ARE NO-TILL MULTICROPPING PRODUCTION METHODS PROFITABLE FOR FLORIDA FARMERS?

DAN L. GUNTER, NANCY MCCABE AND RAY GALLAHER

Increasing costs of agricultural inputs, especially energy and credit, are forcing farmers to evaluate their conventional production methods to determine if lower cost practices can be identified. No-till and multicropping are two practices being given increasing consideration.

Benefits of these practices have been extolled in many of the agriculture publications. The benefits often mentioned include:

1. better utilization of land,
2. reduced fuel and labor costs,
3. spreading of fixed costs of machinery over more annual hours of use, and
4. possible increased yields.

New planting equipment designed to operate in unplowed stubble or mulch and improved herbicides to control weeds and grasses reduce the problems farmers have found to be associated with no-till production practices.

Scientists working for the Institute of Food and Agricultural Sciences (IFAS) at the University of Florida have been conducting research on no-till and multicropping methods for some of the more important Florida field crops.

The purpose of this paper is to report an evaluation of the profitability of producing corn and soybeans using no-till, multicropping practices. A profitability comparison is also made to conventional corn and soybean production.

PROCEDURE

We used data collected from IFAS experiments which were first conducted during 1973 at the University farm near Williston. Multicropping was used in both the no-till and conventionally produced crops. Rye was harvested as hay and/or grain and followed by either corn or soybeans planted with conventional or no-till methods.

Corn and soybeans were no-till planted in a single operation using a two row Brown-Harden Super Seeder with a subsoiler. Conventionally planted corn and soybeans required harrowing, plowing, harrowing and then planting.

To compare the profitability of these enterprises we developed budgets which are a systematic listing of income and expenses for a production period. The

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budgets show income, variable costs, harvest costs, fixed costs and net returns. The budgeted costs are based on 1980 input price levels and the annual ownership and operation costs of the following set of machinery and equipment:

Machinery and Equipment

	USED IN NO-TILL PRODUCTION	USED IN CONV. PRODUCTION
Tractor, 55 hp	X	X
Truck, 2 ton	X	X
Grain Combine	X	X
Sprayer	X	X
Planter		X
Super Seeder 2 row	X	X
MB Plow (4)		X
Harrow		X
Fertilizer Spreader	X	X

ESTIMATED COSTS FOR SOYBEANS

The budget for conventionally tilled soybeans is shown in Figure 1. Yield from the experiment was 20 bushels per acre, variable costs are $78.87 and harvest costs, which include labor and operating expenses associated with the machinery, are $7.81 per acre. The total variable costs which can be thought of as “out –of-pocket” expenses totaled $86.68. The fixed costs are $21.52 and include the normal “DIRTI” five expenses associated with ownership of machinery and equipment. The DIRTI five are: Depreciation, Interest, Repairs, Taxes, and Insurance. Total per acre costs are $108.20, which subtracted from grow receipts leaves a net return to land and management of $65.80 per acre.

ESTIMATED COSTS FOR CORN

Budgets for no-till and conventionally produced corn are shown in Figures 3 and 4. The revenue and costs for alternative corn production methods are:

	NO-TILL	CONVENTIONAL
	---------- Dollars ----------	
Revenue	263.25	256.50
Total Costs	156.77	166.04
Returns to Land and Management	106.48	90.46

CONVENTIONAL TILL SOYBEANS IN RYE STUBBLE
YELL DRAINED ACIDIC SANDY LOAM
LEVY COUNTY. 1980 PRICES

	UNIT	PRICE OR COST/UNIT	QUANTITY	VALUE OR COST
1. GROSS RECEIPTS FROM PRODUCTION				$
	BU.	6.00	29.00	174.00
TOTAL				$ 174.00
2. VARIABLE COSTS				
PREHARVEST				$
SOYBEAN SEED	BU.	13.00	1.00	13.00
TOXAPHENE	LBS	0.77	4.00	3.08
PARAQUAT	PT.	5.30	2.50	13.25
LASSO	LBS.	4.50	2.00	9.00
LEXONE	LBS.	8.75	0.38	3.32
BASAGRAN	QT.	7.75	2.25	17.44
ORTHO X 77	PT.	1.75	0.67	1.17
INNOCULANT	BU.	1.70	1.00	1.70
MACHINERY	ACRE	2.46	1.00	2.46
TRACTORS	ACRE	5.11	1.00	5.11
LABOR(TRACTOR & MACHINERY)	HOUR	3.50	1.65	5.79
INTEREST ON OP. CAP.	DOL	0.14	25.32	3.54
SUBTOTAL, PRE-HARVEST				$ 78.87
HARVEST COSTS				$
MACHINERY	ACRE	5.47	1.00	5.47
LABOR(TRACTOR & MACHINERY)	HOUR	3.50	0.67	2.34
SUBTOTAL, HARVEST				$ 7.80
TOTAL VARIABLE COST				$ 86.68
3. INCOME ABOVE VARIABLE COSTS				$ 87.32
4. FIXED COSTS				$
MACHINERY	ACRE	17.21	1.00	17.21
TRACTORS	ACRE	4.31	1.00	4.31
TOTAL FIXED COSTS				$ 21.52
5. TOTAL COSTS				$ 108.20
6. NET RETURNS				$ 65.80

