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Economic Results of Alternative Farming Systems Trials at South Dakota State University's Northeast Research Station: 1985-1988

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ECONOMIC RESULTS OF ALTERNATIVE FARMING SYSTEMS TRIALS AT SOUTH DAKOTA STATE UNIVERSITY'S NORTHEAST RESEARCH STATION: 1985 - 1988

by

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PREFACE

South Dakota State University (SDSU) has been conducting controlled experiments since 1985 to compare "low-input" ("alternative") farming systems with conventional and reduced tillage systems in which recommended chemical inputs are used. The research is conducted at SDSU's Northeast Research Station, near Watertown, S.D. The research receives its core support from the South Dakota Agricultural Experiment Station.

In 1988, SDSU received a grant through the U.S. Department of Agriculture's Low-Input/Sustainable Agriculture (LISA) program, in part to intensify the agronomic and economic investigations related to these trials. This research report is one of the products of that competitive grant (No. LI-88-12). Yields, cultural practices, and baseline economic results from these trials for the years 1985-1988 are contained in the report. At the end of the 1989 crop season, baseline results for the fifth year of these trials will also be generated. The five years of data will then be used as a partial basis for economic analyses of the "transition" from conventional to low-input (alternative) systems. Policy analyses will also be carried out using some of the data. Hence, this report constitutes a "source document", from which more detailed analyses will be developed.

We wish to thank Brent Van Der Werff for his extensive assistance with the crop enterprise budgets. Our thanks are also extended to Dr. Don Peterson for reviewing the manuscript. Finally, we extend our appreciation to Mrs. Verna Clark for patiently and accurately typing the manuscript and its revisions.

CM, TLD, and JDS
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Introduction

This report contains baseline economic results for the first four years of a set of experiment station trials comparing particular low-input (alternative) farming systems with conventional and reduced tillage systems in which chemical inputs are used.

Systems Analyzed

Alternative (low-input/sustainable) farming systems studies were initiated by South Dakota State University (SDSU) in 1985 at the Northeast (NE) Research Station near Watertown. Two studies are included to represent different sets of crop combinations and rotations. Farming Systems Study I (FSSI) emphasizes row crops and includes Alternative, Conventional, and Ridge Till rotations. Crop combinations and rotation for the Alternative system is oats/alfalfa-alfalfa-soybeans-corn. Synthetic fertilizers, pesticides, and moldboard plow are not used in this system. Weeds are controlled primarily by cultivation, rotation effects, and/or hand weeding. The oats are harvested for grain and also serve as a nurse crop for alfalfa. The alfalfa is harvested as hay. Corn, soybeans, and spring wheat, in that sequence, are included in both the Conventional and Ridge Till systems. Synthetic fertilizer and herbicides are used in both the Conventional and Ridge Till systems; application rates and products used are based on current SDSU Plant Science Department recommendations.

In Farming Systems Study II (FSSII), three systems with an emphasis on small grains are compared. The Alternative rotation consists of oats/clover-

clover-soybeans-spring wheat. Oats are harvested and also act as a nurse crop for clover. The clover in this rotation is included as a green manure crop; it is mowed and chiseled, but not harvested. No synthetic fertilizers or pesticides are used in the Alternative rotation. Conventional and Minimum Till rotations in Farming Systems Study II contain soybeans, spring wheat, and barley, in that order. Synthetic fertilizers and herbicides are used in this system, based upon soil tests and recommendations. Details of the cultural practices for each system in the studies are listed in the tables of Annex C.

Nature and Purpose of Baseline Analysis

This report contains estimates of costs and returns for various crop enterprises and rotations in the Alternative Farming Systems trials from 1985 through 1988. The budgets provide a focus for evaluating the production costs and competitiveness of "low-input/sustainable" ("alternative"), "conventional", and reduced till farming systems at the NE Station. These budgets will also be used in more extensive analyses of the economics of the "transition" from conventional to low-input/sustainable agriculture. They also will aid in detailed sensitivity and "whole farm" analyses in which alternative farm policies and price relationships will be studied.

Procedures in Preparing the Budgets

In this section, the general procedures and assumptions used to construct budget spreadsheets for each system are presented and briefly discussed. Methods used to carry out whole farm analyses with the enterprise budgets are also explained.

Types of Costs

Costs are categorized in these budgets as fixed, direct (or operating), and land costs. Fixed costs include depreciation, interest on capital, real

estate taxes, machinery housing, and insurance on buildings and equipment. These costs are incurred whether a crop is grown or not. Direct costs include such things as fuel and lubrication, machinery repairs, fertilizer, herbicides, seed, and labor. Direct costs are incurred whenever a crop is produced. The budgets in this report contain both direct costs and fixed costs for production practices indicated. When these costs are accounted for, income over all costs from sale of the crop constitute a return to land and management. When land ownership (opportunity) or rental costs are deducted, we are left with "income over all costs"; this can also be thought of as a return to management.

Machinery Assumptions

All the machine costs for the crop budgets are itemized in Annex A, Table A-1. The machine costs were broken down into five categories: (1) fuel and lubrication; (2) machinery repairs; (3) labor; (4) taxes, housing, interest, and insurance; and (5) depreciation. In the enterprise budgets, machine costs for each crop were allocated to the crop which was planted in the year that each machine operation was performed. Machine costs for fall tillage operations were included in costs for crops planted and harvested in that same calendar year.

The machine costs for the enterprise crop budgets were derived by first identifying the reported cultural practices for each crop in the farming systems (see Annex C, Tables 1-20 for the cultural practices). It was assumed that a common implement of a given size was to be used for each field operation so that the estimated machine cost differences among the crops in the systems would reflect only tillage operation differences. To estimate the cost for each crop field operation, the various components of cost for each

implement were combined with the corresponding costs for the tractor assumed to pull the implement.

Enterprise Budgets and Input Price Assumptions

SDSU's Economics Department has been estimating costs of production and net returns for farming systems at the NE Station since 1986. Budgets are developed by crop and cropping practice. The enterprise budgets in Annex D were updated and revised with a microcomputer spreadsheet program originally developed with Lotus (R) 1-2-3 (Release 2.01) by Ron Thaden, Curtis Hoyt and Steven Gylling of the South Dakota Cooperative Extension Service. That spreadsheet was revised some by Mark Leddy.

The enterprise budgets reported herein constitute a summary of inputs, costs, and returns for each of the systems in the years 1985 through 1988. Each budget shows the cost items and associated per acre costs for each crop, including the set-aside acres, within a system. Breakeven selling prices for each crop (necessary to recover direct costs), as well as breakeven yields at given selling prices (necessary to recover production and land costs), are shown in these budgets. The breakeven selling price represents the direct costs per unit of output at that particular yield level. Thus, a selling price higher than the breakeven price would have to be received before that crop enterprise within a system would receive a positive return to fixed costs, land, and management.

Input price data were obtained in large part from SDSU Economics Research Report 87-5 (Dobbs, et al., 1987a). A partial list of selected inputs and their estimated 1986-1987 costs is show in Annex B, Tables 1-3. Quantities of variable inputs, multiplied by their respective prices, determine the costs shown in each enterprise budget. Labor was charged at

$6.00 per hour for all machine labor and $4.00 per hour for hand weeding labor. Interest on operating capital was charged at a 12 percent annual rate. Operating capital was assumed to be borrowed for only six months, on average.

Constant prices were assumed for all inputs in this baseline analysis for the 1985-1988 study period.

Whole Farm Analysis and Output Price and Federal Farm Program Assumptions

Crop prices used in this report for the 1985-87 budgets were the respective marketing year average prices received by South Dakota farmers. Also, some of the selling prices were derived from Codington County loan rates (the county where the Research Station is located) available under the Federal Government farm program. For an overview of the assumptions about the Federal Government Farm program and output prices used in the budgets, see Table 1. It was assumed that farmers would be participating in the government support program for all eligible commodities in each farming system. The output price for a commodity is, therefore, expressed in the budgets in two categories -- estimated selling price and the deficiency payment for all eligible commodities. These prices were used to estimate receipts. Where the loan rate was found to be higher than the marketing year average price, the loan rate was used as the selling price. The total income per acre reflects the combined selling price plus deficiency payment for all the eligible crops.

For example, for the 1988 production year, assumptions about the Federal farm program support levels and selling prices reflect drought conditions. For each crop, the support and/or selling price assumptions used in calculating 1988 gross returns were: (1) corn -- 20% non-paid acreage reduction, $2.50/bu. selling price, and $0.38/bu. deficiency payment; (2)

Table 1. Assumptions about Federal Farm Program and Market Prices used in the Budgets.

Crop	Year 1985	1986	1987	1988	1989
Corn					
Codington county loan rate ($/bu.)	2.33	1.68	1.63	1.61	
Target price ($/bu.)	3.03	3.03	3.03	2.93	
Acreage reduction program (%)	10.0	17.5	20.0	20.0	
Deficiency payments ($/bu.)	.48	1.11	1.09	.38*	
Selling price ($/bu.)	2.33	1.68	1.63	2.50*	
Spring Wheat					
Codington county loan rate ($/bu.)	3.41	2.38	2.26	2.15	
Target price ($/bu.)	4.38	4.38	4.38	4.23	
Acreage reduction program (%)	20.0	22.5	27.5	27.5	
Deficiency payments ($/bu.)	1.08	1.98	1.81	.58*	
Selling price ($/bu.)	3.41	2.42	2.53	3.95*	
Oats					
Codington county loan rate ($/bu.)	1.21	.87	.90	.85	
Target price ($/bu.)	1.60	1.60	1.60	1.55	
Acreage reduction program (%)	10.0	17.5	20.0	5.0	
Deficiency payments ($/bu.)	.29	.39	.20	0*	
Selling price ($/bu.)	1.21	1.28	1.60	2.60*	
Barley					
Codington county loan rate ($/bu.)	2.00	1.45	1.35	1.34	
Target price ($/bu.)	2.60	2.60	2.60	2.51	
Acreage reduction program (%)	10.0	17.5	20.0	20.0	
Deficiency payments ($/bu.)	.52	.99	.79	0*	
Selling price ($/bu.)	2.00	1.45	1.45	2.50*	
Soybeans					
Codington county loan rate ($/bu.)	4.89	4.39	4.59	4.59*	
Selling price ($/bu.)	4.89	4.58	5.15	7.65*	
Alfalfa					
Selling price ($/ton)	47.00	32.00	36.00	70.00*	

*Estimates

spring wheat -- 27 1/2% non-paid acreage reduction, $3.95/bu. selling price, and $0.58/bu. deficiency payment; (3) oats -- 5% non-paid acreage reduction, $2.60/bu. selling price, and no deficiency payment; (4) barley -- 20% non-paid acreage reduction, $2.50/bu. selling price, and no deficiency payment; (5) soybeans -- no acreage reduction requirement and $7.65/bu. selling price; and (6) alfalfa -- $70/ton selling price. No market value was assigned to clover in the Alternative System in Study II, because it is not harvested.

The final part of the budget estimation was to consider the system results and Federal farm program on a hypothetical "whole farm" basis, assuming 540 tillable acres. Allotments of acreage to each crop on the 540-acre farm were done so that (a) the farm was in compliance with all farm program minimum set aside requirements during the 3- or 4-year period and (b) equal acreage was allocated to each crop in the system. For a description and demonstration of the method for calculating the acreage allotments, see Dobbs, et al. (1987a). Set aside requirements and resulting acreage allotments for each crop in FSSI and FSSII are presented in the budget tables of Annex D. With allotments of acreages, it was then possible to calculate the whole farm net returns to each system, using the spreadsheet approach, under the price, yield, and Federal farm program assumptions specified above.

Yield Comparisons

Yield results for the crops in each system during the reference years 1985 through 1988 are presented in Table 2. These are actual results from the farming systems trials. They are the yields used in the preparation of the individual crop budgets presented in this report. Also, they identify possible outcomes of a set of operations and inputs for specified crops in each of the systems within a study group.

Table 2. Farming Systems Yield Comparisons, 1985 - 1988.

	Yield (bu. or ton)/Acre																			
	Corn				Soybeans				Spring Wheat				Oats				Alfalfa			
Study I	1985	1986	1987	1988	1985	1986	1987	1988	1985	1986	1987	1988	1985	1986	1987	1988	1985	1986	1987	1988
Alternative	70.6	99.5	86.9	39.0	18.4	29.8	31.6	10.9	N/A	N/A	N/A	N/A	98.4	57.3	59.9	32.3	2.01	6.14	4.45	2.89
Conventional	82.1	114.6	124.4	19.0	27.0	28.1	31.0	9.0	44.1	57.9	43.6	18.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Ridge Till	86.6	119.6	121.4	31.7	26.6	24.7	28.5	9.4	42.4	50.9	39.8	14.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

	Yield (bu.)/Acre																			
	Barley				Soybeans				Spring Wheat				Oats				Clover			
Study II	1985	1986	1987	1988	1985	1986	1987	1988	1985	1986	1987	1988	1985	1986	1987	1988	1985	1986	1987	1988
Alternative	N/A	N/A	N/A	N/A	15.5	27.5	33.2	16.5	49.6	55.1	44.2	20.0	91.8	60.2	72.4	43.8	Not	Harvested		
Conventional	66.5	88.9	80.8	28.5	24.9	29.4	32.8	14.1	46.9	56.4	44.7	18.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Minimum Till	45.8	76.9	46.5	28.3	25.4	33.3	31.6	16.8	37.7	55.8	48.8	17.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

N/A = Not applicable.

Caution must be exercised in comparing yield results from the first year (1985) with subsequent years' results. The yields did not yet reflect the differences in rotations and tillage practices among the different systems during that first year. Also, the alternative system forage yields in 1985 were based on clear-seeded, first-year stands. Eptom was used in 1985 to aid in establishment of the forages.

In general, these yield results indicate that the systems within each study have similar yields during most years. There are some exceptions, including the low average yields during the 4-year period for the Alternative system corn in Study I and for Minimum Till barley in Study II. Yields for all systems were significantly lower in 1988 than in the three previous years due to drought conditions. However, yields for Alternative system corn were significantly greater than for the conventional system in Study I.

Baseline Results

Baseline costs and results for each system from 1985 through 1988 are summarized in Tables 3 through 6. The first five columns show a breakdown of various cost and return measures for each system on a per-acre basis. The last column in each table shows an aggregation of "net income over all costs except management" on a hypothetical "whole farm" basis, assuming 540 tillable acres. "Direct costs other than labor" per acre in the first column of each table reflect out-of-pocket expenses incurred for each of the systems during the production process. The "gross income" column reflects the value of the commodity produced.

The next three columns in Tables 3-6 represent net income measures. The first measure, "net income over all costs except land, labor, and management", implicitly treats land, labor, and management as fixed. "Net income over all

Table 3. Results of Farming Systems Analyses Based upon 1985 Yields, Farm Program, and Prices.

System[1]	Dollars/Acre					Whole Farm, Net Income Over All Costs Except Management[2] ($)
	Direct Costs Other Than Labor	Gross Income	Net Income Over: All Costs Except Land, Labor, and Management	Net Income Over: All Costs Except Land and Management	Net Income Over: All Costs Except Management	
Farming Systems Study I						
1. Alternative (oats-alfalfa-soybeans-corn)	46	122	45	31	5	2,765
2. Conventional (corn-soybeans-s. wheat)	65	159	65	55	29	15,563
3. Ridge Till (corn-soybeans-s.wheat)	68	160	61	51	25	13,503
Farming Systems Study II						
1. Alternative (oats-clover-soybeans-s. wheat)	35	100	37	26	0	- 183
2. Conventional (soybeans-s. wheat-barley)	52	139	56	46	20	10,688
3. Minimum Till (soybeans-s. wheat-barley)	49	118	42	33	7	3,973

[1]Crops are shown in the order in which they occur in each rotation.

[2]For farm with 540 tillable acres. Figures in this column are equivalent to 540 multiplied by "prerounded" figures in the "all costs except management" column.

Table 4. Results of Farming Systems Analyses Based upon 1986 Yields, Farm Program, and Prices.

System[1]	Dollars/Acre					Whole Farm, Net Income Over All Costs Except Management[2] ($)
	Direct Costs Other Than Labor	Gross Income	Net Income Over: All Costs Except Land, Labor, and Management	Net Income Over: All Costs Except Land and Management	Net Income Over: All Costs Except Management	
Farming Systems Study I						
1. Alternative (oats-alfalfa-soybeans-corn)	46	150	72	60	34	18,436
2. Conventional (corn-soybeans-s. wheat)	66	167	72	62	36	19,411
3. Ridge Till (corn-soybeans-s. wheat)	77	160	56	47	21	11,588
Farming Systems Study II						
1. Alternative (oats-clover-soybeans-s. wheat)	30	103	47	37	11	5,860
2. Conventional (soybeans-s. wheat-barley)	54	141	57	46	20	10,731
3. Minimum Till (soybeans-s. wheat-barley)	71	141	44	36	10	5,141

[1]Crops are shown in the order in which they occur in each rotation.

[2]For farm with 540 tillable acres. Figures in this column are equivalent to 540 multiplied by "prerounded" figures in the "all costs except management" column.

Table 5. Results of Farming Systems Analyses Based upon 1987 Yields, Farm Program, and Prices.

System[1]	Dollars/Acre: Direct Costs Other Than Labor	Gross Income	Net Income Over: All Costs Except Land, Labor, and Management	Net Income Over: All Costs Except Land and Management	Net Income Over: All Costs Except Management	Whole Farm, Net Income Over All Costs Except Management[2] ($)
Farming Systems Study I						
1. Alternative (oats-alfalfa-soybeans-corn)	44	142	66	55	29	15,774
2. Conventional (corn-soybeans-s. wheat)	62	163	73	63	37	20,025
3. Ridge Till (corn-soybeans-s. wheat)	66	155	64	55	29	15,749
Farming Systems Study II						
1. Alternative (oats-clover-soybeans-s. wheat)	30	115	60	50	24	12,698
2. Conventional (soybeans-s. wheat-barley)	51	133	53	42	16	8,680
3. Minimum Till (soybeans-s. wheat-barley)	57	120	38	29	3	1,743

[1]Crops are shown in the order in which they occur in each rotation.

[2]For farm with 540 tillable acres. Figures in this column are equivalent to 540 multiplied by "prerounded" figures in the "all costs except management" column.

Table 6. Results of Farming Systems Analyses Based upon 1988 Yields, Farm Program, and Prices.

System[1]	Dollars/Acre: Direct Costs Other Than Labor	Gross Income	Net Income Over: All Costs Except Land, Labor, and Management	Net Income Over: All Costs Except Land and Management	Net Income Over: All Costs Except Management	Whole Farm, Net Income Over All Costs Except Management[2] ($)
Farming Systems Study I						
1. Alternative (oats-alfalfa-soybeans-corn)	37	114	46	35	9	4,894
2. Conventional (corn-soybeans-s. wheat)	50	63	-13	-21	-47	-25,274
3. Ridge Till (corn-soybeans-s. wheat)	53	69	-10	-17	-43	-23,100
Farming Systems Study II						
1. Alternative (oats-clover-soybeans-s.wheat)	27	84	34	26	0	46
2. Conventional (soybeans-s. wheat-barley)	41	74	7	- 1	-27	-14,808
3. Minimum Till (soybeans s. wheat-barley)	47	78	6	- 2	-28	-14,882

[1]Crops are shown in the order in which they occur in each rotation.

[2]For farm with 540 tillable acres. Figures in this column are equivalent to 540 multiplied by "prerounded" figures in the "all costs except management" column.

costs except land and management" is calculated in the same way as the previous measure, except for the charge for labor, including family labor. The third measure in this set is "net income all costs except management", which reflects the profitability of each system when all costs are accounted for; what is left is the residual return to management.

"Whole farm net income over all costs except management" is the last measure shown in the tables. This measure has the same meaning as the previous measure. However, it reflects the net income as an aggregate value for a farm with 540 tillable acres.

Gross Income Comparisons

The "gross income" per acre for the three systems (Alternative, Conventional, and Ridge Till) in Farming Systems Study I (FSS1) is portrayed in Figure 1. The Alternative system produced the lowest "gross income" during the first three years of the study period when compared with the Conventional and Ridge Till systems. However, during the 1988 drought year, "gross income" for the Alternative system was significantly higher than it was for the two other systems. Although 1988 yields were lower in all the systems than in previous years, corn in the Alternative system had higher per bushel yields than other systems. Another major contributing factor to the higher "gross income" for the Alternative system in Study I was the drought-induced alfalfa prices. The $70/ton alfalfa price used in the 1988 budgets is roughly twice as high as we used in the previous two years.

The comparative "gross income" per acre for the other three systems (Alternative, Conventional and Minimum Till) in Farming System Study II (FSS2) is shown in Figure 2. Here again, the Alternative system showed the lowest "gross income" from 1985 through 1987. The Conventional system produced the

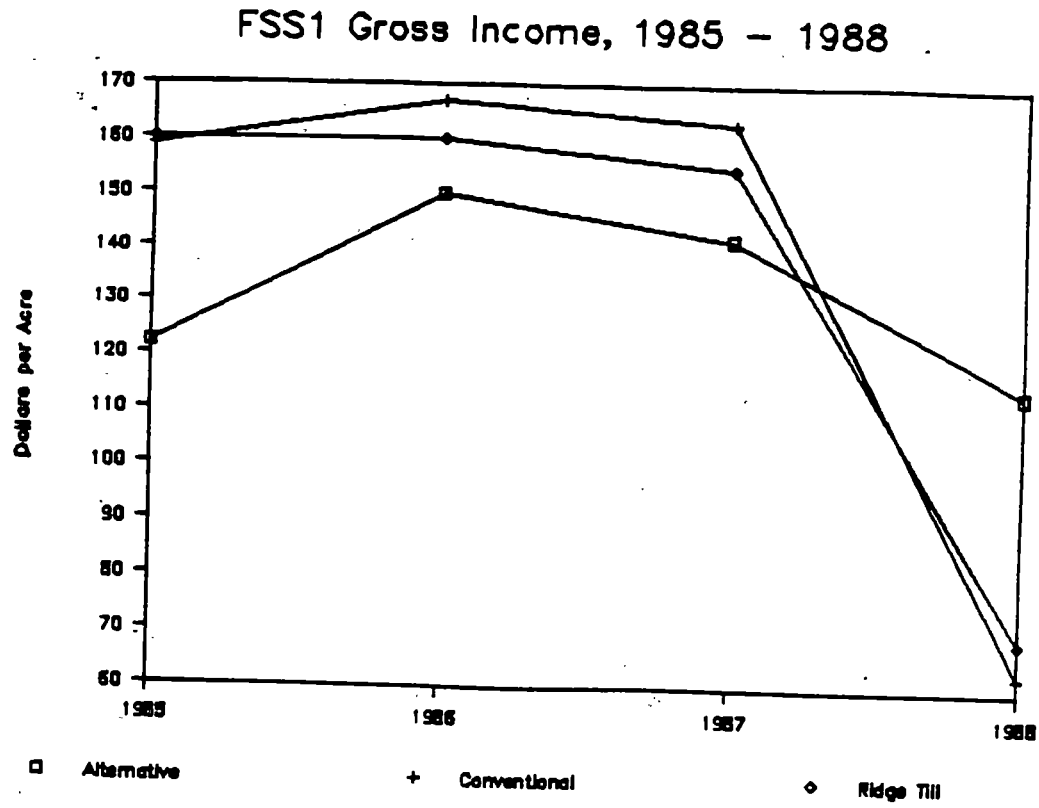

Figure 1. Gross income per acre for the three systems in SDSU's Farming Systems Study I, Northeast Research Station.

