9079
11.84	8.50	170	.9348
12.11	8.75	175	.9617
12.38	9.00	180	.9887
12.65	9.25	185	1.0156
12.92	9.50	190	1.0425
13.19	9.75	195	1.0695
13.46	10.00	200	1.0964
13.73	10.25	205	1.1233
14.00	10.50	210	1.1502
14.27	10.75	215	1.1772
14.54	11.00	220	1.2041
14.81	11.25	225	1.2310
15.08	11.50	230	1.2580
15.34	11.75	235	1.2849
15.61	12.00	240	1.3118
15.88	12.25	245	1.3387
16.15	12.50	250	1.3657
16.42	12.75	255	1.3926
16.69	13.00	260	1.4195
16.96	13.25	265	1.4465
17.23	13.50	270	1.4734
17.50	13.75	275	1.5003
17.77	14.00	280	1.5272

^aFor every 0.01 percentage point, quality factor increments or decreases by 0.001.

^bFor every percentage point, quality factor increments or decreases by 0.1077.

^cFor every pound, quality factor increments or decreases by 0.0054.

Source: [3].

Table 5.--Costs and returns for a 640-acre sugarcane operation in south Florida, 1978-79

Item	Unit	Quantity per acre	Price of cost/unit	Approximate value or cost/acre	Number of acres	Gross value or cost
Total revenues^a						
Seed cane	gross ton	48.00	20.00	960.00	12	11,520
Sugarcane plant cane	net std. ton	58.20	17.22	1,002.20	132	132,290
Sugarcane 1st ratoon	net std. ton	40.54	17.22	698.10	144	100,526
Sugarcane 2nd ratoon	net std. ton	30.55	17.22	526.07	144	75,754
Molasses payment	ave. net ton	37.95	0.458	17.38	420	7,300
Total						327,390
Total variable costs						
Land preparation ^b	acre			66.02	144	9,506
Planting ^b	acre			203.55	144	29,566
Plant cane cultiv. ^b	acre			34.72	144	5,000
Ratoon cultiv. ^b	acre			46.87	288	13,499
Overhead activities ^b	acre			8.75	640	5,602
Labor benefits ^c	acre			1.75	640	1,123
Miscellaneous ^d	acre			8.84	640	5,655
Interest ^e	acre			10.92	640	6,990
Harvesting ^b	acre			331.74	420	139,332
Total						216,220
Total fixed costs						
Machinery and equip. ^f	acre			21.36	640	13,670
Land charge	acre			90.00	640	57,600
Taxes: land and drainage	acre			16.75	640	10,720
Total						81,990

^aSee text for procedure used in computing total revenues.

Continued

Table 5.--Costs and returns for a 640-acre sugarcane operation in south Florida, 1978-79--Continued

^bFrom Table 3.

^cAt 12% of gross salary and includes social security and unemployment and workmen's compensation.

^dAt 10% variable costs above and includes pick-up truck use, office supplies, telephone, etc.

^eAt 10% of pre-harvest variable costs.

^fFrom Table 2.

Table 6.--Returns per gross acre to factors of production for a 640-acre sugarcane operation in south Florida, 1978-79

Item	Charge	Return
	---- Dollars ----	
Total revenue over variable costs to labor, fixed costs, land, and management and risk		511
Variable costs (excluding labor)	336	
Return to labor, fixed costs, land, and management and risk		175
Labor (2.8 hrs. at \$3.60/hr.)	10	
Return to fixed costs, land, and management and risk		165
Fixed costs (Machinery, equipment, and taxes)	38	
Return to land and management and risk		127
Land charge	90	
Return to management and risk		37

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