BROWN-HARDEN SUPERSEEDER
COBB SOYBEANS, SUBSOILED
NANCY MCCABE - RAY GALLAHER

3/10/80

BUDGET IDENTIFICATION NUMBER--- 124438040 10118
ANNUAL CAPITAL MONTH 11

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Figure 1.

NO-TILL SOYBEANS IN RYE STUBBLE
WELL DRAINED ACIDIC SANDY LOAM
LEVY COUNTY, 1980 PRICES

	UNIT	PRICE OR COST/UNIT	QUANTITY	VALUE OR COST
1. GROSS RECEIPTS FROM PRODUCTION				$
	BU.	6.00	39.00	234.00
TOTAL				$ 234.00
2. VARIABLE COSTS				
PREHARVEST				$
SOYBEAN SEED	BU.	13.00	1.00	13.00
TOXAPHENE	LBS.	0.77	4-00	3.08
PARAQUAT	PT.	5.30	2.50	13.25
LASS	LBS.	4.50	2.00	9.00
LEXONE	LBS.	8.75	0.38	3.32
BASAGRAN	QT.	7.75	2.25	17.44
ORTHO X 77	PT.	1.75	0.67	1.17
INNOCULANT	BU.	1.70	I. 00	1.70
FURADAN	LBS.	0.72	10.00	7.20
MACHINERY	ACRE	2.01	1.00	2.01
TRACTORS	ACRE	2.66	1.00	2.66
LABOR(TRACTOR & MACHINERY)	HOUR	3.50	0986	3.02
INTEREST ON OP. CAP.	DOL.	0.14	27.11	3.79
SUBTOTAL. PRE-HARVEST				$ 80.64
YARVEST COSTS				$
MACHINERY	ACRE	5.47	1.00	5.47
LABOR(TRACTOR & MACHINERY)	HOUR	3.50	0.67	2.34
SUBTOTAL. HARVEST				$ 7.80
TOTAL VARIABLE COST				$ 88.45
3. INCOME ABOVE VARIABLE COSTS				$ 145.55
4. FIXED COSTS				$
MACHINERY	ACRE	15.86	1.00	15.86
TRACTORS	ACRE	2.25	1.00	2.25
TOTAL FIXED COSTS				$ 18.10
59 TOTAL COSTS				$ 106.55
6. NET RETURNS				S 127.45

BROWN-HARDEN SUPERSEEDER
COBB SOYBEANS. SUBSOILED, WITH FURADAN
NANCY MCCABE - RAY GALLAHER 3/10/80

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Figure 2.

NO-TILL CORN GRAIN IN RYE HAY STUBBLE
WELL DRAINED ACIDIC SANDY LOAM
LEVY COUNTY, 1980 PRICES

	UNIT	PRICE OR COST/UNIT	OUANTITY	VALUE OR COST
1. GROSS RECEIPTS FROM PROOUCTION				$
CORN	BU.	2.25	117.00	263.25
TOTAL				$ 263.25
2. VARIABLE COSTS				
PREHARVEST				$
CORN SEED	LBS.	0.85	19-00	16.15
NLPEK	CWT.	6.00	6.00	36.00
NITROGEN	LBS.	0.24	120.00	28.80
FURADAN	LBS.	0.72	20.00	14.40
ATRAZINE	LBS.	1.83	2.00	3.66
PARAQUAT	PT.	5.30	1.50	7.95
ORTHO X 77	PT.	1.75	0.66	1.15
LOROX	LBS.	4.50	1.00	4.50
MACHINERY	ACRE	2.06	1.00	2.06
TRACTORS	ACRE	3.36	1.00	3.36
LABOR(TRACTOR & MACHINERY)	HOUR	3.50	1.09	3.80
INTEREST ON OP. CAP.	DOL.	0.14	41.78	5.85
SUBTOTAL. PRE-HARVEST				$ 127.68
HARVEST COSTS				$
YACHINERY	ACRE	6.45	1.00	6.45
LABOR(TRACTOR b UACHINERYI	HOUR	3.50	0.85	
SUBTOTAL. HARVEST				$ 9.42
TOTAL VARIABLE COST				$ 137.10
3. INCOME ABOVE VARIABLE COSTS				$ 126.15
4. FIXED COSTS				$
WACHINERY	ACRE	16.84	1.00	16.84
TRACTORS	ACRE	2.83	1.00	2.83
TJTAL FIXED COSTS				$ 19.67
5. TOTAL COSTS				$ 156.77
6. NET RETURNS				$ 106.48

BROWN-HARDEN SUPERSEEDER
FUNKS G-4507 CORN, SUBSOILED, 5-10-5
NANCY MCCABE - RAY GALLAHER 3/10/80

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Figure 3.