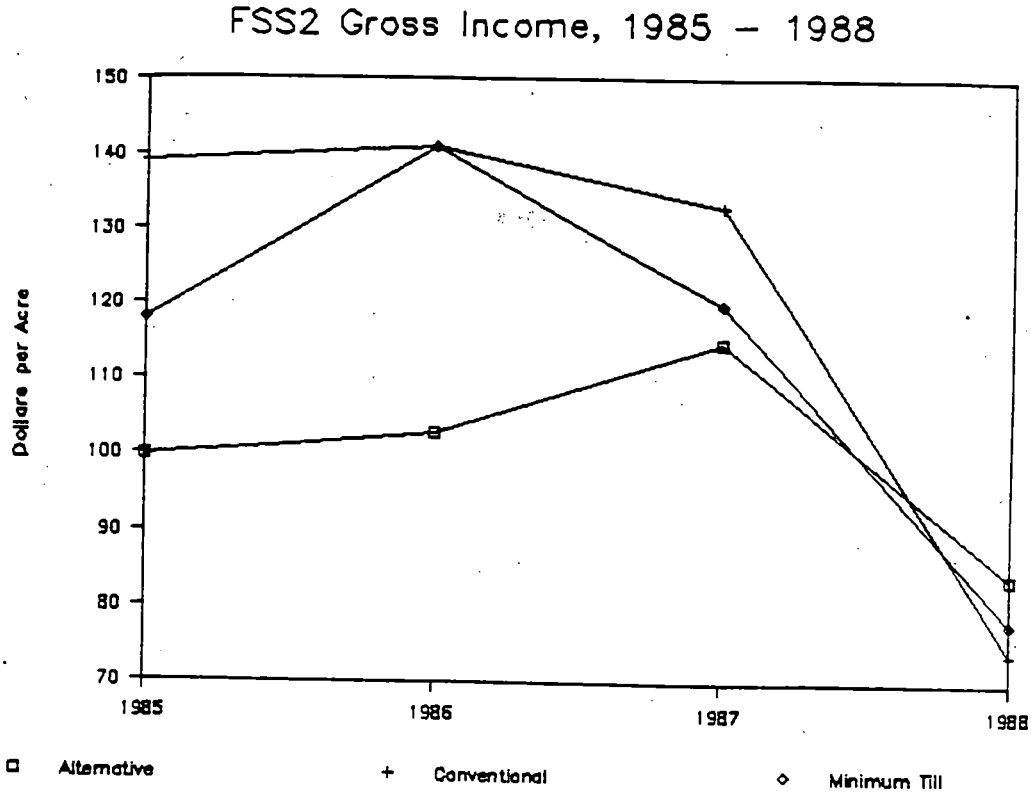

Figure 2. Gross income per acre for the three systems in SDSU's Farming Systems Study II, Northeast Research Station.

highest "gross income" in two of the first three years (1985-87) and tied with Minimum Till in the 1986 production year. The Alternative system produced the highest "gross income" per acre under 1988's drought conditions. Second in "gross income" production was the Minimum Till system, followed by the Conventional system. The spring wheat in the Alternative system had a higher per bushel yield in 1988 than did the Conventional and Minimum Till systems. Also, the soybeans yield in the Alternative system was higher than for the Conventional system and it was nearly as high as the yield for the Minimum Till system.

Direct Cost Comparisons

The "direct costs other than labor" per acre for the three systems in FSS1 are shown in Figure 3. The Alternative system had significantly lower direct costs (other than labor) than the other two systems during the 4-year period. Notice that the required direct cash outlay for each of the systems has been declining since 1987. The decline in direct cash outlays for all of the systems is attributed to changing cultural practices from year to year, (Annex C). The higher "direct costs other than labor" for the Ridge Till system in 1986, on the other hand, resulted from the use of additional herbicides that year.

Year to year estimated "direct costs other than labor" for the Alternative system in FSS2 is the lowest of the three systems (Figure 4). The Conventional system ranked second every year except 1985. The Minimum Till system had the highest direct costs each year except 1985, when it was second to the Alternative system. Figure 4 also appears to show evidence of downward trend for the Conventional and Minimum Till systems, an indication of changes

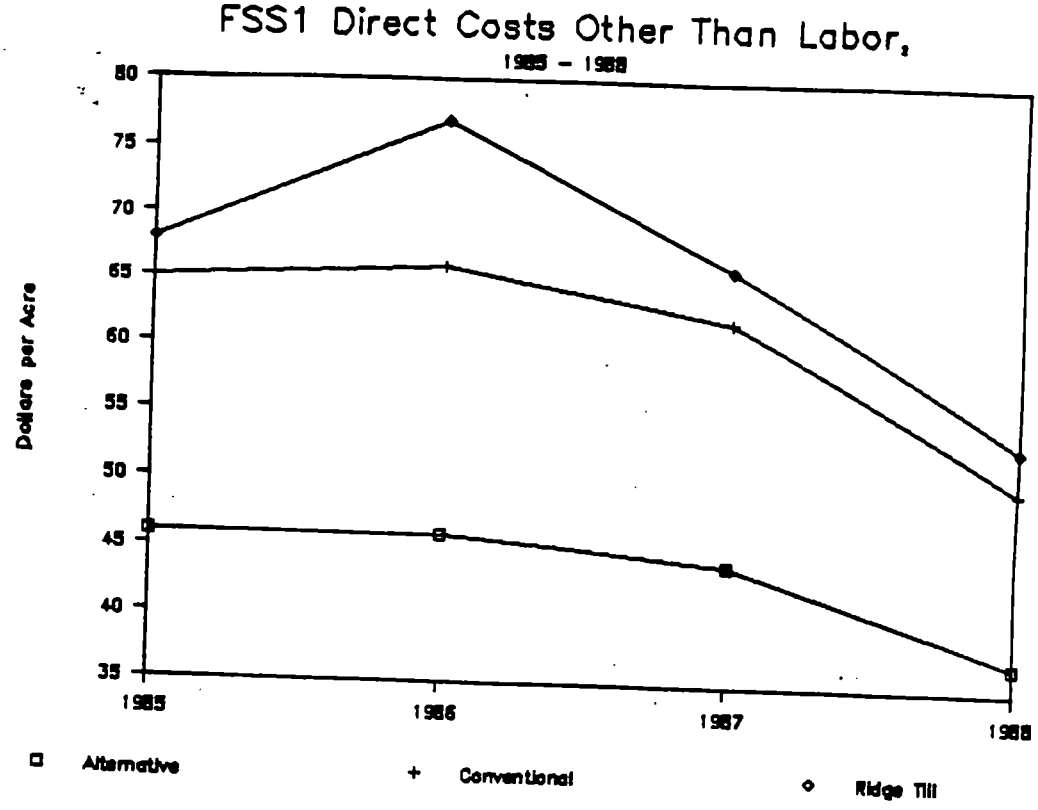

Figure 3. Direct costs per acre for the three systems in SDSU's Farming Systems Study I, Northeast Research Station.

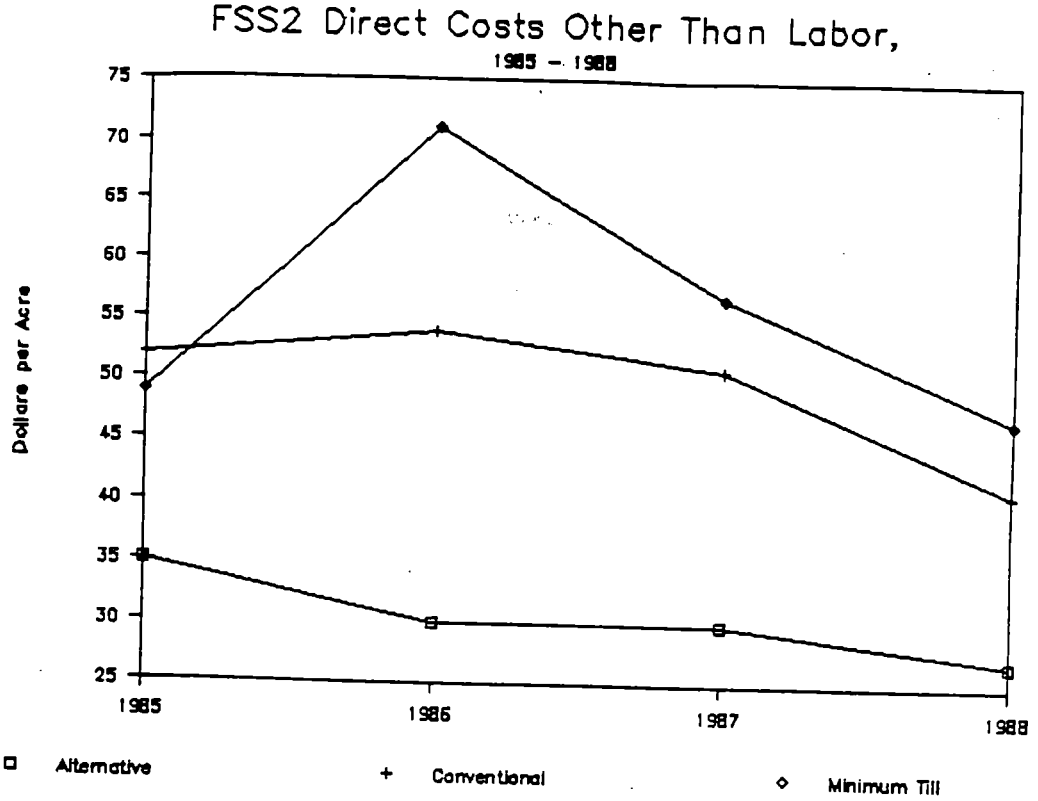

Figure 4. Direct costs per acre for the three systems in SDSU's Farming Systems Study II, Northeast Research Station.

in cultural practices over the years. Direct costs for the Alternative system, however, remained relatively steady.

Net Income Comparisons

"Net income" on a whole farm basis, assuming 540 tillable acres, declined in absolute terms in 1988 for all the systems. This was due to drought conditions. However, the Alternative system in FSS1 produced a positive "net income" every year (Figure 5). This was not the case with the Conventional and Ridge Till systems. Those systems experienced significant losses in 1988, causing the Conventional system to drop from its number one position as most profitable.

FSS2 "net incomes" are presented in Figure 6. Except for the Alternative system, all the systems showed net losses for 1988. The Alternative system was roughly a break-even operation in 1988, after achieving the highest "net income" in 1987. The Alternative system experienced a slight loss in 1985, while the Conventional and Minimum Till systems showed profits from 1985 through 1987.

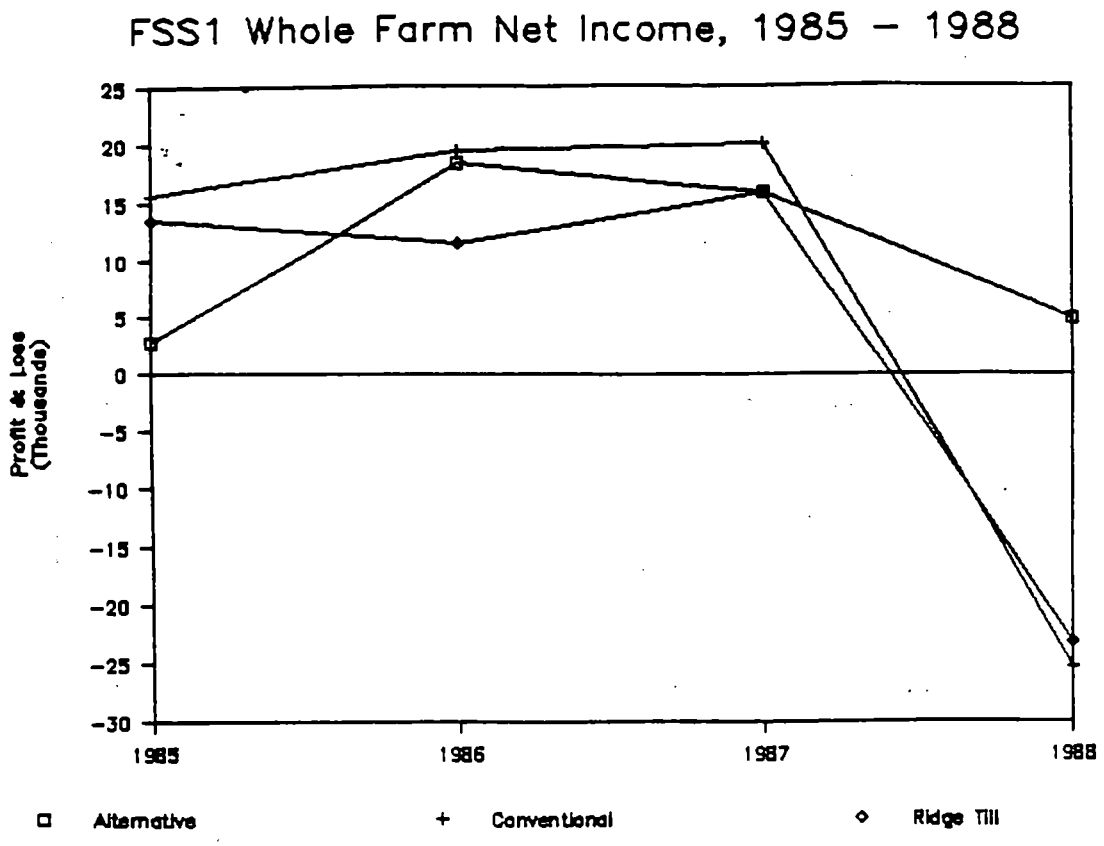

Figure 5. Whole farm net income for the three systems in SDSU's Farming Systems Study I, Northeast Research Station.

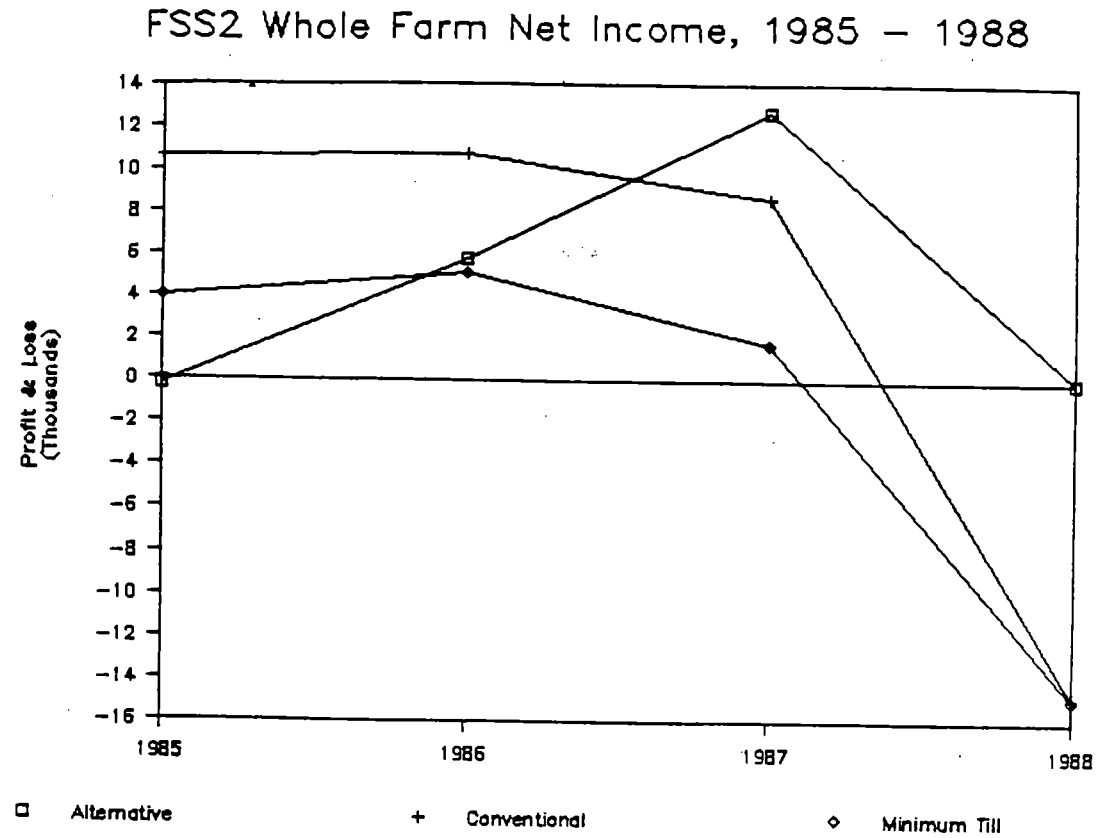

Figure 6. Whole farm net income for the three systems in SDSU's Farming Systems Study II, Northeast Research Station.

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Taylor, D. C., Thomas L. Dobbs, and James H. Shriver. 1988. South Dakota Farmer-Based Reduced Till Crop Budgets. SDSU Economics Research Report 88-3. Brookings, SD.

Wrage, L.J., and P.O. Johnson. 1987. Herbicide Price List. SDSU Extension Extra 8012. Brookings, SD.

ANNEX A

Machine Costs Used in Crop Budgets

The machine costs used in estimating production costs for the crops in the farming systems are presented in Table A-1 of this annex. These costs, except for four implements -- row planter, 6 row, 30"; ridge till row planter, 6 row, 30"; conventional cultivator, 6 row, 30"; and ridge till cultivator, 6 row, 30" -- were the same as those used by Dobbs, et al. (1987a). The principal source of the machine cost coefficients, except for those four machines, was Economics Pamphlet 87-2 (Dobbs, et al., 1987b) and its detailed support tables. The cost coefficients for those four implements were derived primarily from a recent study by Taylor, et al. (1988). For general procedures and assumptions used in developing the machinery cost coefficients, see the above publications.

Annex Table A-1. Machine Costs Used in Crop Budgets.

Assumed Acres/Yr for Mach. Use	Machine operation	Direct (operating) Costs			Fixed Costs**		Total $/Acre
		Fuel & Lub	Machinery Repair	Labor*	Mach. Int., Hou. & Ins.	Depreciation	
		$/acre					
731	Fall Plow 5/16"	1.90	1.51	2.46	2.92	2.44	11.23
599	Chisel 15'	.93	.68	1.21	1.41	1.18	5.41
	Sweep	.23		.12			.35
599	Chisel w/Sweep 15'	1.16	.68	1.33	1.41	1.18	5.76
820	Tandem Disk 17'	.43	.50	.88	1.33	1.27	4.41
917	Rotary Hoe 20'	.22	.24	.78	.51	.47	2.22
595	Field Cultivator 17'	.60	.57	1.21	.99	1.01	4.38
	Spike Harrow 24'	.06	.33		.12	.13	.64
	Field Cultivator w/Harrow	.66	.90	1.21	1.11	1.14	5.02
1075	Spike Harrow 24'	.41	.61	.66	.61	.48	2.77
330	Ordinary Press Drill 10' w/f	.60	1.95	2.18	1.86	2.19	8.78
	Packer	.06	.21		.27	.29	1.59
330	Drill w/Packer	.66	2.16	2.94	2.13	2.48	10.37
330	No Till or Hoe Press Drill 10'	.81	2.07	2.18	1.98	2.23	9.27
371	Row Planter 6 row 30"	.43	1.26	1.16	3.06	3.13	9.04
371	Ridge Till Planter 6 row 30"	.90	1.87	1.16	4.40	4.40	12.73
525	Conv. Cultivator 6 row 30"	.51	.46	1.37	.89	.77	4.00
525	R. T. Cultivator 6 row 30"	1.06	1.11	1.37	2.21	1.97	7.72
740	Sprayer 8 row 26'	.27	.35	.98	.56	.62	2.78
962	Fert. Spreader 45'	.16	.19	.37	.51	.50	1.73
	Manure Spreader	1.33	3.94	3.00	2.60	2.56	13.43
878	Combine SP 6 row	.84	3.37	1.13	6.43	8.23	20.00
878	Combine Small Grain	.76	3.03	1.02	5.79	7.40	18.00
per hour	Gravity Box (260 bu.)***	2.00	3.48	6.00	3.12	2.96	17.56/hr.
per bu							6.8 cent
636	Swather SP 16.5'	.21	1.73	.85	2.57	2.51	7.87
196	Sickle Mower 9'	.40	1.00	1.84	1.03	1.21	5.48
	Raking (Wheel) 18'	.23	.42	.81	.45	.61	2.52
per bale	Baling (large round)*** 3.6 T (2-4.5T/acre)	.33	.60	.56	.89	1.37	3.75/bal
per bale	Baling (large round)*** 6.1 T (over 4.5T/acre)	.24	.45	.42	.67	1.03	2.81/bal
per acre	Bale Stacking (Large round) 3.6 T (2-4.5T/acre)	.23	.26	2.88	.31	.27	3.95/acr
per acre	Bale Stacking (Large round) 6.1 T (over 4.5T/acre)	.31	.35	3.89	.42	.36	5.33/acr

*Labor @ $6/hr
**Includes tractor for non self propelled machines
***Costs NOT on per ACRE basis

ANNEX B

Seeding Rate, Labor Cost, and Chemical Price Assumptions Included in the Budgets

The general assumptions used to develop coefficients for the seed, labor, and chemicals costs for the crop budgets are presented in Tables 1-3 of this annex.

Machinery labor was charged at $6.00/hr and other labor (e.g., hand weeding of soybeans) at $4.00/hr in all years of the study.

The seeding rates were taken directly from the Annual Progress Reports of the Northeast Research Station, Watertown, South Dakota (1985-1988). Most of the seed prices were the same as those used in Dobbs, Weiss and Leddy (1987) and were held constant for each crop seed throughout the 4-year period. However, sweet clover and red clover seed prices used in the budgets were determined from local dealers prices for 1988; those prices were then used for all years in which each type of clover was sown.

The herbicide rates for all the budgets were taken from the "Annual Progress Reports for the Northeast Research Station, Watertown, South Dakota," for the study period. Herbicide prices used in estimating costs of each application were based primarily on Dobbs, et al. (1987a) and on SDSU Extension Extra 8012, "Herbicide Price List, January 1987", by Wrage and Johnson (1987).

The fertilizer application rates for all other budgets were also taken from the "Annual Progress Reports.....". Fertilizer prices were obtained from Dobbs, et al. (1987a).

Both herbicide and fertilizer prices were held constant for the study period.

Annex Table B-1. Seeding Rate and Labor Cost Assumptions included in the Budgets.*

Crop	Year				
	1985	1986	1987	1988	1989
Corn					
Seeding	18 MVK @ $.75/MVK	18 MVK @ $.75/MVK	19.4 MVK @ $.75/MVK	18.5 MVK @ $.75/MVK	
Machine labor	$6.00	$6.00	$6.00	$6.00	
Other labor	$4.00	$4.00	$4.00	$4.00	
Oats					
Seeding	48 lbs/acre @$.09/lb.	48 lbs/acre @ $.09/lb.	40 lbs/acre @ $.09/lb.	48 lbs/acre @ $.09/lb.	
Machine labor	$6.00	$6.00	$6.00	$6.00	
Other labor	$4.00	$4.00	$4.00	$4.00	
Alfalfa					
Seeding	9.5 lbs/acre @ $2.25/lb.	9.5 lbs/acre @ $2.25/lb.	9.5 lbs/acre @ $2.25/lb.	9.5 lbs/acre @ $2.25 lb.	
Machine labor	$6.00	$6.00	$6.00	$6.00	
Other labor	$4.00	$4.00	$4.00	$4.00	
Soybeans					
Seeding	1 bu/acre @ $8.50/bu.	1 bu/acre @ $8.50/bu.	1 bu/acre @ $8.50/bu.	1 bu/acre @ $8.50/bu.	
Machine Labor	$6.00	$6.00	$6.00	$6.00	
Other labor	$4.00	$4.00	$4.00	$4.00	
Spring Wheat					
Seeding	75 lbs/acre @ $.11/lb.	75 lbs/acre @ $.11/lb.	70 lbs/acre @ $.11/lb.	70 lbs/acre @ $.11/lb.	
Machine labor	$6.00	$6.00	$6.00	$6.00	
Other labor	$4.00	$4.00	$4.00	$4.00	
Barley					
Seeding	58 lbs/acre @ $.07/lb.	58 lbs/acre @ $.07/lb.	58 lbs/acre @ $.07/lb.	58 lbs/acre @ $.07/lb.	
Machine labor	$6.00	$6.00	$6.00	$6.00	
Other labor	$4.00	$4.00	$4.00	$4.00	
Sweet Clover					
Seeding	9.5 lbs/acre @ $.55/lb.	9.5 lbs/acre @ $.55/lb.	4.5 lbs/acre @ $.55/lb.	4.5 lbs/acre @ $.55/lb.	
Red Clover**					
Seeding			4.5 lbs/acre @ $1.25/lb.	4.5 lbs/acre @ $1.25/lb.	

*Labor figures represent costs per hour.

**Machine labor operations were together with sweet clover in 1987 and 1988.

Annex Table B-2. Assumed Herbicide Prices Used in the Budgets.

Herbicide	Price
Lasso, 4E	$ 5.39/pt.
Lasso, 15G	$ 0.85/lb.
Treflan, 4E	$ 3.36/pt.
Hoelon, 3E	$ 6.19/pt.
Buctril, 2E	$ 5.46/pt.
2, 4-D Amine	$ 1.47/pt.
Roundup 3L	$10.36/pt.
Blazer 2L	$10.16/pt.
Eptam	$ 2.86/pt.
Banvel, 4L	$ 7.10/pt.
Bronate	$ 6.04/pt.
Poast 1.5E	$13.14/pt.
Ramrod 20G	.83/lb.
MCPA	$ 1.47/pt.

Annex Table B-3. Assumed Fertilizer Prices Used in the Budgets.

Fertilizer	Price
Nitrogen (N)	$ .18/lb.
Phosphorus (P)	$ .18/lb.

ANNEX C

Farming Systems Cultural Practices

Actual cultural practices followed were used in estimating the cost coefficients for each field operation for each crop within each system. Tables 1-20 in this annex summarize field operations for each crop in each system during the 4-year period. The first column identifies the field operation and also the actual planting date and yield. Immediately following the field operations are the codes listed for each operation performed during a particular year for a crop. The following codes are used:

h/a = Hours per acre

s = Spring operation

f = Fall operation

x = The number of repetitions (e.g., 2x means two passes for a particular field operation)

Annex Table C-1. Cultural Practices for FSS1 Corn Alternative

	1985	1986		1987		1988	1989
Disk	s1x	s1x	f1x	s1x	f1x	f1x	
Field Cultivator	1x	1x					
Harrow							
Field Cultivator w/Harrow				1x		1x	
Planter	1x	1x		1x		1x	
Rotary Hoe		2x		2x		2x	
Regular Cultivator	3x	2x		2x		2x	
Ridge Cultivator							
Hand Weeding	1.4 h/a						
Fertilizer							
Herbicide							
Swather							
Hay Baler							
Combine	1x	1x		1x		1x	
Manure Spreader							
Chisel Plow							
Chisel w/Subsurface Sweep							
Moldboard Plow							
Planting Date	May 20	May 19		May 12		May 4	
Yield	70.6	99.5		86.9		39.0	

Annex Table C-2. Cultural Practices for FSS1 Corn Conventional

	1985	1986	1987	1988	1989
Disk	s1x	s1x	f1x	f1x	
Field Cultivator		1x			
Harrow					
Field Cultivator w/Harrow			1x	1x	
Planter	1x	1x	1x	1x	
Rotary Hoe	1x				
Regular Cultivator	2x	2x	2x	2x	
Ridge Cultivator					
Hand Weeding					
Fertilizer*	N - 100 P - 0 K - 0	N - 100 P - 0 K - 0	N - 37 P - 0 K - 0	N - 75 P - 30 K - 0	
Herbicide**	Ramrod 10 lbs. band	Lasso II 7 lbs. band	Lasso II 7 lbs. band	Lasso II 7 lbs. band	
Swather					
Hay Baler					
Combine	1x	1x	1x	1x	
Manure Spreader					
Chisel Plow					
Chisel w/Subsurface Sweep					
Moldboard Plow					
Planting Date	May 8	May 14	May 6	May 4	
Yield	82.1	114.6	124.4	19.0	

*Fertilizer: N was applied with fertilizer spreader and (P) was incorporated with the planter.

**Herbicide: Ramrod and Lasso II were applied with the planter.

Annex Table C-3. Cultural Practices for FSS1 Corn Ridge Till

	1985	1986	1987	1988	1989
Disk	s1x				
Field Cultivator					
Harrow				1x	
Field Cultivator w/Harrow					
Planter*	1x	1x	1x	1x	
Rotary Hoe	1x				
Regular Cultivator	1x	1x	1x	1x	
Ridge Cultivator	1x	1x	1x	1x	
Hand Weeding					
Fertilizer**	N - 100 P - 0 K - 0	N - 100 P - 0 K - 0	N - 31 P - 0 K - 0	N - 105 P - 30 K - 0	
Herbicide***	Ramrod 10 lbs. band	Lasso II 7 lbs. band	Lasso II 7 lbs. band Banvel 1/2 pt.	Lasso II 7 lbs. band	
Swather					
Hay baler					
Combine	1x	1x	1x	1x	
Manure Spreader					
Chisel Plow	f1x				
Chisel w/Subsurface Sweep					
Moldboard Plow					
Planting Date	May 8	May 19	May 6	May 4	
Yield	86.6	119.6	121.4	31.7	

*Planter: Corn was seeded with a ridge till planter.
**Fertilizer: N was applied with a fertilizer spreader and (P) was incorporated with the planter.
***Herbicide: Ramrod and Lasso II were applied with the planter and Banvel was applied with a sprayer.

Annex Table C-4. Cultural Practices for FSS1 Soybean Alternative.

	1985	1986	1987	1988	1989
Disk	s1x	s1x	s1x	s1x	
Field Cultivator	1x	1x	1x	1x	
Harrow					
Field Cultivator w/Harrow					
Planter	1x	1x	1x	1x	
Rotary Hoe		1x	2x	2x	
Regular Cultivator	2x	2x	2x	2x	
Ridge Cultivator					
Hand Weeding	2.0 h/a	1.14 h/a		1.06 h/a	
Fertilizer					
Herbicide					
Swather					
Hay Baler					
Combine	1x	1x	1x	1x	
Manure Spreader					
Chisel Plow	f1x				
Chisel w/Subsurface Sweep					
Moldboard Plow					
Planting Date	May 31	May 28	May 15	May 10	
Yield	18.4	29.8	31.6	10.9	

Annex Table C-5. Cultural Practices for FSS1 Soybeans Conventional

	1985	1986	1987	1988	1989
Disk	s1x	s2x	s2x	s2x	
Field Cultivator					
Harrow					
Field Cultivator w/Harrow					
Planter	1x	1x	1x	1x	
Rotary Hoe					
Regular Cultivator	2x	2x	2x	2x	
Ridge Cultivator					
Hand Weeding	1.4 h/a	1.07 h/a	1.64 h/a	1.25 h/a	
Fertilizer					
Herbicide*	Lasso 3 qt./a	Treflan 1 1/2 pt. per acre	Treflan 1 1/2 pt. per acre	Treflan 1 1/2 pt. per acre	
Swather					
Hay Baler					
Combine	1x	1x	1x	1x	
Manure Spreader					
Chisel Plow	f1x				
Chisel w/Subsurface Sweep					
Moldboard Plow					
Planting Date	May 21	May 20	May 14	May 10	
Yield	27.0	28.1	31.0	9.0	

*Herbicide: Lasso and Treflan were applied with a sprayer.

Annex Table C-6. Cultural Practices for FSS1 Soybeans Ridge Till

	1985	1986	1987	1988	1989
Disk	s1x				
Field Cultivator					
Harrow					
Field Cultivator w/Harrow					
Planter (Ridge Till)*	1x	1x	1x	1x	
Rotary Hoe					
Regular Cultivator	2x	2x	2x	2x	
Ridge Cultivator					
Hand Weeding	1.8 h/a	1.34 h/a	1.39 h/a	1.12 h/a	
Fertilizer					
Herbicide**	Lasso 3 qt./a	Lasso II 7 lbs. band Blazer 1 1/2 pt. per acre + Poast 1 1/2 pt. per acre	Lasso II 7 lbs. band Blazer 1 1/2 pt. per acre	Lasso II 7 lbs. band	
Swather					
Hay Baler					
Combine	1x	1x	1x	1x	
Manure Spreader					
Chisel Plow	f1x				
Chisel w/Subsurface Sweep					
Moldboard Plow					
Planting Date	May 21	May 19	May 13	May 10	
Yield	26.6	24.7	28.5	9.4	

*Planter: Soybeans were seeded with a ridge till planter.

**Herbicide: Lasso, Blazer + Poast, and Blazer were applied with a sprayer. Lasso II was applied with the planter.

Annex Table C-7. Cultural Practices for FSS1 Spring Wheat Conventional

	1985	1986	1987	1988	1989
Disk	s2x	s1x			
Field Cultivator		1x			
Harrow					
Field Cultivator w/Harrow			1x	1x	
Planter* (Drill)	1x	1x	1x	1x	
Rotary Hoe					
Regular Cultivator					
Ridge Cultivator					
Hand Weeding					
Fertilizer**	N - 100 P - 0 K - 0	N - 90 P - 0 K - 0	N - 77 P - 0 K - 0	N - 105 P - 30 K - 0	
Herbicide***	Bronate 1/2 pt. per acre	Hoelon 2 pt./a MCPA 1/2 pt. per acre	Hoelon 2 pt./a Buctril 1 pt./a	Hoelon 2 pt./a Buctril 1 pt./a	
Swather	1x	1x	1x	1x	
Hay Baler					
Combine	1x	1x	1x	1x	
Manure Spreader					
Chisel Plow					
Chisel w/Subsurface Sweep					
Moldboard Plow	f1x	f1x	f1x	f1x	
Planting Date	Apr 26	Apr 29	Apr 15	Apr 11	
Yield	44.1	57.9	43.6	18.6	

*Planter: Spring Wheat was seeded with a drill.
**Fertilizer: N was applied with fertilizer spreader and P was incorporated with the drill.
***Herbicide: Bronate, Hoelon + MCPA, and Hoelon + Buctril were applied with a sprayer.

Annex Table C-8. Cultural Practices FSS1 Spring Wheat Ridge Till

	1985	1986	1987	1988	1989
Disk	s2x				
Field Cultivator		1x			
Harrow				1x	
Field Cultivator w/Harrow					
Planter* (Hoe Drill)	1x	1x	1x	1x	
Rotary Hoe					
Regular Cultivator					
Ridge Cultivator**	1x	1x			
Hand Weeding					
Fertilizer***	N - 100 P - 0 K - 0	N - 90 P - 0 K - 0	N - 77 P - 0 K - 0	N - 105 P - 30 K - 0	
Herbicide****	Bronate 1/2 pt. per acre	Hoelon 2 pt./a + MCPA 1/2 pt. per acre	Hoelon 2 pt./a + Buctril 1 pt./a	Hoelon 2 pt./a + Buctril 1 pt./a	
Swather	1x	1x	1x	1x	
Hay Baler					
Combine	1x	1x	1x	1x	
Manure Spreader					
Chisel Plow	f1x		f1x	f1x	
Chisel w/Subsurface Sweep					
Moldboard Plow					
Planting Date	Apr 26	Apr 29	Apr 15	Apr 11	
Yield	42.4	50.9	39.8	14.8	

*Planter: Spring Wheat was seeded with a hoe drill.
**Ridges were built in the Fall.
***Fertilizer: N was applied with a fertilizer spreader and P was incorporated with the hoe drill.
****Herbicide: Bronate, Hoelon + MCPA, and Hoelon + Buctril were applied with a sprayer.

Annex Table C-9. Cultural Practices for FSS1 Oats/Alfalfa Alternative

	1985	1986	1987	1988	1989
Disk	s2x	s2x	s1x		
Field Cultivator				1x	
Harrow	1x				
Field Cultivator w/Harrow		1x	1x	1x	
Planter* (Drill)	1x	1x	1x	1x	
Rotary Hoe					
Regular Cultivator					
Ridge Cultivator					
Hand Weeding					
Fertilizer					
Herbicide					
Swather	1x	1x	1x	1x	
Hay Baler					
Combine	1x	1x	1x	1x	
Manure Spreader	1 T/a dry matter	2 T/a dry matter	2.5 T/a dry matter	2.74 T/a dry matter	
Chisel Plow					
Chisel w/Subsurface Sweep					
Moldboard Plow					
Planting Date	Apr 29	Apr 23	Apr 16	Apr 12	
Yield	98.4	57.3	59.9	32.3	

*Planter: Oats/Alfalfa were seeded with a drill, with packer attached.

Annex Table C-10. Cultural Practices for FSS1 Alfalfa Alternative

	1985	1986	1987	1988	1989
Disk	2x				
Field Cultivator	1x			f1x	
Harrow	1x				
Field Cultivator w/Harrow					
Planter					
Rotary Hoe					
Regular Cultivator					
Hand Weeding					
Fertilizer					
Herbicide*	Eptam 3 lb. ai per acre				
Swather	2x	3x	3x	3x	
Hay Baler	2x	3x	3x	3x	
Combine					
Manure Spreader					
Chisel Plow		f1x	f1x	f1x	
Chisel w/Subsurface Sweep	f2x	f1x	f1x		
Moldboard Plow					
Planting Date	Apr 29				
Yield	2.01 T/a 2 cuttings	6.14 T/a 3 cuttings	4.45 T/a 3 cuttings	2.89 T/a 3 cuttings	

*Herbicide: Eptam was applied with a sprayer and used only in 1985.

Annex Table C-11. Cultural Practices for FSS2 Spring Wheat Alternative

	1985	1986	1987	1988	1989
Disk	s2x	s1x	s1x		
Field Cultivator		1x	1x	1x	
Harrow					
Field Cultivator w/Harrow				1x	
Planter* (Drill)	1x	1x	1x	1x	
Rotary Hoe			1x	1x	
Regular Cultivator					
Ridge Cultivator					
Hand Weeding					
Fertilizer					
Herbicide					
Swather	1x	1x	1x	1x	
Hay Baler					
Combine	1x	1x	1x	1x	
Manure Spreader					
Chisel Plow	f1x	f1x	f1x	f1x	
Chisel w/Subsurface Sweep					
Moldboard Plow					
Planting Date	May 2	May 21	Apr 16	Apr 7	
Yield	49.6	55.1	44.2	20.0	

*Planter: Spring Wheat was seeded with a drill.

Annex Table C-12. Cultural Practices for FSS2 Spring Wheat Conventional

	1985	1986	1987	1988	1989
Disk	s2x	s1x			
Field Cultivator		1x	2x	1x	
Harrow					
Field Cultivator w/Harrow				1x	
Planter* (Drill)	1x	1x	1x	1x	
Rotary Hoe					
Regular Cultivator					
Ridge Cultivator					
Hand Weeding					
Fertilizer**	N - 100 P - 0 K - 0	N - 90 P - 0 K - 0	N - 108 P - 0 K - 0	N - 50 P - 30 K - 0	
Herbicide***	Bronate 1/2 pt. per acre	Hoelon 2 pt./a MCPA 1/2 pt. per acre	Hoelon 2 pt./a Buctril 1 pt./a	Hoelon 2 pt./a Buctril 1 pt./a	
Swather	1x	1x	1x	1x	
Hay Baler					
Combine	1x	1x	1x	1x	
Manure Spreader					
Chisel Plow					
Chisel w/Subsurface Sweep					
Moldboard Plow	f1x	f1x	f1x	f1x	
Planting Date	Apr 25	Apr 23	Apr 15	Apr 7	
Yield	46.9	56.4	44.7	18.3	

*Planter: Spring Wheat was seeded with a drill.
**Fertilizer: N was applied with a fertilizer spreader and P was incorporated with the drill.
***Herbicide: Bronate, Hoelon + MCPA, and Hoelon +Buctril were applied with a sprayer.

Annex Table C-13. Cultural Practices for FSS2 Spring Wheat Minimum Till

	1985	1986	1987	1988	1989
Disk	s1x				
Field Cultivator					
Harrow				1x	
Field Cultivator w/Harrow					
Planter* (Hoe Drill)	1x	1x	1x	1x	
Rotary Hoe					
Regular Cultivator					
Ridge Cultivator					
Hand Weeding					
Fertilizer**	N - 100 P - 0 K - 0	N - 90 P - 0 K - 0	N - 108 P - 0 K - 0	N - 75 P - 30 K - 0	
Herbicide***	Bronate 1/2 pt. per acre	Hoelon 2 pt./a MCPA 1/2 pt. per acre	Hoelon 2 pt./a Buctril 1 pt./a	Hoelon 2 pt./a Buctril 1 pt./a	
Swather	1x	1x	1x	1x	
Hay Baler					
Combine	1x	1x	1x	1x	
Manure Spreader					
Chisel Plow	f1x	f1x	f1x	f1x	
Chisel w/Subsurface Sweep					
Moldboard Plow					
Planting Date	Apr 25	Apr 23	Apr 15	Apr 7	
Yield	37.7	55.8	48.8	17.0	

*Planter: Spring Wheat was seeded with a hoe drill.
**Fertilizer: N was applied with a fertilizer spreader and P was incorporated with the hoe drill.
***Herbicide: Bronate, Hoelon + MCPA, and Hoelon + Buctril were applied with a sprayer.

Annex Table C-14. Cultural Practices for FSS2 Soybeans Alternative.

	1985	1986	1987	1988	1989
Disk	s2x	s2x	s1x	s1x	
Field Cultivator	1x	1x	1x		
Harrow					
Field Cultivator w/Harrow				1x	
Planter	1x	1x	1x	1x	
Rotary Hoe		1x	2x	2x	
Regular Cultivator		2x	2x	2x	
Ridge Cultivator					
Hand Weeding	2.4 h/a	2.80 h/a	2.47 h/a	1.25 h/a	
Fertilizer					
Herbicide					
Swather					
Hay Baler					
Combine	1x	1x	1x	1x	
Manure Spreader					
Chisel Plow	f1x				
Chisel w/Subsurface Sweep					
Moldboard Plow					
Planting Date	May 31	May 28	May 15	May 10	
Yield	15.5	27.5	33.2	16.5	

Annex Table C-15. Cultural Practices for FSS2 Soybeans Conventional

	1985	1986	1987	1988	1989
Disk	s2x	s2x	s2x	s1x	
Field Cultivator					
Harrow				2x	
Field Cultivator w/Harrow					
Planter	1x	1x	1x	1x	
Rotary Hoe					
Regular Cultivator		2x	2x	2x	
Ridge Cultivator					
Hand Weeding	1.6 h/a	1.49 h/a	1.45 h/a	.53 h/a	
Fertilizer					
Herbicide*	Lasso 3 qt./a	Treflan 1 1/2 pt. per acre	Treflan 1 1/2 pt. per acre	Treflan 1 1/2 pt. per acre	
Swather					
Hay Baler					
Combine	1x	1x	1x	1x	
Manure Spreader					
Chisel Plow	f1x				
Chisel w/Subsurface Sweep					
Moldboard Plow					
Planting Date	May 21	May 22	May 14	May 10	
Yield	24.9	29.4	32.8	14.1	

*Herbicide: Lasso and Treflan were applied with a sprayer.

Annex Table C-16. Cultural Practices for FSS2 Soybeans Minimum Till

	1985	1986	1987	1988	1989
Disk	s1x				
Field Cultivator					
Harrow				1x	
Field Cultivator w/Harrow					
Planter* (Ridge Till)	1x	1x	1x	1x	
Rotary Hoe					
Regular Cultivator		2x	2x	1x	
Ridge Cultivator					
Hand Weeding	1.4 h/a	1.30 h/a	1.31 h/a	1.32 h/a	
Fertilizer					
Herbicide**	Lasso 3 qt./a	Lasso II 7 lbs. band Blazer 1 1/2 pts per acre + Poast 1 1/2 pt. per acre	Lasso 3 qt./a Blazer 1 1/2 pts	Lasso 3 qt./a	
Swather					
Hay Baler					
Combine	1x	1x	1x	1x	
Manure Spreader					
Chisel Plow	f1x				
Chisel w/Subsurface Sweep					
Moldboard Plow					
Planting Date	May 21	May 20	May 14	May 10	
Yield	25.4	33.3	31.6	16.8	

*Planter: Soybeans were seeded with a ridge till planter.

**Herbicide: Lasso, Blazer, and Blazer + Poast were applied with a sprayer. Lasso II was applied with a ridge till planter.

Annex Table C-17. Cultural Practices for FSS2 Barley Conventional

	1985	1986	1987	1988	1989
Disk	s2x	s1x			
Field Cultivator		1x	2x		
Harrow					
Field Cultivator w/Harrow				1x	
Planter* (Drill)	1x	1x	1x	1x	
Rotary Hoe					
Regular Cultivator					
Ridge Cultivator					
Hand Weeding					
Fertilizer**	N - 100 P - 0 K - 0	N - 70 P - 0 K - 0	N - 37 P - 0 K - 0	N - 0 P - 30 K - 0	
Herbicide***	Bronate 1/2 pt/a	Hoelon 2 pt/a MCPA 1/2 pt/a	Bronate 1 1/2 pt per acre	Bronate 1 pt/a	
Swather	1x	1x	1x	1x	
Hay Baler					
Combine	1x	1x	1x	1x	
Manure Spreader					
Chisel Plow					
Chisel w/Subsurface Sweep					
Moldboard Plow	f1x	f1x	f1x	f1x	
Planting Date	Apr 25	Apr 23	Apr 15	Apr 11	
Yield	66.5	88.9	80.8	28.5	

*Planter: Barley was seeded with a drill.
**Fertilizer: N was applied with a fertilizer spreader and P was incorporated with the drill.
***Herbicide: Bronate and Hoelon + MCPA were applied with a sprayer.