CONVENTIONAL TILL CORN IN RYE HAY STUBBLE
YELL DRAINED ACIDIC SANDY LOAM
LEVY COUNTY. 1980 PRICES

	UNIT	PRICE Of? COST/UNIT	QUANTITY	VALUE OR COST
1. GROSS RECEIPTS FROM PRODUCTION				$
CORN	BU	2.25	114000	256.50
TOTAL				$ 256.50
2. VARIABLE COSTS				
PREHARVEST				$
CORN SEED	LBS.	0.85	19.00	16.15
N&P&K	CWT.	6.00	60 00	36.00
NITROCEN	LBS.	0.24	120.00	28.80
FURADAN	LBS.	0072	20.00	14.40
ATRAZINE	LBS.	1.83	2.00	3.66
PARAQUAT	PT.	5.30	1.50	7.95
ORTHO X 77	PT.	I. 75	0.66	1.15
LOROX	LBS.	4.50	1.00	4.50
MACHINERY	ACRE	2.52	1.00	2.52
TRACTORS	ACRE	5.81	1.00	5.81
LABOR(TRACTOR & MACHINERY)	HOUR	3.50	1.88	6.58
INTEREST ON OP. CAP.	DOL.	0.14	42.99	6.02
SUBTOTAL. PRE-HARVEST				$ 133.53
HARVEST COSTS				$
MACHINERY	ACRE	6.45	I.00	6.45
LABORETRACTOR & MACHINERY)	HOUR	3.50	0.85	2.97
SUBTOTAL. HARVEST				$ 9.42
TOTAL VARIABLE COST				$ 142.95
30 INCOME ABOVE VARIABLE COST5				$ 113.55
4. FIXED COSTS				$
MACHINERY	ACRE	18.19	1.00	18.19
TRACTORS	ACRE	4.90	1.00	4.90
TOTAL FIXED COSTS				$ 23.09
5. TOTAL COSTS				$ 166.04
6. NET RETURNS				$ 90.46

BROWN-HARDEN SUPERSEEDER
FUNKS G-4507 CORN. SUBSOILED, 5-10-5
NANCY MCCABE - RAY GALLAHER 3/10/80

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Figure 4.

Yields observed were three bushels per acre higher in the no-till field while the machinery operating costs were lower accounting for the $76.02 difference in net revenue.

FUEL AND LABOR COSTS COMPARISONS

With increased interest in energy conservation, producers can compare fuel use for the alternative production methods. Figure 5 shows the gallons per acre of gasoline and diesel fuel. The no-till practices require almost three gallons less fuel than the conventional practices. This translates into more than a $3 per acre cost savings at 1980 fuel price levels. However, fuel savings alone may not provide enough incentive for farmers to adopt a new set of cultural practices.

In addition to the fuel savings, labor and machinery requirements are reduced with no-till practices. Figure 6 shows a labor savinas of almost 0.8 of an hour/acre for both corn and soybeans produced using no-till production methods. Likewise, machinery hours required are lower using no-till. For example, the variable costs per acre for the tractor is $5.11 for conventionally planted soybeans and $2.66 for no-till (Figure 7). The variable costs for the tractor for no-till corn production is $3.36 per acre as compared with $5.81 if produced conventional 1y.

PROFITABILITY OF MULTICROPPING

Other fixed or variable cost comparisons can be made, but the real test is whether or not net returns are higher? If we compare net returns per acre where corn and soybeans are multicropped with hay, yieldinq both rye grain and hay, the total net returns are as follows:

	NO-TILL CORN	CONV. TILL CORN	NO-TILL SOYBEANS	CONV. TILL SOYBEANS
Single crop	$106.48	$ 90.46	$127.45	$65.80
Rye grain and hay	14.29	14.29	14.29	14.29
Tota1 returns/acre	$120.77	$104.75	$141.74	$80.09

CONCLUSIONS

The results of the experiments and budget analysis show that no-till and multi-cropping are more profitable than conventional cultural practices to produce the same crops. Differences in profits are due to reduced costs and higher yields using no-till production.

These results stem from one year's experiment. Further experimental work needs to be undertaken to evaluate the effectiveness of no-till practices under farm conditions. Farmers considering no-till practices should do some careful feasibility analyses before they trade their mold board plow and disk for one-pass planting equipment.