Annex Table C-18. Cultural Practices FSS2 Barley Minimum Till

	1985	1986	1987	1988	1989
Disk	s1x				
Field Cultivator			1x		
Harrow				1x	
Field Cultivator w/Harrow					
Planter* (Hoe Drill)	1x	1x	1x	1x	
Rotary Hoe					
Regular Cultivator					
Ridge Cultivator					
Hand Weeding					
Fertilizer**	N - 100 P - 0 K - 0	N - 70 P - 0 K - 0	N - 77 P - 0 K - 0	N - 0 P - 30 K - 0	
Herbicide***	Bronate 1/2 pt/a	Hoelon 2 pt/a MCPA 1/2 pt/a	Bronate 1 1/2 pt per acre	Bronate 1 pt/a	
Swather	1x	1x	1x	1x	
Hay Baler					
Combine	1x	1x	1x	1x	
Manure Spreader					
Chisel Plow	f1x	f1x	f1x	f1x	
Chisel w/Subsurface Sweep					
Moldboard Plow					
Planting Date	Apr 25	Apr 23	Apr 29	Apr 11	
Yield	45.8	76.9	46.5	28.3	

*Planter: Barley was seeded with a hoe drill.
**Fertilizer: N was applied with a fertilizer spreader and P was incorporated with the hoe drill.
***Herbicide: Bronate and Hoelon + MCPA were applied with a sprayer.

Annex Table C-19. Cultural Practices for FSS2 Oats/Clover Alternative

	1985	1986	1987	1988	1989
Disk	s2x	s1x	s1x		
Field Cultivator			1x		
Harrow	1x				
Field Cultivator w/Harrow				1x	
Planter* (Drill)	1x	1x	1x	1x	
Rotary Hoe					
Regular Cultivator					
Ridge Cultivator					
Hand Weeding					
Fertilizer					
Herbicide					
Swather	1x	1x	1x	1x	
Hay Baler					
Combine	1x	1x	1x	1x	
Manure Spreader	1 T/a dry matter				
Chisel Plow					
Chisel w/Subsurface Sweep					
Moldboard Plow					
Planting Date	Apr 29	Apr 23	Apr 16	Apr 12	
Yield	91.8	60.2	72.4	43.8	

*Planter: Oats/Sweet Clover were seeded with a drill, with packer attached.

Annex Table C-20. Cultural Practices for FSS2 Clover Alternative

	1985	1986	1987	1988	1989
Disk	s2x				
Field Cultivator	f1x			1x	
Harrow	1x				
Field Cultivator w/Harrow					
Planter					
Rotary Hoe					
Regular Cultivator					
Ridge Cultivator					
Hand Weeding					
Fertilizer					
Herbicide*	Eptam 3 lb ai/a				
Swather					
Hay Baler					
Combine					
Manure Spreader					
Chisel Plow		f1x	f1x	f1x	
Chisel w/Subsurface Sweep	f2x	f1x			
Moldboard Plow					
Mower	1x	1x	1x	1x	
Planting Date	Apr 29				
Yield**	2 cutting 2.23 T/a	1 cutting 1.36 T/a	1 cutting 2.40 T/a	1 cutting .92 T/a	

*Herbicide: Eptam was applied with a sprayer and used only in 1985.

**Yield was estimated and not harvested.

ANNEX D

Enterprise Budgets and Whole Farm Results

This annex contains budget results obtained by using the spreadsheet approach to estimate costs and returns per planted acre for each of the crops in the systems. This is followed, for each system, by results on a "whole farm" basis. Results are shown for the years 1985-1988.

To assist in interpreting the data contained in the farming systems crop budgets, we will refer to the tables for the "Alternative" system for 1985 in Farming Systems Study 1.

First presented is the "Input Summary and Results-----" table of projected per acre costs and returns for the enterprise. Total income per acre for each crop in the system is listed on the fifth row of that table. For example, corn is $194.74. Immediately following that is the section on direct costs per acre by type of cost, for each crop in the system. Following that are other calculated results for each crop. In the corn example, these calculated results include: (1) total direct (operating) costs per acre, $81.48; (2) total fixed costs per acre, $37.33; (3) production costs per acre, which is the sum total of direct and fixed costs, $118.81; (4) land charges per acre, $21; (5) total production and land costs per acre, $139.81; and (6) income over all costs per acre, $54.93.

In these budget tables, the numbers in parentheses indicate negative numbers. These budgets are on a per-acre basis. Costs were allocated to crops according to the calendar year of operation. In the case of alfalfa, for example, establishment costs for it are included in the oats column, because these costs occur during the calendar year in which oats is the

principal crop. This cost allocation procedure was followed throughout the budgeting process.

The second sheet contains information to enable the evaluation of the profitability of the system. For example, income over all costs for the Alternative system with 1985 yield and cost assumptions is shown for a 540 crop acre farm in northeast South Dakota. For detailed procedures in calculating set aside requirement acres, crop distribution (acres), and other results for the systems, see Dobbs, Weiss and Leddy (1987). Income over all costs for the 540 acre farm using this Alternative farming system with 1985 yields and cultural practices and 1985 farm program provisions and prices comes to $2,765. This is the residual return to management and risk.

The last section at the end of each system budget contains a bar chart showing income over all costs that pertain to acres devoted to each crop enterprise and (in the last bar) the whole farm. The information source for this chart comes from the table just above it, in each case.

INPUT SUMMARY AND RESULTS--ALTERNATIVE ROTATION 1985 : FARMING SYSTEMS STUDY I

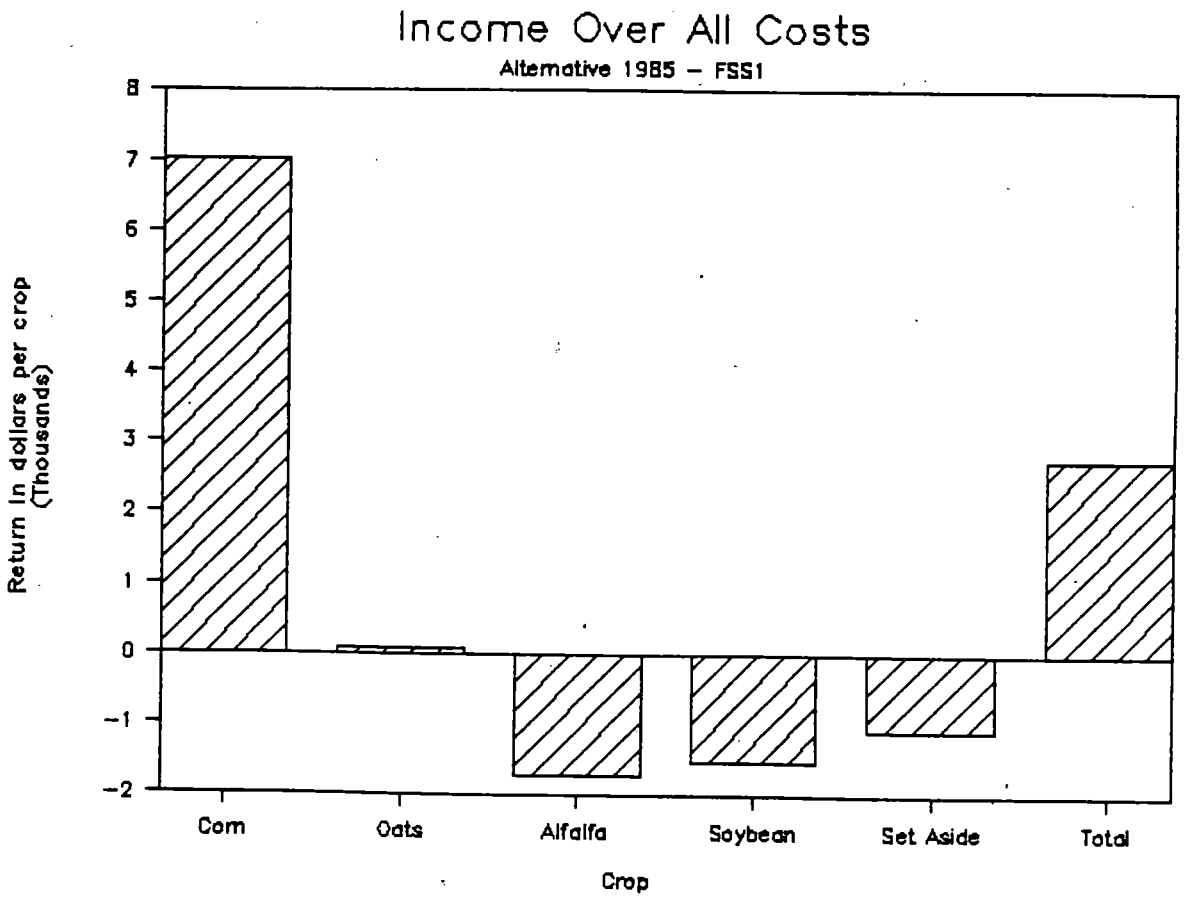
	Corn	Oats	Alfalfa	Soybean	Set Aside
RECEIPTS:					
Estimated grain yield (units/ac.).....	71	98	2.0	18	0
Estimated selling price or value ($/unit)...	$2.33	$1.21	$47.00	$4.89	$0.00
GOVERNMENT PAYMENT:					
Base yield (units/ac.).....	63	53	0	0	0
Deficiency payment ($/unit).....	$0.48	$0.29	$0.00	$0.00	$0.00
I. Total income per acre.....	$194.74	$134.43	$94.47	$89.98	$0.00
DIRECT COSTS:					
Seed ($/ac.).....	$13.50	$25.88	$0.00	$8.50	$0.00
Fertilizer ($/ac.).	$0.00	$0.00	$0.00	$0.00	$0.00
Fertilizer application ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Herbicide ($/ac.).....	$0.00	$0.00	$9.81	$0.00	$0.00
Herbicide application ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Insecticide ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Insecticide application ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Crop insurance ($/ac.).....	$12.25	$2.66	$0.00	$2.73	$0.00
Storage ($/ac.).....	$7.84	$10.92	$0.00	$2.04	$0.00
Drying ($/ac.).....	$10.59	$0.00	$0.00	$0.00	$0.00
Overhead ($/ac.).....	$5.50	$5.00	$5.00	$5.50	$2.50
Custom machine hire ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Fuel and lubrication ($/ac.).....	$4.37	$4.27	$6.45	$3.46	$1.53
Machinery repair ($/ac.).....	$8.02	$11.61	$10.06	$6.87	$1.25
Interest on non labor direct costs ($/ac)...	$3.67	$3.57	$1.85	$1.72	$0.31
Labor charge($/ac.).....	$15.74	$10.26	$14.97	$15.56	$2.42
II. Total direct (operating) costs.....	$81.48	$74.17	$48.14	$46.38	$8.01
Income over direct costs (I minus II)....	$113.26	$60.27	$46.33	$43.59	($8.01)
Breakeven price per unit (direct costs)..	$1.15	$0.75	$23.95	$2.52	ERR
FIXED COSTS:					
Interest, Housing & Ins. on machinery ($/ac)	$15.33	$15.97	$16.38	$13.81	$2.40
Deprec. on machinery and equipment ($/ac.)..	$16.75	$17.52	$17.19	$15.39	$2.19
Real estate taxes ($/ac.).....	$5.25	$5.25	$5.25	$5.25	$5.25
III. Total fixed costs.....	$37.33	$38.74	$38.82	$34.45	$9.84
IV. Production costs ($/ac., excluding land) (II plus III)	$118.81	$112.91	$86.96	$80.83	$17.85
Production costs ($/unit)...	$1.68	$1.15	$43.27	$4.39	ERR
V. Land charges ($/ac.).....	$21.00	$21.00	$21.00	$21.00	$21.00
VI. Total production and land costs ($/ac.). (IV plus V)	$139.81	$133.91	$107.96	$101.83	$38.85
Production and land costs ($/unit).....	$1.98	$1.36	$53.71	$5.53	ERR
Breakeven yield (units/ac.)..... (at selling price)	60.0	110.7	2.3	20.8	ERR
VII. Income over all costs ($/acre)..... (I minus IV)	$54.93	$0.53	($13.49)	($11.86)	($38.85)
Income over all costs ($/unit).....	$0.78	$0.01	($6.71)	($0.64)	ERR

ALTERNATIVE ROTATION 1985 : FARMING SYSTEMS STUDY I
SUMMARY DATA FOR REPRESENTATIVE FARM IN NORTHEAST SOUTH DAKOTA.

	Corn	Oats	Alfalfa	Soybean	Set Aside	Total
Farm Program Set-aside Requirement (%).....	10	10	0	0	0	
Crop Distribution (acres)..	128	128	128	128	28	540
Income Over All Costs..... ($/acre)	$54.93	$0.53	($13.49)	($11.86)	($38.85)	
Income Over All Costs..... ($/crop)	$7,030	$67	($1,727)	($1,517)	($1,088)	$2,765

Dollars/acre

Gross Income	Direct costs (excl. labor)	Income over non-labor & non-land costs	Inc. over non-land costs	Inc. over all costs
$122	$46	$45	$31	$5



INPUT SUMMARY AND RESULTS--ALTERNATIVE ROTATION 1986 : FARMING SYSTEMS STUDY I

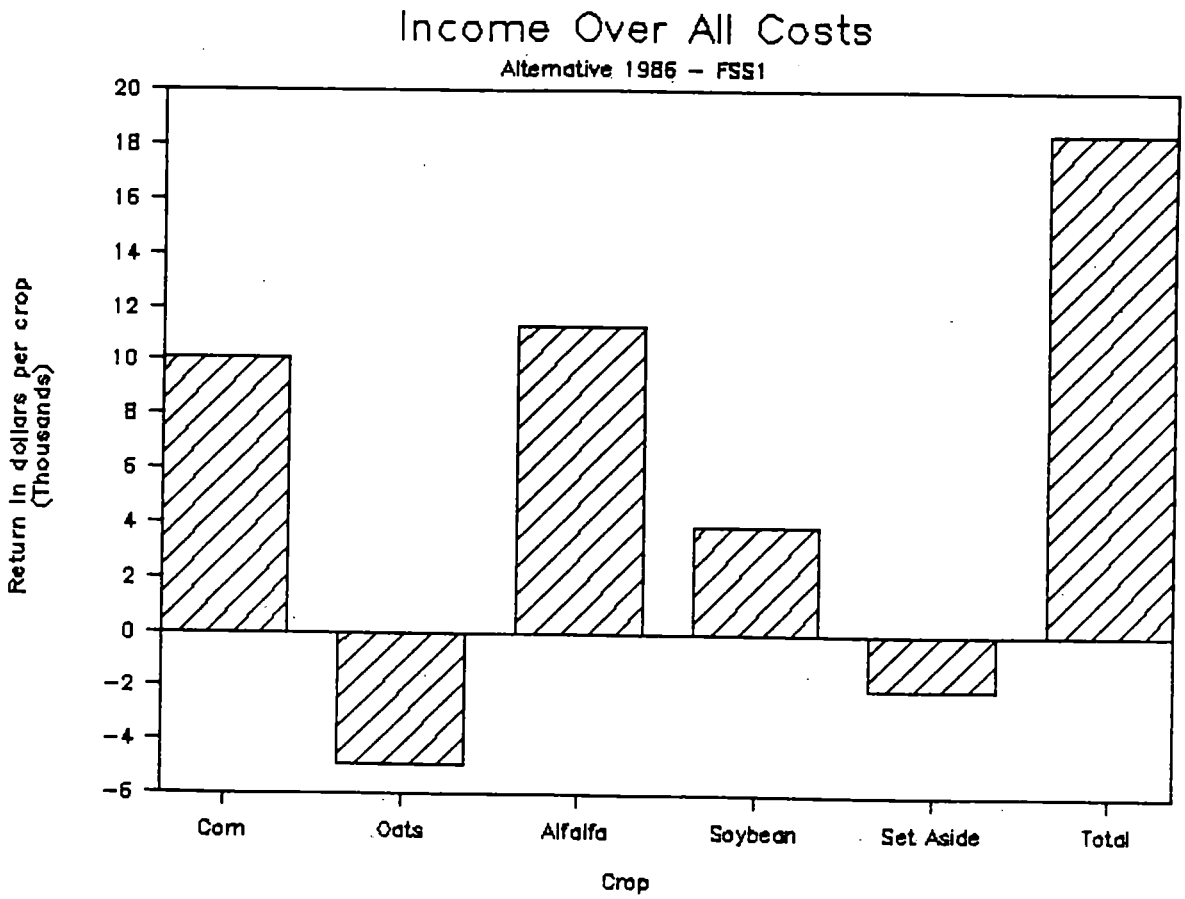
	Corn	Oats	Alfalfa	Soybean	Set Aside
RECEIPTS:					
Estimated grain yield (units/ac.).....	100	57	6.1	30	0
Estimated selling price or value ($/unit)...	$1.68	$1.28	$32.00	$4.58	$0.00
GOVERNMENT PAYMENT:					
Base yield (units/ac.).....	63	53	0	0	0
Deficiency payment ($/unit).....	$1.11	$0.39	$0.00	$0.00	$0.00
I. Total income per acre.....	$237.09	$94.01	$196.48	$136.48	$0.00
DIRECT COSTS:					
Seed ($/ac.).....	$13.50	$25.88	$0.00	$8.50	$0.00
Fertilizer ($/ac.).	$0.00	$0.00	$0.00	$0.00	$0.00
Fertilizer application ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Herbicide ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Herbicide application ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Insecticide ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Insecticide application ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Crop insurance ($/ac.).....	$17.27	$1.55	$0.00	$4.42	$0.00
Storage ($/ac.).....	$11.04	$6.36	$0.00	$3.31	$0.00
Drying ($/ac.).....	$14.93	$0.00	$0.00	$0.00	$0.00
Overhead ($/ac.).....	$5.50	$5.00	$5.00	$5.50	$2.50
Custom machine hire ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Fuel and lubrication ($/ac.).....	$4.96	$4.86	$5.68	$3.77	$1.53
Machinery repair ($/ac.).....	$8.93	$13.32	$11.84	$7.26	$1.25
Interest on non labor direct costs ($/ac)...	$4.51	$3.37	$1.33	$1.94	$0.31
Labor charge($/ac.).....	$11.88	$11.34	$14.85	$13.14	$2.42
II. Total direct (operating) costs.....	$92.51	$71.68	$38.70	$47.83	$8.01
Income over direct costs (I minus II)....	$144.58	$22.34	$157.78	$88.65	($8.01)
Breakeven price per unit (direct costs)..	$0.93	$1.25	$6.30	$1.61	ERR
FIXED COSTS:					
Interest, Housing & Ins. on machinery ($/ac)	$17.13	$17.28	$17.79	$14.46	$2.40
Deprec. on machinery and equipment ($/ac.)..	$18.52	$18.99	$20.51	$15.99	$2.19
Real estate taxes ($/ac.).....	$5.25	$5.25	$5.25	$5.25	$5.25
III. Total fixed costs.....	$40.90	$41.52	$43.55	$35.70	$9.84
IV. Production costs ($/ac., excluding land) (II plus III)	$133.41	$113.20	$82.25	$83.53	$17.85
Production costs ($/unit)...	$1.34	$1.98	$13.40	$2.80	ERR
V. Land charges ($/ac.).....	$21.00	$21.00	$21.00	$21.00	$21.00
VI. Total production and land costs ($/ac.). (IV plus V)	$154.41	$134.20	$103.25	$104.53	$38.85
Production and land costs ($/unit).....	$1.55	$2.34	$16.82	$3.51	ERR
Breakeven yield (units/ac.)..... (at selling price)	91.9	104.8	3.2	22.8	ERR
VII. Income over all costs ($/acre)..... (I minus IV)	$82.68	($40.18)	$93.23	$31.95	($38.85)
Income over all costs ($/unit).....	$0.83	($0.70)	$15.18	$1.07	ERR

ALTERNATIVE ROTATION 1986 : FARMING SYSTEMS STUDY I
SUMMARY DATA FOR REPRESENTATIVE FARM IN NORTHEAST SOUTH DAKOTA.

	Corn	Oats	Alfalfa	Soybean	Set Aside	Total
Farm Program Set-aside Requirement (%).....	17.5	17.5	0	0	0	
Crop Distribution (acres)..	122	122	122	122	52	540
Income Over All Costs..... ($/acre)	$82.68	($40.18)	$93.23	$31.95	($38.85)	
Income Over All Costs..... ($/crop)	$10,087	($4,902)	$11,374	$3,898	($2,020)	$18,436

Dollars/acre

Gross Income	Direct costs (excl. labor)	Income over non-labor & non-land costs	Inc. over non-land costs	Inc. over all costs
$150	$46	$72	$60	$34



INPUT SUMMARY AND RESULTS--ALTERNATIVE ROTATION 1987 : FARMING SYSTEMS STUDY I

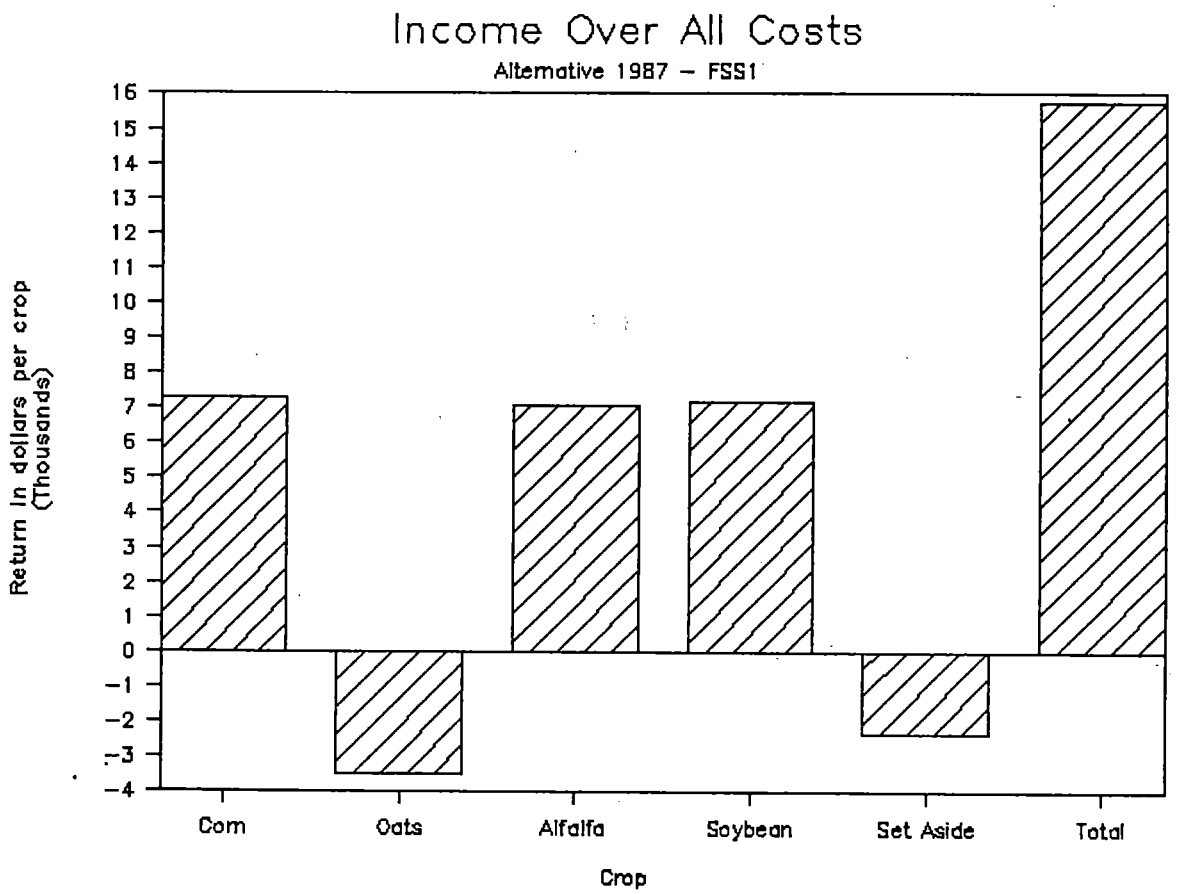
	Corn	Oats	Alfalfa	Soybean	Set Aside
RECEIPTS:					
Estimated grain yield (units/ac.).....	87	60	4.5	32	0
Estimated selling price or value ($/unit)...	$1.63	$1.60	$36.00	$5.15	$0.00
GOVERNMENT PAYMENT:					
Base yield (units/ac.).....	63	53	0	0	0
Deficiency payment ($/unit).....	$1.09	$0.20	$0.00	$0.00	$0.00
I. Total income per acre.....	$210.32	$106.44	$160.20	$162.74	$0.00
DIRECT COSTS:					
Seed ($/ac.).....	$14.55	$25.88	$0.00	$8.50	$0.00
Fertilizer ($/ac.).	$0.00	$0.00	$0.00	$0.00	$0.00
Fertilizer application ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Herbicide ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Herbicide application ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Insecticide ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Insecticide application ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Crop insurance ($/ac.).....	$15.08	$1.62	$0.00	$4.68	$0.00
Storage ($/ac.).....	$9.65	$6.65	$0.00	$3.51	$0.00
Drying ($/ac.).....	$13.04	$0.00	$0.00	$0.00	$0.00
Overhead ($/ac.).....	$5.50	$5.00	$5.00	$5.50	$2.50
Custom machine hire ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Fuel and lubrication ($/ac.).....	$4.92	$4.85	$5.60	$4.00	$1.53
Machinery repair ($/ac.).....	$9.09	$14.06	$11.63	$7.52	$1.25
Interest on non labor direct costs ($/ac)...	$4.25	$3.44	$1.32	$1.99	$0.31
Labor charge($/ac.).....	$11.57	$12.05	$13.72	$9.41	$2.42
II. Total direct (operating) costs.....	$87.64	$73.54	$37.27	$45.11	$8.01
Income over direct costs (I minus II)....	$122.68	$32.90	$122.93	$117.63	($8.01)
Breakeven price per unit (direct costs)..	$1.01	$1.23	$8.37	$1.43	ERR
FIXED COSTS:					
Interest, Housing & Ins. on machinery ($/ac)	$17.10	$16.91	$17.47	$14.99	$2.40
Deprec. on machinery and equipment ($/ac.)..	$18.51	$18.69	$20.11	$16.48	$2.19
Real estate taxes ($/ac.).....	$5.25	$5.25	$5.25	$5.25	$5.25
III. Total fixed costs.....	$40.86	$40.85	$42.83	$36.72	$9.84
IV. Production costs ($/ac., excluding land) (II plus III)	$128.50	$114.39	$80.10	$81.83	$17.85
Production costs ($/unit)...	$1.48	$1.91	$18.00	$2.59	ERR
V. Land charges ($/ac.).....	$21.00	$21.00	$21.00	$21.00	$21.00
VI. Total production and land costs ($/ac.). (IV plus V)	$149.50	$135.39	$101.10	$102.83	$38.85
Production and land costs ($/unit).....	$1.72	$2.26	$22.72	$3.25	ERR
Breakeven yield (units/ac.)..... (at selling price)	91.7	84.6	2.8	20.0	ERR
VII. Income over all costs ($/acre)..... (I minus IV)	$60.82	($28.95)	$59.10	$59.91	($38.85)
Income over all costs ($/unit).....	$0.70	($0.48)	$13.28	$1.90	ERR

ALTERNATIVE ROTATION 1987 : FARMING SYSTEMS STUDY I
SUMMARY DATA FOR REPRESENTATIVE FARM IN NORTHEAST SOUTH DAKOTA.

	Corn	Oats	Alfalfa	Soybean	Set Aside	Total
Farm Program Set-aside Requirement (%).....	20	20	0	0	0	
Crop Distribution (acres)..	120	120	120	120	60	540
Income Over All Costs..... ($/acre)	$60.82	($28.95)	$59.10	$59.91	($38.85)	
Income Over All Costs..... ($/crop)	$7,298	($3,474)	$7,092	$7,189	($2,331)	$15,774

Dollars/acre

Gross Income	Direct costs (excl. labor)	Income over non-labor & non-land costs	Inc. over non-land costs	Inc. over all costs
$142	$44	$66	$55	$29



INPUT SUMMARY AND RESULTS--ALTERNATIVE ROTATION 1988 : FARMING SYSTEMS STUDY I

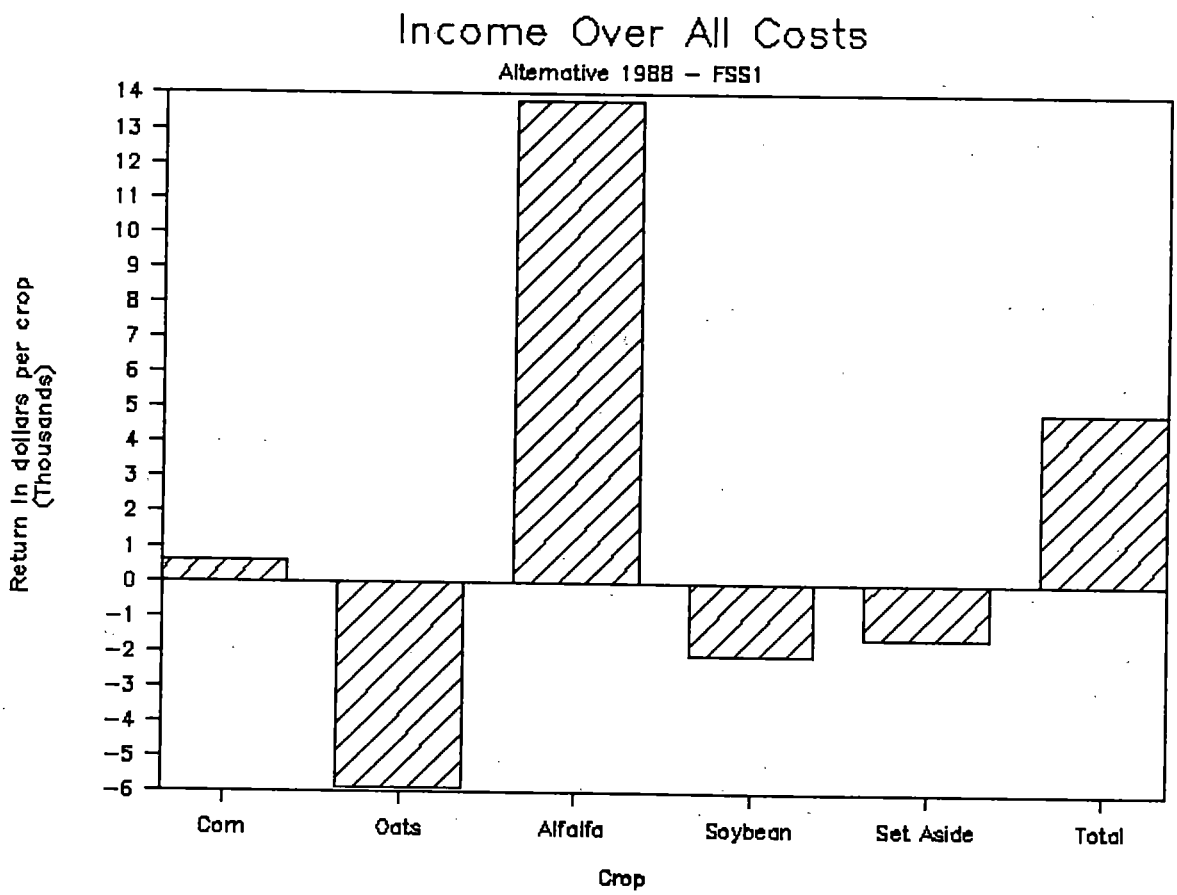
	Corn	Oats	Alfalfa	Soybean	Set Aside
RECEIPTS:					
Estimated grain yield (units/ac.).....	39	32	2.9	11	0
Estimated selling price or value ($/unit)...	$2.50	$2.60	$70.00	$7.65	$0.00
GOVERNMENT PAYMENT:					
Base yield (units/ac.).....	63	53	0	0	0
Deficiency payment ($/unit).....	$0.38	$0.00	$0.00	$0.00	$0.00
I. Total income per acre.....	$121.44	$83.98	$202.30	$83.39	$0.00
DIRECT COSTS:					
Seed ($/ac.).....	$13.88	$25.88	$0.00	$8.50	$0.00
Fertilizer ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Fertilizer application ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Herbicide ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Herbicide application ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Insecticide ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Insecticide application ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Crop insurance ($/ac.).....	$6.77	$0.87	$0.00	$1.62	$0.00
Storage ($/ac.).....	$4.33	$3.59	$0.00	$1.21	$0.00
Drying ($/ac.).....	$5.85	$0.00	$0.00	$0.00	$0.00
Overhead ($/ac.).....	$5.50	$5.00	$5.00	$5.50	$2.50
Custom machine hire ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Fuel and lubrication ($/ac.).....	$3.90	$4.96	$4.35	$3.84	$1.53
Machinery repair ($/ac.).....	$7.71	$14.22	$10.27	$7.25	$1.25
Interest on non labor direct costs ($/ac)...	$2.84	$3.23	$1.16	$1.65	$0.31
Labor charge($/ac.).....	$8.80	$12.09	$12.44	$13.18	$2.42
II. Total direct (operating) costs.....	$59.57	$69.83	$33.22	$42.75	$8.01
Income over direct costs (I minus II)....	$61.87	$14.15	$169.08	$40.64	($8.01)
Breakeven price per unit (direct costs)..	$1.53	$2.16	$11.49	$3.92	ERR
FIXED COSTS:					
Interest, Housing & Ins. on machinery ($/ac)	$14.69	$16.54	$15.20	$14.74	$2.40
Deprec. on machinery and equipment ($/ac.)..	$16.22	$18.42	$17.10	$16.24	$2.19
Real estate taxes ($/ac.).....	$5.25	$5.25	$5.25	$5.25	$5.25
III. Total fixed costs.....	$36.16	$40.21	$37.55	$36.23	$9.84
IV. Production costs ($/ac., excluding land) (II plus III)	$95.73	$110.04	$70.77	$78.98	$17.85
Production costs ($/unit).....	$2.45	$3.41	$24.49	$7.25	ERR
V. Land charges ($/ac.).....	$21.00	$21.00	$21.00	$21.00	$21.00
VI. Total production and land costs ($/ac.). (IV plus V)	$116.73	$131.04	$91.77	$99.98	$38.85
Production and land costs ($/unit).....	$2.99	$4.06	$31.75	$9.17	ERR
Breakeven yield (units/ac.)..... (at selling price)	46.7	50.4	1.3	13.1	ERR
VII. Income over all costs ($/acre)..... (I minus IV)	$4.71	($47.06)	$110.53	($16.59)	($38.85)
Income over all costs ($/unit).....	$0.12	($1.46)	$38.25	($1.52)	ERR

ALTERNATIVE ROTATION 1988 : FARMING SYSTEMS STUDY I
SUMMARY DATA FOR REPRESENTATIVE FARM IN NORTHEAST SOUTH DAKOTA.

	Corn	Oats	Alfalfa	Soybean	Set Aside	Total
Farm Program Set-aside Requirement (%).....	20	5	0	0	0	
Crop Distribution (acres)..	125	125	125	125	40	540
Income Over All Costs..... ($/acre)	$4.71	($47.06)	$110.53	($16.59)	($38.85)	
Income Over All Costs..... ($/crop)	$589	($5,882)	$13,816	($2,074)	($1,554)	$4,894

Dollars/acre

Gross Income	Direct costs (excl. labor)	Income over non-labor & non-land costs	Inc. over non-land costs	Inc. over all costs
$114	$37	$46	$35	$9



INPUT SUMMARY AND RESULTS: CONVENTIONAL ROTATION 1985 : FARMING SYSTEMS STUDY I

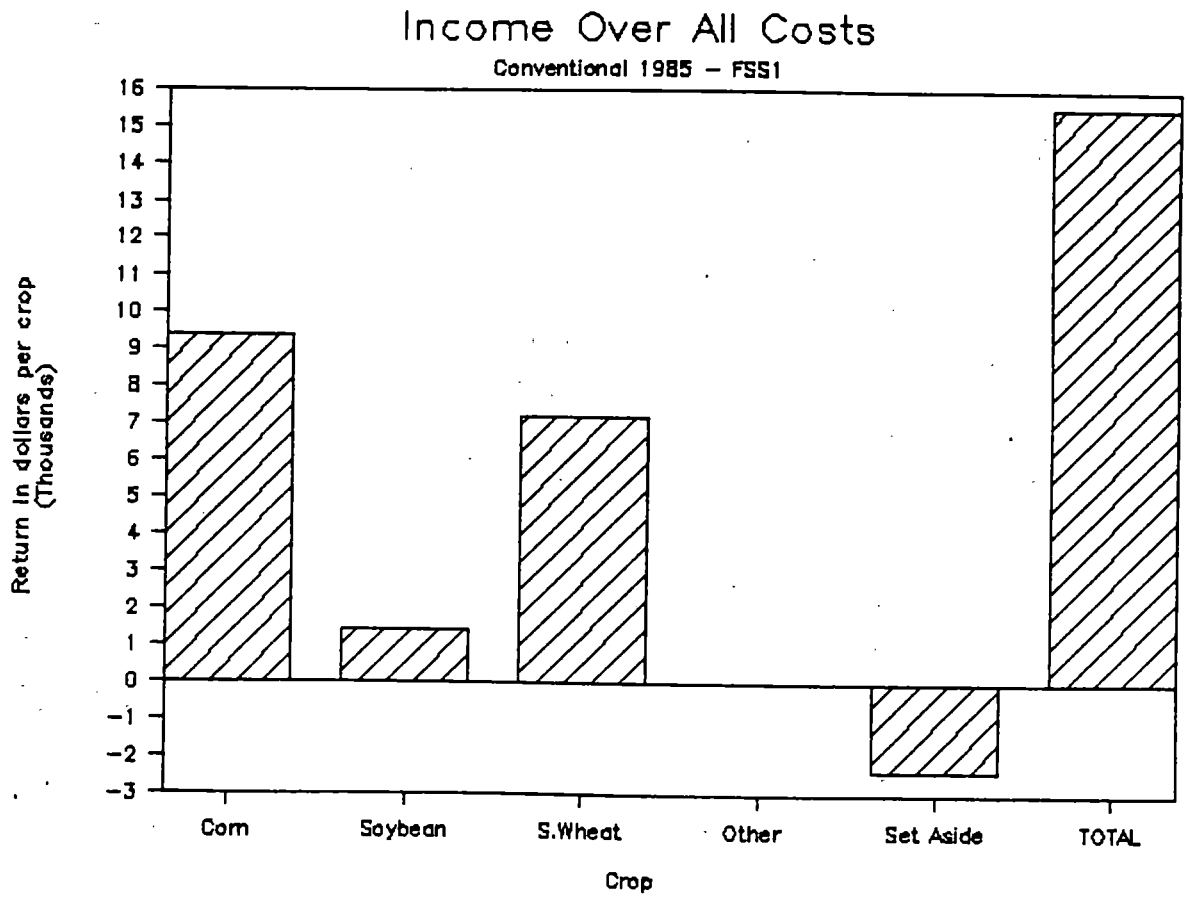
	Corn	Soybean	S.Wheat	Other	Set Aside
RECEIPTS:					
Estimated grain yield (units/ac.).....	82	27	44	0	0
Estimated selling price or value ($/unit)...	$2.33	$4.89	$3.41	$0.00	$0.00
GOVERNMENT PAYMENT:					
Base yield (units/ac.).....	63	0	27	0	0
Deficiency payment ($/unit).....	$0.48	$0.00	$1.08	$0.00	$0.00
I. Total income per acre.....	$221.53	$132.03	$179.54	$0.00	$0.00
DIRECT COSTS:					
Seed ($/ac.).....	$13.50	$8.50	$8.12	$0.00	$0.00
Fertilizer ($/ac.).....	$18.00	$0.00	$18.00	$0.00	$0.00
Fertilizer application ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Herbicide ($/ac.).....	$8.30	$21.30	$3.02	$0.00	$4.15
Herbicide application ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Insecticide ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Insecticide application ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Crop insurance ($/ac.).....	$14.25	$4.00	$4.01	$0.00	$0.00
Storage ($/ac.).....	$9.11	$3.00	$4.90	$0.00	$0.00
Drying ($/ac.).....	$12.32	$0.00	$0.00	$0.00	$0.00
Overhead ($/ac.).....	$5.50	$5.50	$5.00	$0.00	$2.50
Custom machine hire ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Fuel and lubrication ($/ac.).....	$3.73	$3.20	$5.10	$0.00	$1.12
Machinery repair ($/ac.).....	$7.58	$6.76	$10.35	$0.00	$1.00
Interest on non labor direct costs ($/ac)...	$5.46	$3.09	$3.46	$0.00	$0.52
Labor charge($/ac.).....	$8.94	$13.10	$10.62	$0.00	$2.12
II. Total direct (operating) costs.....	$106.69	$68.45	$72.58	$0.00	$11.42
Income over direct costs (I minus II)....	$114.85	$63.58	$106.96	$0.00	($11.42)
Breakeven price per unit (direct costs)..	$1.30	$2.54	$1.65	ERR	ERR
FIXED COSTS:					
Interest, Housing & Ins. on machinery ($/ac)	$14.61	$13.48	$17.40	$0.00	$1.85
Deprec. on machinery and equipment ($/ac.)..	$16.07	$15.10	$18.70	$0.00	$1.75
Real estate taxes ($/ac.).....	$5.25	$5.25	$5.25	$0.00	$5.25
III. Total fixed costs.....	$35.93	$33.83	$41.35	$0.00	$8.85
IV. Production costs ($/ac., excluding land) (II plus III)	$142.62	$102.28	$113.93	$0.00	$20.27
Production costs ($/unit).....	$1.74	$3.79	$2.58	ERR	ERR
V. Land charges ($/ac.).....	$21.00	$21.00	$21.00	$0.00	$21.00
VI. Total production and land costs ($/ac.). (IV plus V)	$163.62	$123.28	$134.93	$0.00	$41.27
Production and land costs ($/unit).....	$1.99	$4.57	$3.06	ERR	ERR
Breakeven yield (units/ac.)..... (at selling price)	70.2	25.2	39.6	ERR	ERR
VII. Income over all costs ($/acre)..... (I minus IV)	$57.92	$8.75	$44.61	$0.00	($41.27)
Income over all costs ($/unit).....	$0.71	$0.32	$1.01	ERR	ERR

CONVENTIONAL ROTATION 1985 : FARMING SYSTEMS STUDY I
SUMMARY DATA FOR REPRESENTATIVE FARM IN NORTHEAST SOUTH DAKOTA.

	Corn	Soybean	S.Wheat	Other	Set Aside	TOTAL FARM
Farm Program Set-aside Requirement (%).....	10	0	20.0	0	0	
Crop Distribution (acres)..	161	161	161	0	57	540
Income Over All Costs..... ($/acre)	$57.92	$8.75	$44.61	$0.00	($41.27)	
Income Over All Costs..... ($/crop)	$9,324	$1,409	$7,182	$0	($2,352)	$15,563

Dollars/acre

Gross Income	Direct costs (excl. labor)	Income over non-labor & non-land costs	Inc. over non-land costs	Inc. over all costs
$159	$65	$65	$55	$29



INPUT SUMMARY AND RESULTS: CONVENTIONAL ROTATION 1986--FARMING SYSTEMS STUDY I

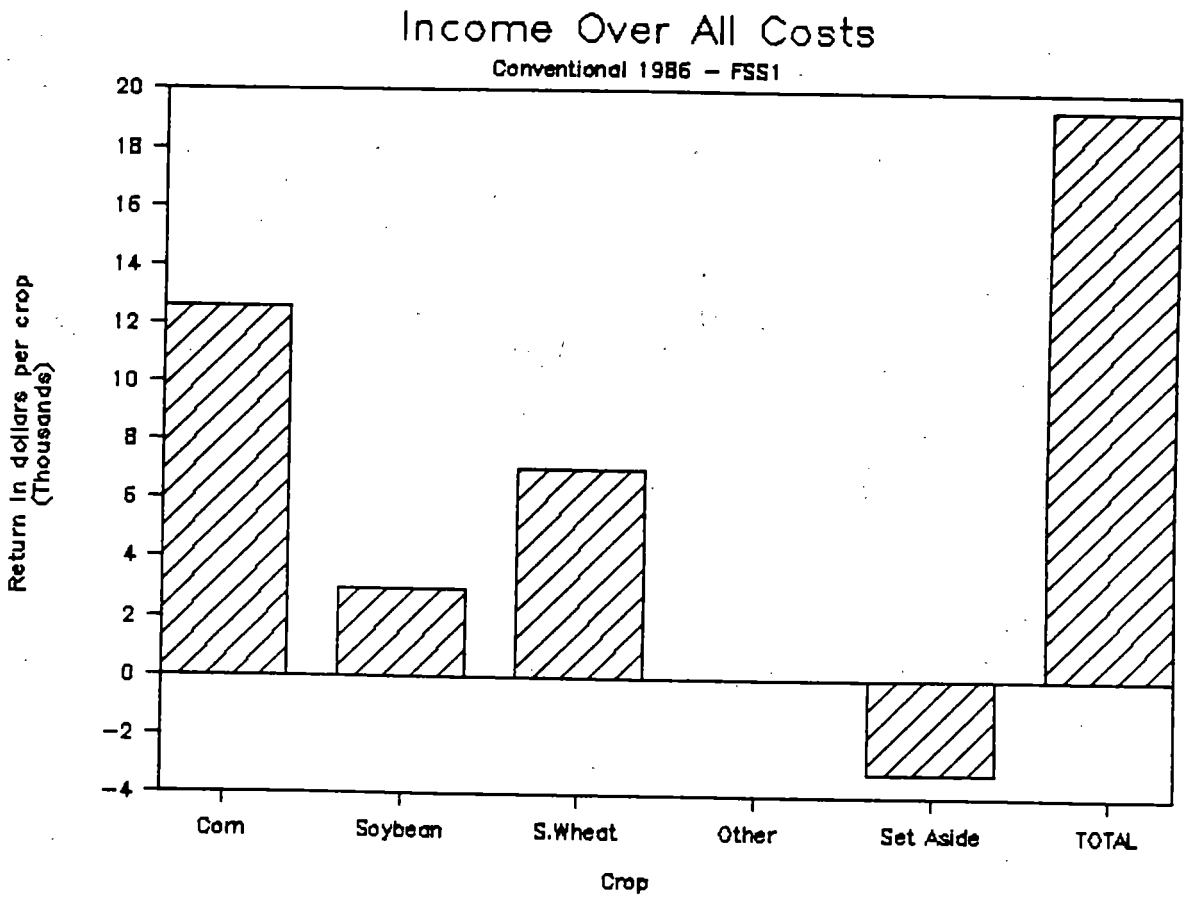
	Corn	Soybean	S.Wheat	Other	Set Aside
RECEIPTS:					
Estimated grain yield (units/ac.)	115	28	58	0	0
Estimated selling price or value ($/unit)	$1.68	$4.58	$2.42	$0.00	$0.00
GOVERNMENT PAYMENT:					
Base yield (units/ac.)	63	0	27	0	0
Deficiency payment ($/unit)	$1.11	$0.00	$1.98	$0.00	$0.00
I. Total income per acre	$262.46	$128.70	$193.58	$0.00	$0.00
DIRECT COSTS:					
Seed ($/ac.)	$13.50	$8.50	$8.12	$0.00	$0.00
Fertilizer ($/ac.)	$18.00	$0.00	$16.20	$0.00	$0.00
Fertilizer application ($/ac.)	$0.00	$0.00	$0.00	$0.00	$0.00
Herbicide ($/ac.)	$5.95	$5.04	$13.12	$0.00	$4.15
Herbicide application ($/ac.)	$0.00	$0.00	$0.00	$0.00	$0.00
Insecticide ($/ac.)	$0.00	$0.00	$0.00	$0.00	$0.00
Insecticide application ($/ac.)	$0.00	$0.00	$0.00	$0.00	$0.00
Crop insurance ($/ac.)	$19.89	$4.16	$5.27	$0.00	$0.00
Storage ($/ac.)	$12.72	$3.12	$6.43	$0.00	$0.00
Drying ($/ac.)	$17.19	$0.00	$0.00	$0.00	$0.00
Overhead ($/ac.)	$5.50	$5.50	$5.00	$0.00	$2.50
Custom machine hire ($/ac.)	$0.00	$0.00	$0.00	$0.00	$0.00
Fuel and lubrication ($/ac.)	$4.36	$3.64	$5.38	$0.00	$1.12
Machinery repair ($/ac.)	$8.34	$7.28	$10.61	$0.00	$1.00
Interest on non labor direct costs ($/ac)	$6.24	$2.20	$4.15	$0.00	$0.52
Labor charge($/ac.)	$10.14	$12.70	$11.28	$0.00	$2.12
II. Total direct (operating) costs	$121.83	$52.15	$85.55	$0.00	$11.42
Income over direct costs (I minus II)	$140.63	$76.55	$108.02	$0.00	($11.42)
Breakeven price per unit (direct costs)	$1.06	$1.86	$1.48	ERR	ERR
FIXED COSTS:					
Interest, Housing & Ins. on machinery ($/ac)	$15.48	$14.83	$17.23	$0.00	$1.85
Deprec. on machinery and equipment ($/ac.)	$16.99	$16.38	$18.60	$0.00	$1.75
Real estate taxes ($/ac.)	$5.25	$5.25	$5.25	$0.00	$5.25
III. Total fixed costs	$37.72	$36.46	$41.08	$0.00	$8.85
IV. Production costs ($/ac., excluding land) (II plus III)	$159.55	$88.61	$126.63	$0.00	$20.27
Production costs ($/unit)	$1.39	$3.15	$2.19	ERR	ERR
V. Land charges ($/ac.)	$21.00	$21.00	$21.00	$0.00	$21.00
VI. Total production and land costs ($/ac.). (IV plus V)	$180.55	$109.61	$147.63	$0.00	$41.27
Production and land costs ($/unit)	$1.58	$3.90	$2.55	ERR	ERR
Breakeven yield (units/ac.) (at selling price)	107.5	23.9	61.0	ERR	ERR
VII. Income over all costs ($/acre) (I minus IV)	$81.91	$19.09	$45.94	$0.00	($41.27)
Income over all costs ($/unit)	$0.71	$0.68	$0.79	ERR	ERR

CONVENTIONAL ROTATION 1986 : FARMING SYSTEMS STUDY I
SUMMARY DATA FOR REPRESENTATIVE FARM IN NORTHEAST SOUTH DAKOTA.