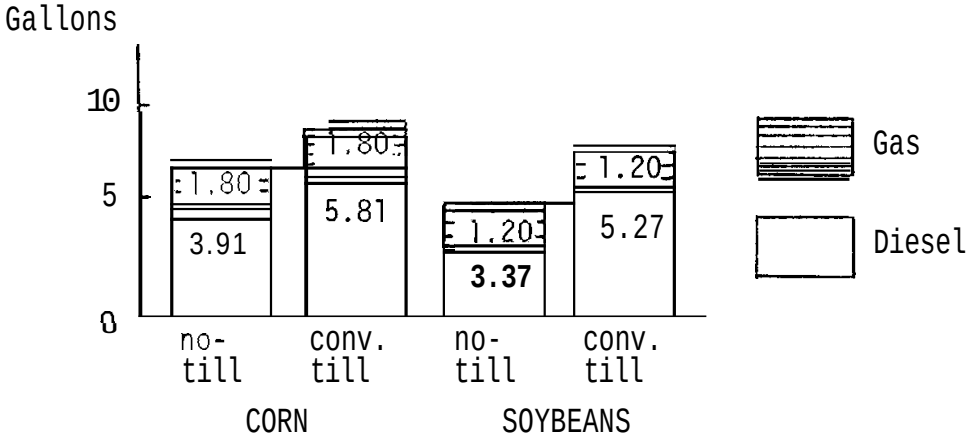

Figure 5. Fuel Used Per Acre.

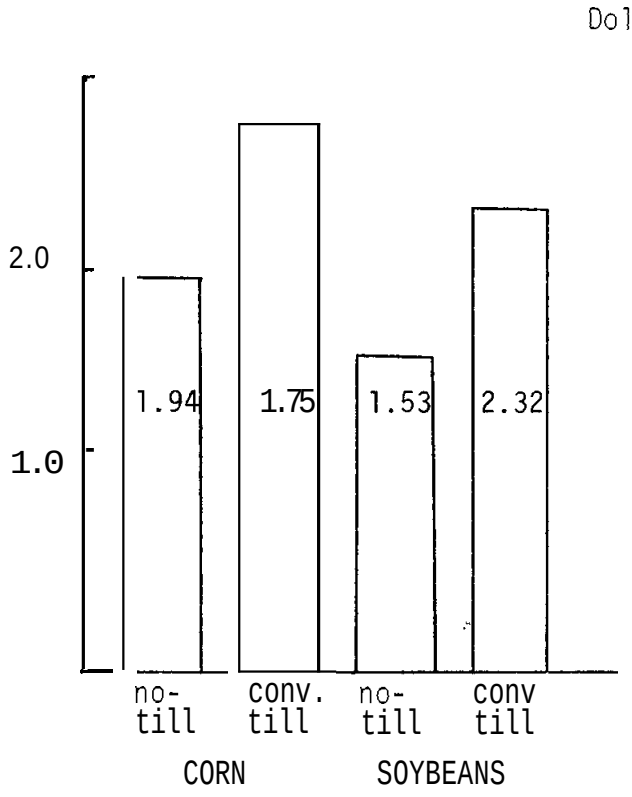

Figure 6. Labor Requirements For Conventional and No-Till Corn and Soybeans.

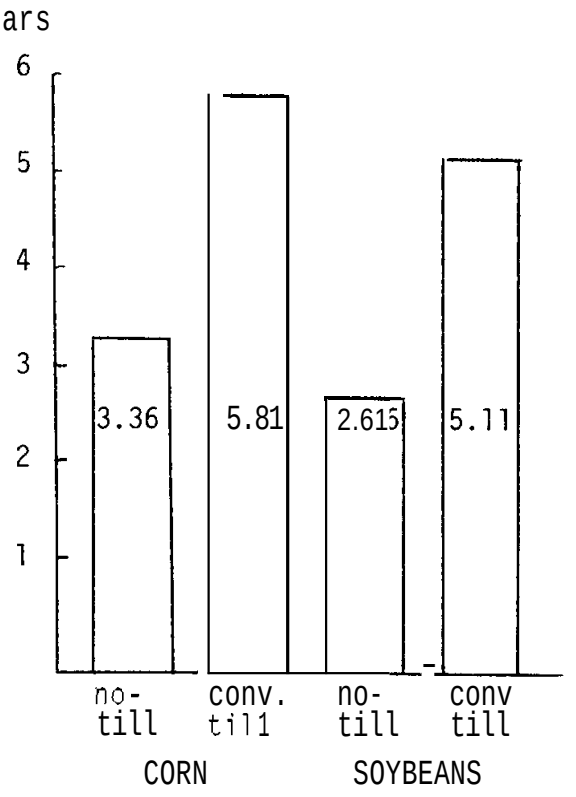

Figure 7. Variable Costs of Tractor Per Acre.