	Corn	Soybean	S.Wheat	Other	Set Aside	TOTAL FARM
Farm Program Set-aside Requirement (%).....	17.5	0	22.5	0	0	
Crop Distribution (acres)..	154	154	154	0	78	540
Income Over All Costs..... ($/acre)	$81.91	$19.09	$45.94	$0.00	($41.27)	
Income Over All Costs..... ($/crop)	$12,614	$2,940	$7,076	$0	($3,219)	$19,411

Dollars/acre

Gross Income	Direct costs (excl. labor)	Income over non-labor & non-land costs	Inc. over non-land costs	Inc. over all costs
$167	$66	$72	$62	$36



INPUT SUMMARY AND RESULTS: CONVENTIONAL ROTATION 1987 --FARMING SYSTEMS STUDY I

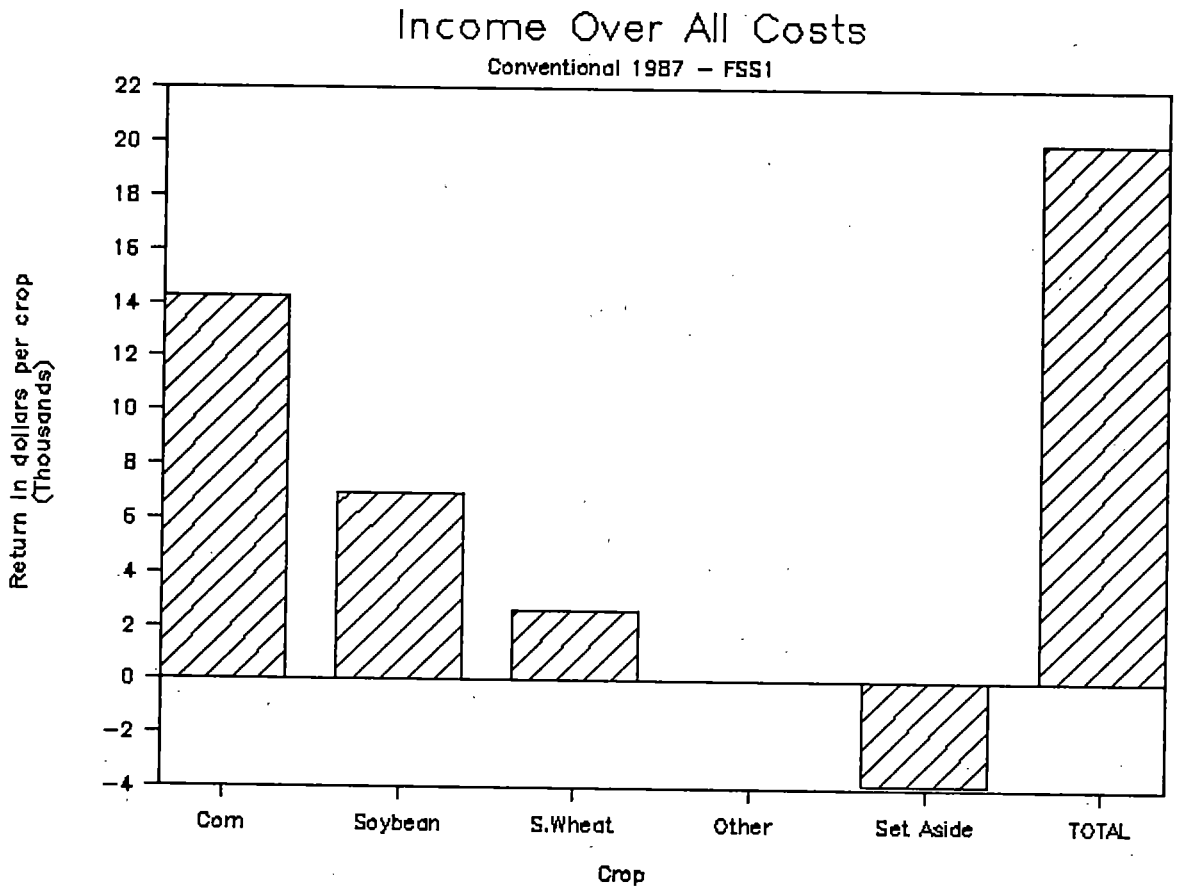
	Corn	Soybean	S.Wheat	Other	Set Aside
RECEIPTS:					
Estimated grain yield (units/ac.).....	124	31	44	0	0
Estimated selling price or value ($/unit)...	$1.63	$5.15	$2.53	$0.00	$0.00
GOVERNMENT PAYMENT:					
Base yield (units/ac.).....	63	0	27	0	0
Deficiency payment ($/unit).....	$1.09	$0.00	$1.81	$0.00	$0.00
I. Total income per acre.....	$271.44	$159.65	$159.18	$0.00	$0.00
DIRECT COSTS:					
Seed ($/ac.).....	$14.55	$8.50	$7.58	$0.00	$0.00
Fertilizer ($/ac.).	$6.66	$0.00	$13.86	$0.00	$0.00
Fertilizer application ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Herbicide ($/ac.).....	$5.95	$5.04	$17.84	$0.00	$4.15
Herbicide application ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Insecticide ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Insecticide application ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Crop insurance ($/ac.).....	$21.59	$4.59	$3.97	$0.00	$0.00
Storage ($/ac.).....	$13.81	$3.44	$4.84	$0.00	$0.00
Drying ($/ac.).....	$18.66	$0.00	$0.00	$0.00	$0.00
Overhead ($/ac.).....	$5.50	$5.50	$5.00	$0.00	$2.50
Custom machine hire ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Fuel and lubrication ($/ac.).....	$4.50	$3.66	$4.90	$0.00	$1.12
Machinery repair ($/ac.).....	$8.81	$7.31	$10.24	$0.00	$1.00
Interest on non labor direct costs ($/ac)...	$5.92	$2.25	$4.04	$0.00	$0.52
Labor charge($/ac.).....	$10.38	$15.05	$10.08	$0.00	$2.12
II. Total direct (operating) costs.....	$116.33	$55.35	$82.35	$0.00	$11.42
Income over direct costs (I minus II)....	$155.11	$104.30	$76.83	$0.00	($11.42)
Breakeven price per unit (direct costs)..	$0.94	$1.79	$1.89	ERR	ERR
FIXED COSTS:					
Interest, Housing & Ins. on machinery ($/ac)	$15.71	$14.86	$15.84	$0.00	$1.85
Deprec. on machinery and equipment ($/ac.)..	$17.23	$16.41	$17.30	$0.00	$1.75
Real estate taxes ($/ac.).....	$5.25	$5.25	$5.25	$0.00	$5.25
III. Total fixed costs.....	$38.19	$36.52	$38.39	$0.00	$8.85
IV. Production costs ($/ac., excluding land) (II plus III)	$154.52	$91.87	$120.74	$0.00	$20.27
Production costs ($/unit)...	$1.24	$2.96	$2.77	ERR	ERR
V. Land charges ($/ac.).....	$21.00	$21.00	$21.00	$0.00	$21.00
VI. Total production and land costs ($/ac.). (IV plus V)	$175.52	$112.87	$141.74	$0.00	$41.27
Production and land costs ($/unit).....	$1.41	$3.64	$3.25	ERR	ERR
Breakeven yield (units/ac.)..... (at selling price)	107.7	21.9	56.0	ERR	ERR
VII. Income over all costs ($/acre)..... (I minus IV)	$95.92	$46.78	$17.44	$0.00	($41.27)
Income over all costs ($/unit).....	$0.77	$1.51	$0.40	ERR	ERR

CONVENTIONAL ROTATION 1987 : FARMING SYSTEMS STUDY I
SUMMARY DATA FOR REPRESENTATIVE FARM IN NORTHEAST SOUTH DAKOTA.

	Corn	Soybean	S.Wheat	Other	Set Aside	TOTAL FARM
Farm Program Set-aside Requirement (%).....	20	0	27.5	0	0	
Crop Distribution (acres)..	149	149	149	0	93	540
Income Over All Costs..... ($/acre)	$95.92	$46.78	$17.44	$0.00	($41.27)	
Income Over All Costs..... ($/crop)	$14,293	$6,971	$2,599	$0	($3,838)	$20,025

Dollars/acre

Gross Income	Direct costs (excl. labor)	Income over non-labor & non-land costs	Inc. over non-land costs	Inc. over all costs
$163	$62	$73	$63	$37



INPUT SUMMARY AND RESULTS: CONVENTIONAL ROTATION 1988 --FARMING SYSTEMS STUDY I

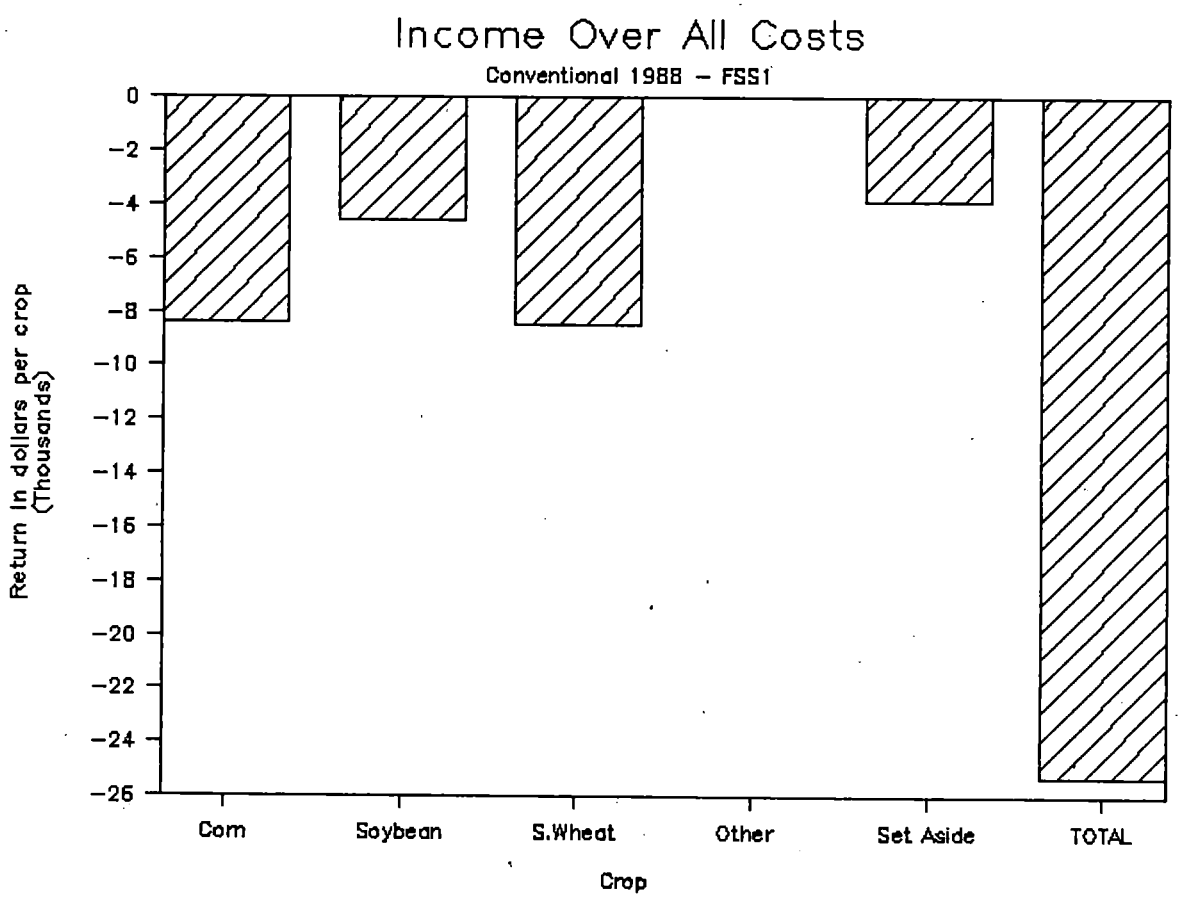
	Corn	Soybean	S.Wheat	Other	Set Aside
RECEIPTS:					
Estimated grain yield (units/ac.).....	19	9	19	0	0
Estimated selling price or value ($/unit)...	$2.50	$7.65	$3.95	$0.00	$0.00
GOVERNMENT PAYMENT:					
Base yield (units/ac.).....	63	0	27	0	0
Deficiency payment ($/unit).....	$0.38	$0.00	$0.58	$0.00	$0.00
I. Total income per acre.....	$71.44	$68.85	$89.13	$0.00	$0.00
DIRECT COSTS:					
Seed ($/ac.).....	$13.88	$8.50	$7.58	$0.00	$0.00
Fertilizer ($/ac.).	$18.90	$0.00	$24.30	$0.00	$0.00
Fertilizer application ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Herbicide ($/ac.).....	$5.95	$5.04	$17.84	$0.00	$4.15
Herbicide application ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Insecticide ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Insecticide application ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Crop insurance ($/ac.).....	$3.30	$1.33	$1.69	$0.00	$0.00
Storage ($/ac.).....	$2.11	$1.00	$2.06	$0.00	$0.00
Drying ($/ac.).....	$2.85	$0.00	$0.00	$0.00	$0.00
Overhead ($/ac.).....	$5.50	$5.50	$5.00	$0.00	$2.50
Custom machine hire ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Fuel and lubrication ($/ac.).....	$3.18	$2.98	$4.70	$0.00	$1.12
Machinery repair ($/ac.).....	$6.93	$6.56	$9.91	$0.00	$1.00
Interest on non labor direct costs ($/ac)...	$3.70	$1.83	$4.33	$0.00	$0.52
Labor charge($/ac.).....	$6.54	$11.60	$9.48	$0.00	$2.12
II. Total direct (operating) costs.....	$72.84	$44.34	$86.89	$0.00	$11.42
Income over direct costs (I minus II)....	($1.40)	$24.51	$2.24	$0.00	($11.42)
Breakeven price per unit (direct costs)..	$3.83	$4.93	$4.67	ERR	ERR
FIXED COSTS:					
Interest, Housing & Ins. on machinery ($/ac)	$13.56	$13.71	$15.54	$0.00	$1.85
Deprec. on machinery and equipment ($/ac.)..	$15.26	$15.39	$17.01	$0.00	$1.75
Real estate taxes ($/ac.).....	$5.25	$5.25	$5.25	$0.00	$5.25
III. Total fixed costs.....	$34.07	$34.35	$37.80	$0.00	$8.85
IV. Production costs ($/ac., excluding land) (II plus III)	$106.91	$78.69	$124.69	$0.00	$20.27
Production costs ($/unit)...	$5.63	$8.74	$6.70	ERR	ERR
V. Land charges ($/ac.).....	$21.00	$21.00	$21.00	$0.00	$21.00
VI. Total production and land costs ($/ac.). (IV plus V)	$127.91	$99.69	$145.69	$0.00	$41.27
Production and land costs ($/unit).....	$6.73	$11.08	$7.83	ERR	ERR
Breakeven yield (units/ac.)..... (at selling price)	51.2	13.0	36.9	ERR	ERR
VII. Income over all costs ($/acre)..... (I minus IV)	($56.47)	($30.84)	($56.56)	$0.00	($41.27)
Income over all costs ($/unit).....	($2.97)	($3.43)	($3.04)	ERR	ERR

CONVENTIONAL ROTATION 1988 : FARMING SYSTEMS STUDY I
SUMMARY DATA FOR REPRESENTATIVE FARM IN NORTHEAST SOUTH DAKOTA.

	Corn	Soybean	S.Wheat	Other	Set Aside	TOTAL FARM
Farm Program Set-aside Requirement (%).....	20	0	27.5	0	0	
Crop Distribution (acres)..	149	149	149	0	93	540
Income Over All Costs..... ($/acre)	($56.47)	($30.84)	($56.56)	$0.00	($41.27)	
Income Over All Costs..... ($/crop)	($8,413)	($4,595)	($8,428)	$0	($3,838)	($25,274)

Dollars/acre

Gross Income	Direct costs (excl. labor)	Income over non-labor & non-land costs	Inc. over non-land costs	Inc. over all costs
$63	$50	($13)	($21)	($47)



INPUT SUMMARY AND RESULTS--RIDGE TILL ROTATION 1985 : FARMING SYSTEMS STUDY I

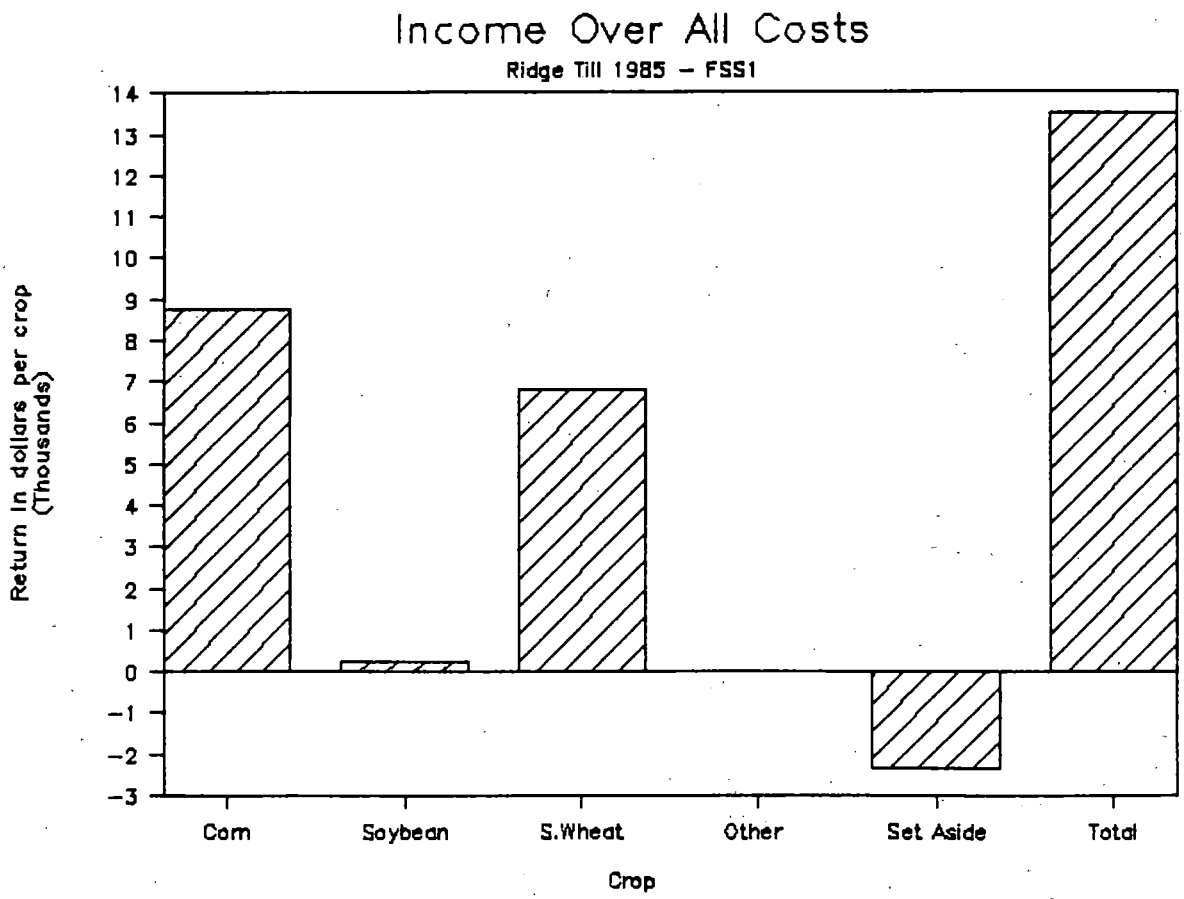
	Corn	Soybean	S. Wheat	Other	Set Aside
RECEIPTS:					
Estimated grain yield (units/ac.).....	87	27	42	0	0
Estimated selling price or value ($/unit)...	$2.33	$4.89	$3.41	$0.00	$0.00
GOVERNMENT PAYMENT:					
Base yield (units/ac.).....	63	0	27	0	0
Deficiency payment ($/unit).....	$0.48	$0.00	$1.08	$0.00	$0.00
I. Total income per acre.....	$232.02	$130.07	$173.74	$0.00	$0.00
DIRECT COSTS:					
Seed ($/ac.).....	$17.25	$8.50	$8.10	$0.00	$0.00
Fertilizer ($/ac.).	$18.00	$0.00	$18.00	$0.00	$0.00
Fertilizer application ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Herbicide ($/ac.).....	$8.30	$21.30	$3.02	$0.00	$4.15
Herbicide application ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Insecticide ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Insecticide application ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Crop insurance ($/ac.).....	$15.03	$3.94	$3.86	$0.00	$0.00
Storage ($/ac.).....	$9.61	$2.95	$4.71	$0.00	$0.00
Drying ($/ac.).....	$12.99	$0.00	$0.00	$0.00	$0.00
Overhead ($/ac.).....	$5.50	$5.50	$5.00	$0.00	$2.50
Custom machine hire ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Fuel and lubrication ($/ac.).....	$4.79	$3.66	$4.46	$0.00	$1.12
Machinery repair ($/ac.).....	$8.90	$7.37	$10.05	$0.00	$1.00
Interest on non labor direct costs ($/ac)...	$5.94	$3.15	$3.38	$0.00	$0.52
Labor charge($/ac.).....	$9.06	$14.70	$9.54	$0.00	$2.12
II. Total direct (operating) costs.....	$115.37	$71.07	$70.12	$0.00	$11.41
Income over direct costs (I minus II)....	$116.65	$59.00	$103.62	$0.00	($11.41)
Breakeven price per unit (direct costs)..	$1.33	$2.67	$1.65	ERR	ERR
FIXED COSTS:					
Interest, Housing & Ins. on machinery ($/ac)	$17.32	$14.82	$16.66	$0.00	$1.85
Deprec. on machinery and equipment ($/ac.)..	$18.60	$16.36	$18.28	$0.00	$1.75
Real estate taxes ($/ac.).....	$5.25	$5.25	$5.25	$0.00	$5.25
III. Total fixed costs.....	$41.17	$36.43	$40.19	$0.00	$8.85
IV. Production costs ($/ac., excluding land) (II plus III)	$156.54	$107.50	$110.31	$0.00	$20.26
Production costs ($/unit)...	$1.81	$4.04	$2.60	ERR	ERR
V. Land charges ($/ac.).....	$21.00	$21.00	$21.00	$0.00	$21.00
VI. Total production and land costs ($/ac.). (IV plus V)	$177.54	$128.50	$131.31	$0.00	$41.26
Production and land costs ($/unit).....	$2.05	$4.83	$3.10	ERR	ERR
Breakeven yield (units/ac.)..... (at selling price)	76.2	26.3	38.5	ERR	ERR
VII. Income over all costs ($/acre)..... (I minus IV)	$54.48	$1.57	$42.43	$0.00	($41.26)
Income over all costs ($/unit).....	$0.63	$0.06	$1.00	ERR	ERR

RIDGE TILL ROTATION 1985 : FARMING SYSTEMS STUDY I
SUMMARY DATA FOR REPRESENTATIVE FARM IN NORTHEAST SOUTH DAKOTA.

	Corn	Soybean	S.Wheat	Other	Set Aside	Total
Farm Program Set-aside Requirement (%).....	10	0	20.0	0	0	
Crop Distribution (acres)..	161	161	161	0	57	540
Income Over All Costs..... ($/acre)	$54.48	$1.57	$42.43	$0.00	($41.26)	
Income Over All Costs..... ($/crop)	$8,771	$253	$6,832	$0	($2,352)	$13,503

Dollars/acre

Gross Income	Direct costs (excl. labor)	Income over non-labor & non-land costs	Inc. over non-land costs	Inc. over all costs
$160	$68	$61	$51	$25



INPUT SUMMARY AND RESULTS--RIDGE TILL ROTATION 1986 : FARMING SYSTEMS STUDY I

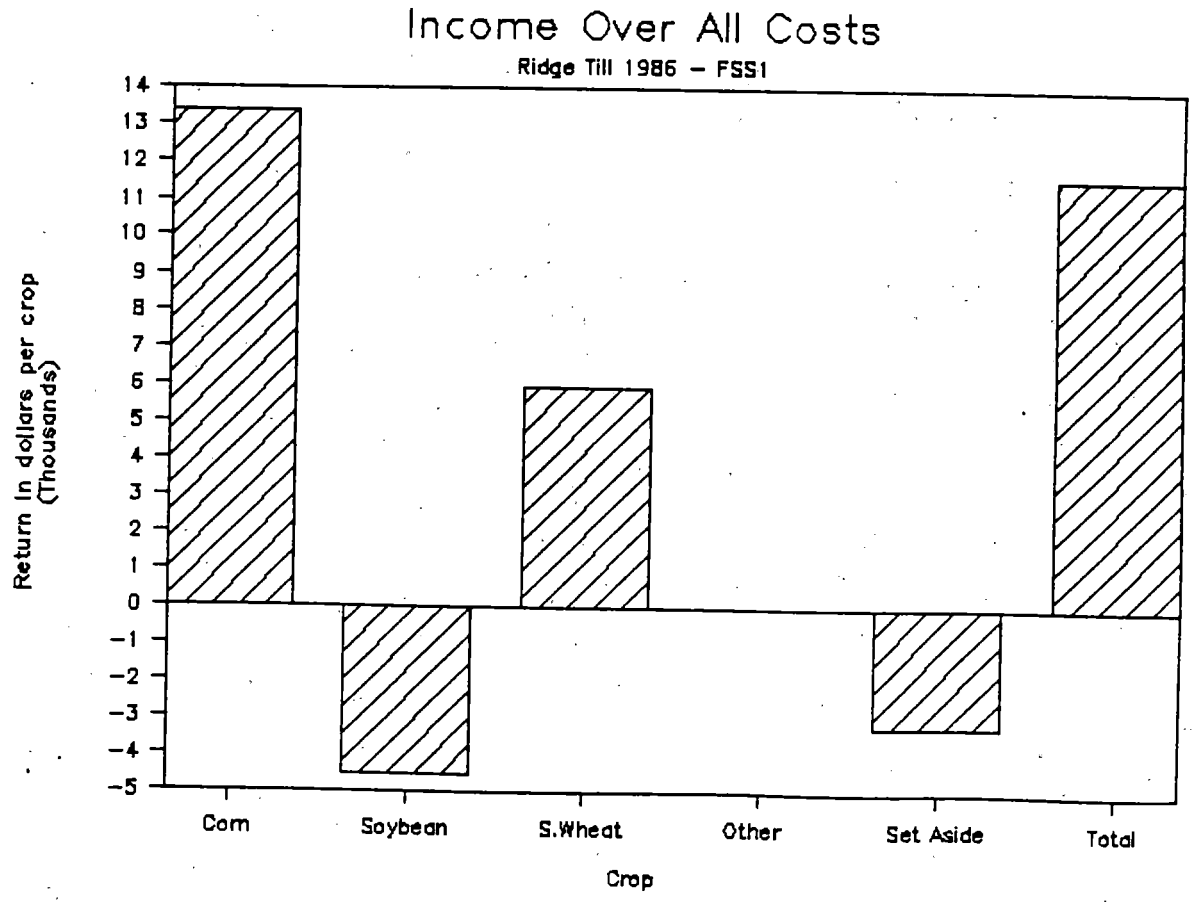
	Corn	Soybean	S. Wheat	Other	Set Aside
RECEIPTS:					
Estimated grain yield (units/ac.)	120	25	51	0	0
Estimated selling price or value ($/unit)	$1.68	$4.58	$2.42	$0.00	$0.00
GOVERNMENT PAYMENT:					
Base yield (units/ac.)	63	0	27	0	0
Deficiency payment ($/unit)	$1.11	$0.00	$1.98	$0.00	$0.00
I. Total income per acre	$270.86	$113.13	$176.64	$0.00	$0.00
DIRECT COSTS:					
Seed ($/ac.)	$17.25	$8.50	$8.10	$0.00	$0.00
Fertilizer ($/ac.)	$18.00	$0.00	$16.20	$0.00	$0.00
Fertilizer application ($/ac.)	$0.00	$0.00	$0.00	$0.00	$0.00
Herbicide ($/ac.)	$5.95	$40.90	$13.12	$0.00	$4.15
Herbicide application ($/ac.)	$0.00	$0.00	$0.00	$0.00	$0.00
Insecticide ($/ac.)	$0.00	$0.00	$0.00	$0.00	$0.00
Insecticide application ($/ac.)	$0.00	$0.00	$0.00	$0.00	$0.00
Crop insurance ($/ac.)	$20.76	$3.66	$4.63	$0.00	$0.00
Storage ($/ac.)	$13.28	$2.74	$5.65	$0.00	$0.00
Drying ($/ac.)	$17.94	$0.00	$0.00	$0.00	$0.00
Overhead ($/ac.)	$5.50	$5.50	$5.00	$0.00	$2.50
Custom machine hire ($/ac.)	$0.00	$0.00	$0.00	$0.00	$0.00
Fuel and lubrication ($/ac.)	$4.23	$3.22	$4.26	$0.00	$1.12
Machinery repair ($/ac.)	$8.41	$6.84	$9.73	$0.00	$1.00
Interest on non labor direct costs ($/ac)	$6.59	$4.22	$3.95	$0.00	$0.52
Labor charge($/ac.)	$7.79	$11.96	$9.18	$0.00	$2.12
II. Total direct (operating) costs	$125.69	$87.55	$79.81	$0.00	$11.41
Income over direct costs (I minus II)	$145.17	$25.58	$96.82	$0.00	($11.41)
Breakeven price per unit (direct costs)	$1.05	$3.54	$1.57	ERR	ERR
FIXED COSTS:					
Interest, Housing & Ins. on machinery ($/ac)	$15.37	$13.47	$15.22	$0.00	$1.85
Deprec. on machinery and equipment ($/ac.)	$16.73	$15.07	$16.82	$0.00	$1.75
Real estate taxes ($/ac.)	$5.25	$5.25	$5.25	$0.00	$5.25
III. Total fixed costs	$37.35	$33.79	$37.29	$0.00	$8.85
IV. Production costs ($/ac., excluding land) (II plus III)	$163.04	$121.34	$117.10	$0.00	$20.26
Production costs ($/unit)	$1.36	$4.91	$2.30	ERR	ERR
V. Land charges ($/ac.)	$21.00	$21.00	$21.00	$0.00	$21.00
VI. Total production and land costs ($/ac.). (IV plus V)	$184.04	$142.34	$138.10	$0.00	$41.26
Production and land costs ($/unit)	$1.54	$5.76	$2.71	ERR	ERR
Breakeven yield (units/ac.) (at selling price)	109.5	31.1	57.1	ERR	ERR
VII. Income over all costs ($/acre) (I minus IV)	$86.82	($29.21)	$38.53	$0.00	($41.26)
Income over all costs ($/unit)	$0.73	($1.18)	$0.76	ERR	ERR

RIDGE TILL ROTATION 1986 : FARMING SYSTEMS STUDY I
SUMMARY DATA FOR REPRESENTATIVE FARM IN NORTHEAST SOUTH DAKOTA.

	Corn	Soybean	S.Wheat	Other	Set Aside	Total
Farm Program Set-aside Requirement (%).....	17.5	0	22.5	0	0	
Crop Distribution (acres)..	154	154	154	0	78	540
Income Over All Costs..... ($/acre)	$86.82	($29.21)	$38.53	$0.00	($41.26)	
Income Over All Costs..... ($/crop)	$13,370	($4,498)	$5,934	$0	($3,218)	$11,588

Dollars/acre

Gross Income	Direct costs (excl. labor)	Income over non-labor & non-land costs	Inc. over non-land costs	Inc. over all costs
$160	$77	$56	$47	$21



INPUT SUMMARY AND RESULTS--RIDGE TILL ROTATION 1987: FARMING SYSTEMS STUDY I

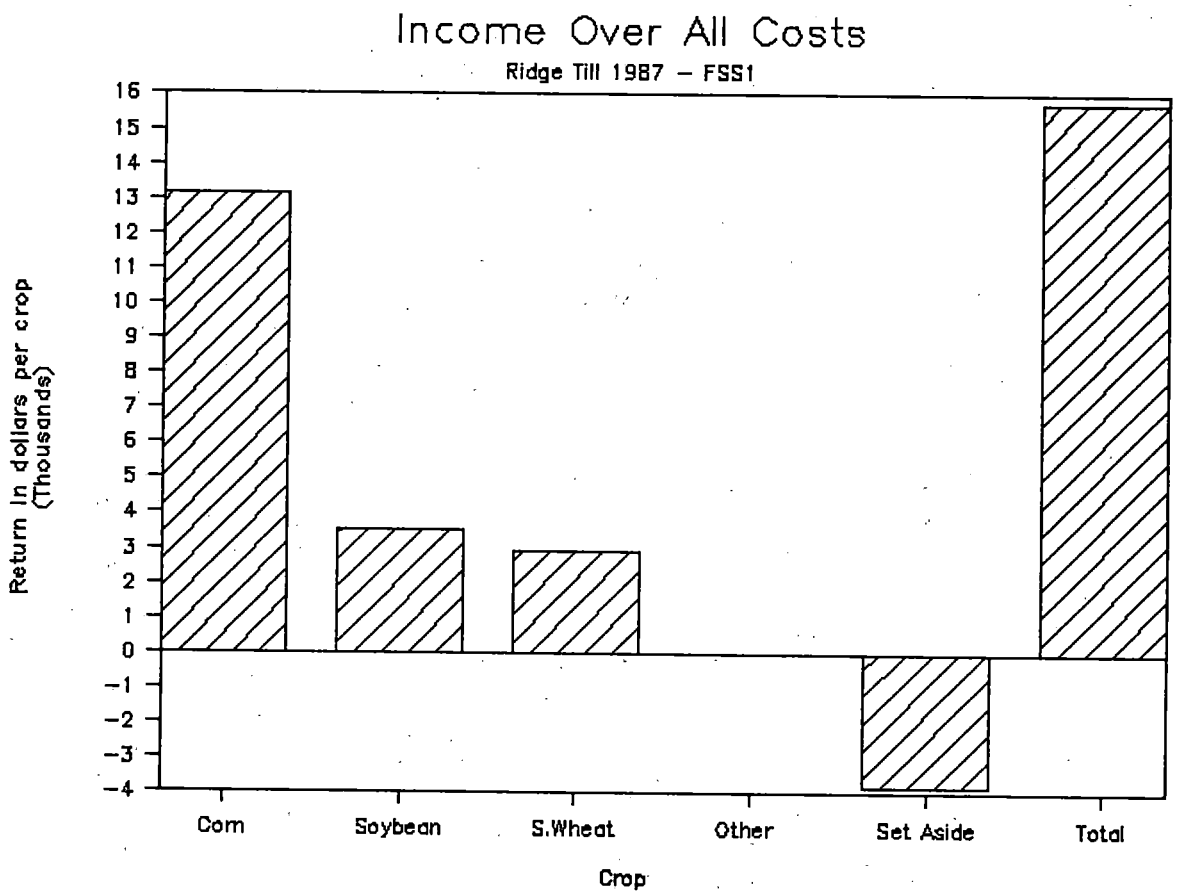
	Corn	Soybean	S. Wheat	Other	Set Aside
RECEIPTS:					
Estimated grain yield (units/ac.).....	121	29	40	0	0
Estimated selling price or value ($/unit)...	$1.63	$5.15	$2.53	$0.00	$0.00
GOVERNMENT PAYMENT:					
Base yield (units/ac.).....	63	0	27	0	0
Deficiency payment ($/unit).....	$1.09	$0.00	$1.81	$0.00	$0.00
I. Total income per acre.....	$266.55	$146.78	$149.56	$0.00	$0.00
DIRECT COSTS:					
Seed ($/ac.).....	$14.55	$8.50	$7.56	$0.00	$0.00
Fertilizer ($/ac.).	$6.66	$0.00	$13.86	$0.00	$0.00
Fertilizer application ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Herbicide ($/ac.).....	$9.50	$21.19	$17.84	$0.00	$4.15
Herbicide application ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Insecticide ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Insecticide application ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Crop insurance ($/ac.).....	$21.07	$4.22	$3.62	$0.00	$0.00
Storage ($/ac.).....	$13.48	$3.16	$4.42	$0.00	$0.00
Drying ($/ac.).....	$18.21	$0.00	$0.00	$0.00	$0.00
Overhead ($/ac.).....	$5.50	$5.50	$5.00	$0.00	$2.50
Custom machine hire ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Fuel and lubrication ($/ac.).....	$4.67	$3.25	$3.45	$0.00	$1.12
Machinery repair ($/ac.).....	$8.97	$6.89	$8.58	$0.00	$1.00
Interest on non labor direct costs ($/ac)...	$6.07	$3.12	$3.81	$0.00	$0.52
Labor charge($/ac.).....	$9.18	$12.22	$7.53	$0.00	$2.12
II. Total direct (operating) costs.....	$117.86	$68.06	$75.67	$0.00	$11.41
Income over direct costs (I minus II)....	$148.70	$78.72	$73.90	$0.00	($11.41)
Breakeven price per unit (direct costs)..	$0.97	$2.39	$1.90	ERR	ERR
FIXED COSTS:					
Interest, Housing & Ins. on machinery ($/ac)	$16.43	$13.51	$13.30	$0.00	$1.85
Deprec. on machinery and equipment ($/ac.)..	$17.87	$15.11	$14.89	$0.00	$1.75
Real estate taxes ($/ac.).....	$5.25	$5.25	$5.25	$0.00	$5.25
III. Total fixed costs.....	$39.55	$33.87	$33.44	$0.00	$8.85
IV. Production costs ($/ac., excluding land) (II plus III)	$157.41	$101.93	$109.11	$0.00	$20.26
Production costs ($/unit)...	$1.30	$3.58	$2.74	ERR	ERR
V. Land charges ($/ac.).....	$21.00	$21.00	$21.00	$0.00	$21.00
VI. Total production and land costs ($/ac.). (IV plus V)	$178.41	$122.93	$130.11	$0.00	$41.26
Production and land costs ($/unit).....	$1.47	$4.31	$3.27	ERR	ERR
Breakeven yield (units/ac.)..... (at selling price)	109.5	23.9	51.4	ERR	ERR
VII. Income over all costs ($/acre)..... (I minus IV)	$88.15	$23.85	$19.46	$0.00	($41.26)
Income over all costs ($/unit).....	$0.73	$0.84	$0.49	ERR	ERR

RIDGE TILL ROTATION 1987: FARMING SYSTEMS STUDY I
SUMMARY DATA FOR REPRESENTATIVE FARM IN NORTHEAST SOUTH DAKOTA.

	Corn	Soybean	S.Wheat	Other	Set Aside	Total
Farm Program Set-aside Requirement (%).....	20	0	27.5	0	0	
Crop Distribution (acres)..	149	149	149	0	93	540
Income Over All Costs..... ($/acre)	$88.15	$23.85	$19.46	$0.00	($41.26)	
Income Over All Costs..... ($/crop)	$13,134	$3,553	$2,899	$0	($3,837)	$15,749

Dollars/acre

Gross Income	Direct costs (excl. labor)	Income over non-labor & non-land costs	Inc. over non-land costs	Inc. over all costs
$155	$66	$64	$55	$29



INPUT SUMMARY AND RESULTS--RIDGE TILL ROTATION 1988 : FARMING SYSTEMS STUDY I

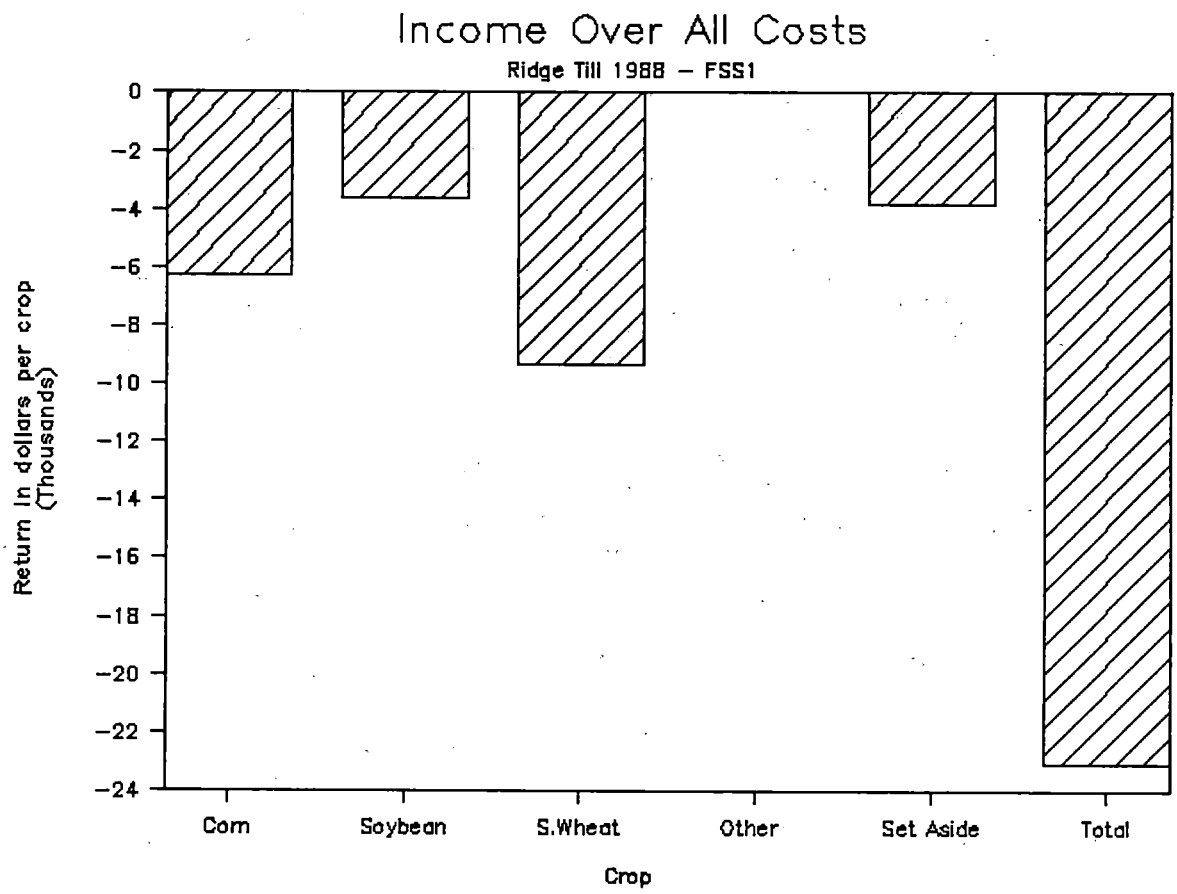
	Corn	Soybean	S. Wheat	Other	Set Aside
RECEIPTS:					
Estimated grain yield (units/ac.).....	32	9	15	0	0
Estimated selling price or value ($/unit)...	$2.50	$7.65	$3.95	$0.00	$0.00
GOVERNMENT PAYMENT:					
Base yield (units/ac.).....	63	0	27	0	0
Deficiency payment ($/unit).....	$0.38	$0.00	$0.58	$0.00	$0.00
I. Total income per acre.....	$103.19	$71.91	$74.12	$0.00	$0.00
DIRECT COSTS:					
Seed ($/ac.).....	$13.88	$8.50	$7.58	$0.00	$0.00
Fertilizer ($/ac.).	$24.30	$0.00	$24.30	$0.00	$0.00
Fertilizer application ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Herbicide ($/ac.).....	$5.95	$5.95	$17.84	$0.00	$4.15
Herbicide application ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Insecticide ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Insecticide application ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Crop insurance ($/ac.).....	$5.50	$1.39	$1.35	$0.00	$0.00
Storage ($/ac.).....	$3.52	$1.04	$1.64	$0.00	$0.00
Drying ($/ac.).....	$4.76	$0.00	$0.00	$0.00	$0.00
Overhead ($/ac.).....	$5.50	$5.50	$5.00	$0.00	$2.50
Custom machine hire ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Fuel and lubrication ($/ac.).....	$4.12	$2.83	$3.66	$0.00	$1.12
Machinery repair ($/ac.).....	$8.03	$6.29	$8.86	$0.00	$1.00
Interest on non labor direct costs ($/ac)...	$4.47	$1.86	$4.16	$0.00	$0.52
Labor charge($/ac.).....	$6.79	$9.76	$7.61	$0.00	$2.12
II. Total direct (operating) costs.....	$86.81	$43.13	$81.99	$0.00	$11.41
Income over direct costs (I minus II)....	$16.38	$28.78	($7.87)	$0.00	($11.41)
Breakeven price per unit (direct costs)..	$2.74	$4.59	$5.54	ERR	ERR
FIXED COSTS:					
Interest, Housing & Ins. on machinery ($/ac)	$15.43	$12.72	$13.61	$0.00	$1.85
Deprec. on machinery and equipment ($/ac.)..	$16.71	$14.28	$15.08	$0.00	$1.75
Real estate taxes ($/ac.).....	$5.25	$5.25	$5.25	$0.00	$5.25
III. Total fixed costs.....	$37.39	$32.25	$33.94	$0.00	$8.85
IV. Production costs ($/ac., excluding land) (II plus III)	$124.20	$75.38	$115.93	$0.00	$20.26
Production costs ($/unit)...	$3.92	$8.02	$7.83	ERR	ERR
V. Land charges ($/ac.).....	$21.00	$21.00	$21.00	$0.00	$21.00
VI. Total production and land costs ($/ac.). (IV plus V)	$145.20	$96.38	$136.93	$0.00	$41.26
Production and land costs ($/unit).....	$4.58	$10.25	$9.25	ERR	ERR
Breakeven yield (units/ac.)..... (at selling price)	58.1	12.6	34.7	ERR	ERR
VII. Income over all costs ($/acre)..... (I minus IV)	($42.01)	($24.47)	($62.81)	$0.00	($41.26)
Income over all costs ($/unit).....	($1.33)	($2.60)	($4.24)	ERR	ERR

RIDGE TILL ROTATION 1988 : FARMING SYSTEMS STUDY I
SUMMARY DATA FOR REPRESENTATIVE FARM IN NORTHEAST SOUTH DAKOTA.

	Corn	Soybean	S.Wheat	Other	Set Aside	Total
Farm Program Set-aside Requirement (%).....	20	0	27.5	0	0	
Crop Distribution (acres)..	149	149	149	0	93	540
Income Over All Costs..... ($/acre)	($42.01)	($24.47)	($62.81)	$0.00	($41.26)	
Income Over All Costs..... ($/crop)	($6,260)	($3,646)	($9,359)	$0	($3,837)	($23,103)

Dollars/acre

Gross Income	Direct costs (excl. labor)	Income over non-labor & non-land costs	Inc. over non-land costs	Inc. over all costs
$69	$53	($10)	($17)	($43)



INPUT SUMMARY AND RESULTS-- ALTERNATIVE ROTATION 1985 : Farming Systems Study II

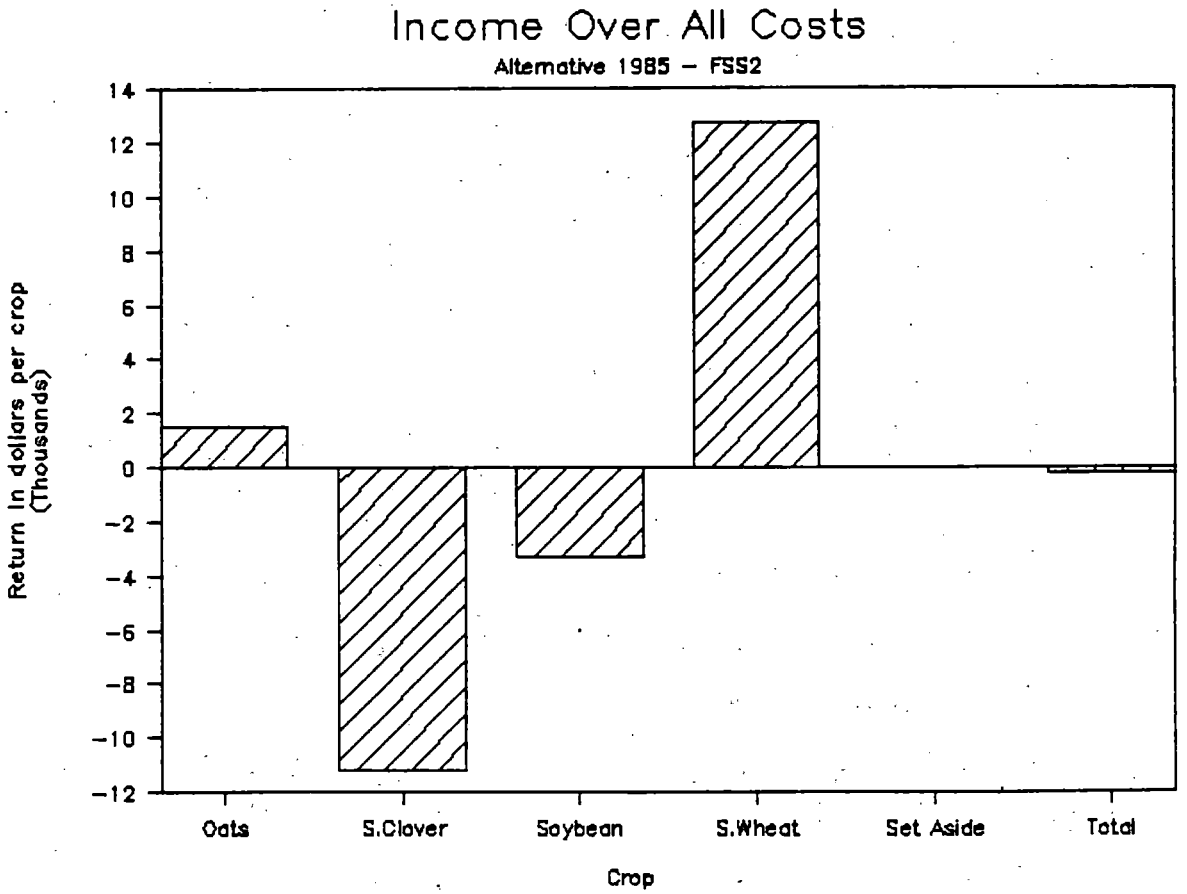
	Oats	S.Clover	Soybean	S.Wheat	Set Aside
RECEIPTS:					
Estimated grain yield (units/ac.).....	92	2.0	15.5	50	0
Estimated selling price or value ($/unit)...	$1.21	$0.00	$4.89	$3.41	$0.00
GOVERNMENT PAYMENT:					
Base yield (units/ac.).....	53	0	0	27	0
Deficiency payment ($/unit).....	$0.29	$0.00	$0.00	$1.08	$0.00
I. Total income per acre.....	$126.45	$0.00	$75.80	$198.30	$0.00
DIRECT COSTS:					
Seed ($/ac.).....	$9.73	$0.00	$8.50	$8.10	$0.00
Fertilizer ($/ac.).	$0.00	$0.00	$0.00	$0.00	$0.00
Fertilizer application ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Herbicide ($/ac.).....	$0.00	$9.81	$0.00	$0.00	$0.00
Herbicide application ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Insecticide ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Insecticide application ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Crop insurance ($/ac.).....	$2.48	$0.00	$2.30	$4.51	$0.00
Storage ($/ac.).....	$10.19	$0.00	$1.72	$5.51	$0.00
Drying ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Overhead ($/ac.).....	$5.00	$4.00	$5.50	$5.00	$0.00
Custom machine hire ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Fuel and lubrication ($/ac.).....	$4.22	$5.26	$2.85	$3.74	$0.00
Machinery repair ($/ac.).....	$11.53	$5.89	$6.41	$9.05	$0.00
Interest on non labor direct costs ($/ac)...	$2.55	$1.48	$1.61	$2.13	$0.00
Labor charge($/ac.).....	$10.09	$10.98	$16.44	$8.16	$0.00
II. Total direct (operating) costs.....	$55.79	$37.42	$45.33	$46.19	$0.00
Income over direct costs (I minus II)....	$70.66	($37.42)	$30.46	$152.10	$0.00
Breakeven price per unit (direct costs)..	$0.61	$18.62	$2.92	$0.93	ERR
FIXED COSTS:					
Interest, Housing & Ins. on machinery ($/ac)	$15.89	$9.70	$13.33	$14.89	$0.00
Deprec. on machinery and equipment ($/ac.)..	$17.45	$9.43	$15.09	$16.38	$0.00
Real estate taxes ($/ac.).....	$5.25	$5.25	$5.25	$5.25	$0.00
III. Total fixed costs.....	$38.59	$24.38	$33.67	$36.52	$0.00
IV. Production costs ($/ac., excluding land) (II plus III)	$94.38	$61.80	$79.00	$82.71	$0.00
Production costs ($/unit)...	$1.03	$30.74	$5.10	$1.67	ERR
V. Land charges ($/ac.).....	$21.00	$21.00	$21.00	$21.00	$0.00
VI. Total production and land costs ($/ac.). (IV plus V)	$115.38	$82.80	$100.00	$103.71	$0.00
Production and land costs ($/unit).....	$1.26	$41.19	$6.45	$2.09	ERR
Breakeven yield (units/ac.)..... (at selling price)	95.4	ERR	20.5	30.4	ERR
VII. Income over all costs ($/acre)..... (I minus IV)	$11.07	($82.80)	($24.21)	$94.58	$0.00
Income over all costs ($/unit).....	$0.12	($41.19)	($1.56)	$1.91	ERR

ALTERNATIVE ROTATION 1985 : FARMING SYSTEMS STUDY II
SUMMARY DATA FOR REPRESENTATIVE FARM IN NORTHEAST SOUTH DAKOTA.

	Oats	S.Clover	Soybean	S.Wheat	Set Aside	Total
Farm Program Set-aside Requirement (%).....	10	0	0	20.0	0	
Crop Distribution (acres)..	135	135	135	135	0	540
Income Over All Costs..... ($/acre)	$11.07	($82.80)	($24.21)	$94.58	$0.00	
Income Over All Costs..... ($/crop)	$1,494	($11,178)	($3,268)	$12,769	$0	($183)

Dollars/acre

Gross Income	Direct costs (excl. labor)	Income over non-labor & non-land costs	Inc. over non-land costs	Inc. over all costs
$100	$35	$37	$26	($0)



INPUT SUMMARY AND RESULTS-- ALTERNATIVE ROTATION 1986 : FARMING SYSTEMS STUDY II

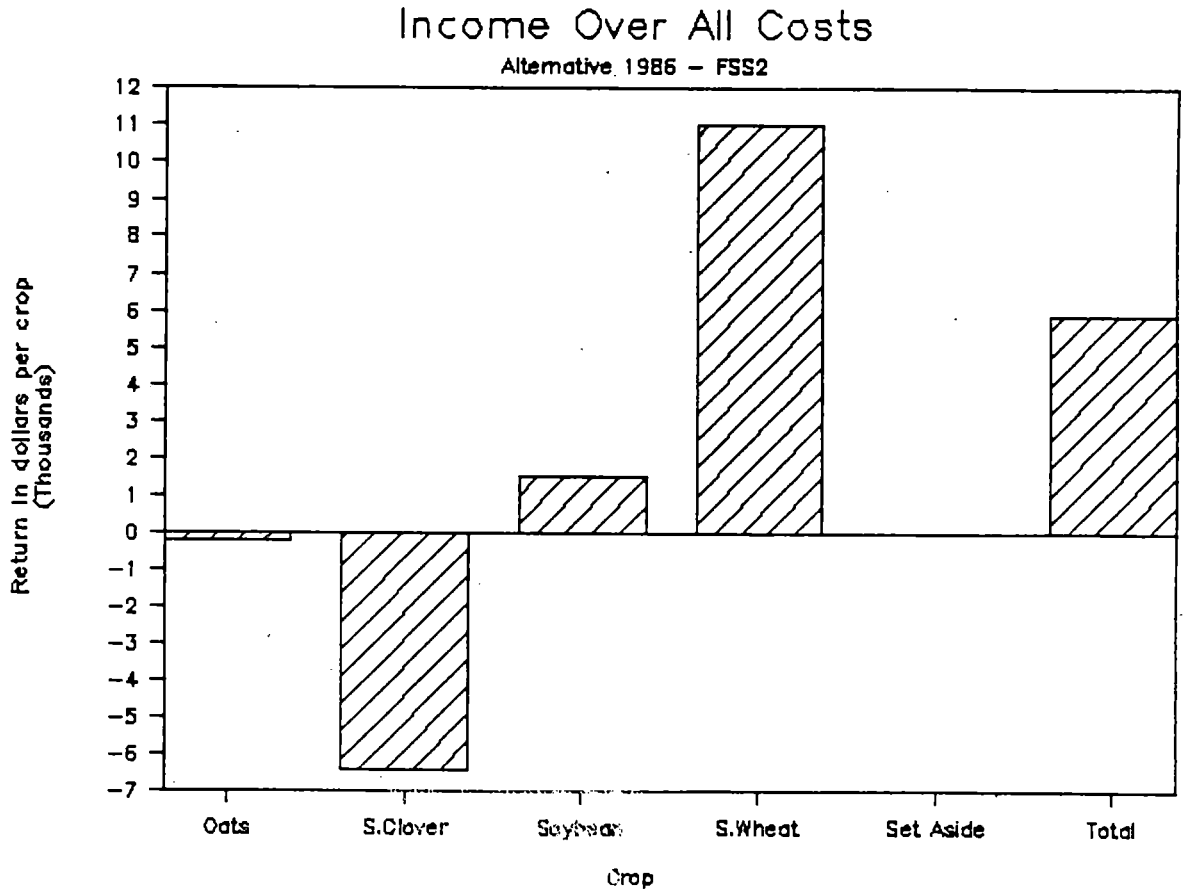
	Oats	S.Clover	Soybean	S.Wheat	Set Aside
RECEIPTS:					
Estimated grain yield (units/ac.).....	60	1.4	27.5	55	0
Estimated selling price or value ($/unit)...	$1.28	$0.00	$4.58	$2.42	$0.00
GOVERNMENT PAYMENT:					
Base yield (units/ac.).....	53	0	0	27	0
Deficiency payment ($/unit).....	$0.39	$0.00	$0.00	$1.98	$0.00
I. Total income per acre.....	$97.73	$0.00	$125.95	$186.80	$0.00
DIRECT COSTS:					
Seed ($/ac.).....	$9.73	$0.00	$8.50	$8.10	$0.00
Fertilizer ($/ac.).	$0.00	$0.00	$0.00	$0.00	$0.00
Fertilizer application ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Herbicide ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Herbicide application ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Insecticide ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Insecticide application ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Crop insurance ($/ac.).....	$1.63	$0.00	$4.08	$5.01	$0.00
Storage ($/ac.).....	$6.68	$0.00	$3.05	$6.12	$0.00
Drying ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Overhead ($/ac.).....	$5.00	$4.00	$5.50	$5.00	$0.00
Custom machine hire ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Fuel and lubrication ($/ac.).....	$3.12	$2.49	$4.18	$3.95	$0.00
Machinery repair ($/ac.).....	$8.92	$2.36	$7.73	$9.20	$0.00
Interest on non labor direct costs ($/ac)...	$2.08	$0.52	$1.96	$2.21	$0.00
Labor charge($/ac.).....	$7.53	$4.38	$20.62	$8.64	$0.00
II. Total direct (operating) costs.....	$44.68	$13.75	$55.61	$48.23	$0.00
Income over direct costs (I minus II)....	$53.05	($13.75)	$70.34	$138.57	$0.00
Breakeven price per unit (direct costs)..	$0.74	$10.11	$2.02	$0.88	ERR
FIXED COSTS:					
Interest, Housing & Ins. on machinery ($/ac)	$13.38	$3.85	$15.76	$14.61	$0.00
Deprec. on machinery and equipment ($/ac.)..	$15.20	$3.57	$17.23	$16.19	$0.00
Real estate taxes ($/ac.).....	$5.25	$5.25	$5.25	$5.25	$0.00
III. Total fixed costs.....	$33.83	$12.67	$38.24	$36.05	$0.00
IV. Production costs ($/ac., excluding land) (II plus III)	$78.51	$26.42	$93.85	$84.28	$0.00
Production costs ($/unit)...	$1.30	$19.43	$3.41	$1.53	ERR
V. Land charges ($/ac.).....	$21.00	$21.00	$21.00	$21.00	$0.00
VI. Total production and land costs ($/ac.). (IV plus V)	$99.51	$47.42	$114.85	$105.28	$0.00
Production and land costs ($/unit).....	$1.65	$34.87	$4.18	$1.91	ERR
Breakeven yield (units/ac.)..... (at selling price)	77.7	ERR	25.1	43.5	ERR
VII. Income over all costs ($/acre)..... (I minus IV)	($1.78)	($47.42)	$11.10	$81.52	$0.00
Income over all costs ($/unit).....	($0.03)	($34.87)	$0.40	$1.48	ERR

ALTERNATIVE ROTATION 1986 : FARMING SYSTEMS STUDY II
SUMMARY DATA FOR REPRESENTATIVE FARM IN NORTHEAST SOUTH DAKOTA.

	Oats	S.Clover	Soybean	S.Wheat	Set Aside	Total
Farm Program Set-aside Requirement (%).....	17.5	0	0	22.5	0	
Crop Distribution (acres)..	135	135	135	135	0	540
Income Over All Costs..... ($/acre)	($1.78)	($47.42)	$11.10	$81.52	$0.00	
Income Over All Costs..... ($/crop)	($241)	($6,402)	$1,498	$11,005	$0	$5,860

Dollars/acre

Gross Income	Direct costs (excl. labor)	Income over non-labor & non-land costs	Inc. over non-land costs	Inc. over all costs
$103	$30	$47	$37	$11



INPUT SUMMARY AND RESULTS-- ALTERNATIVE ROTATION 1987 : FARMING SYSTEMS STUDY II

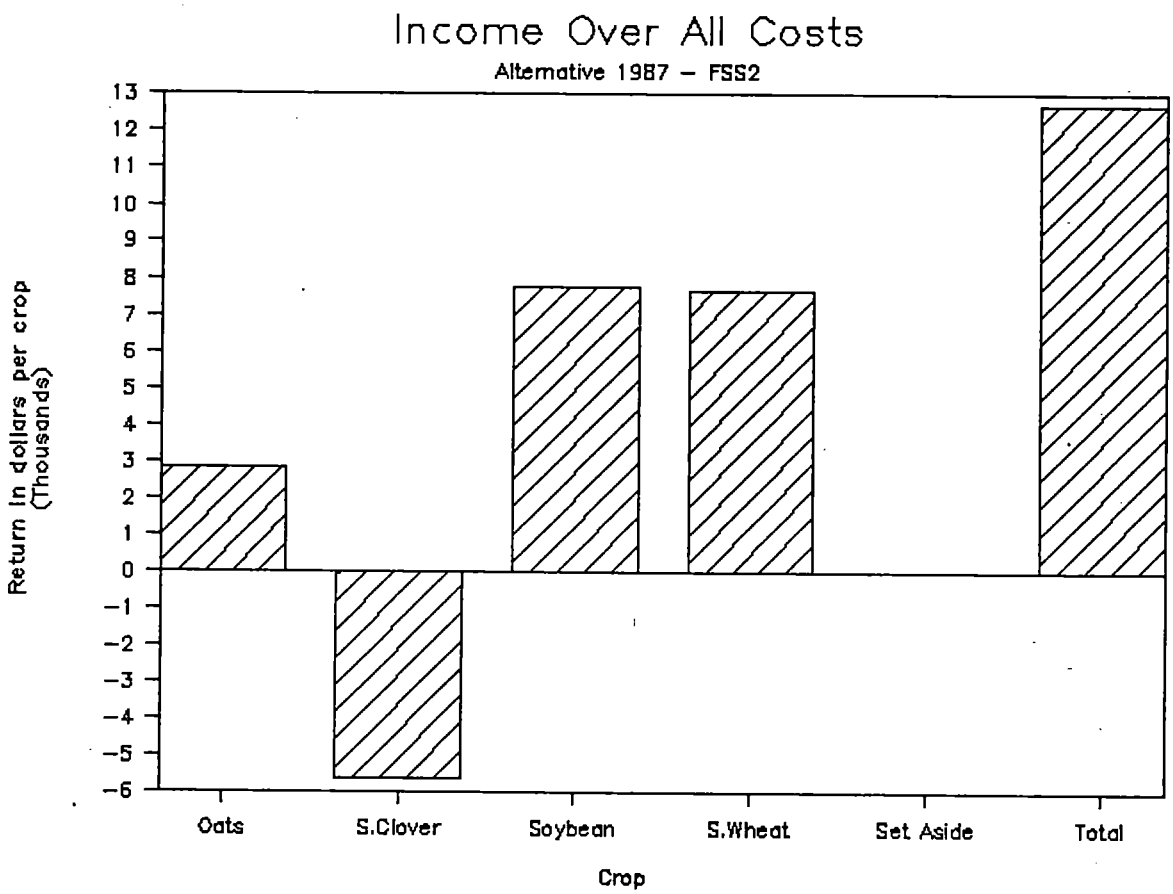
RECEIPTS:	Oats	S.Clover	Soybean	S.Wheat	Set Aside
Estimated grain yield (units/ac.).....	72	2.4	33.2	44	0
Estimated selling price or value ($/unit)...	$1.60	$0.00	$5.15	$2.53	$0.00
GOVERNMENT PAYMENT:					
Base yield (units/ac.).....	53	0	0	27	0
Deficiency payment ($/unit).....	$0.20	$0.00	$0.00	$1.81	$0.00
I. Total income per acre.....	$126.44	$0.00	$170.98	$160.70	$0.00
DIRECT COSTS:					
Seed ($/ac.).....	$11.85	$0.00	$8.50	$7.56	$0.00
Fertilizer ($/ac.).	$0.00	$0.00	$0.00	$0.00	$0.00
Fertilizer application ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Herbicide ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Herbicide application ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Insecticide ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Insecticide application ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Crop insurance ($/ac.).....	$1.96	$0.00	$4.92	$4.02	$0.00
Storage ($/ac.).....	$8.04	$0.00	$3.69	$4.91	$0.00
Drying ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Overhead ($/ac.).....	$5.00	$4.00	$5.50	$5.00	$0.00
Custom machine hire ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Fuel and lubrication ($/ac.).....	$3.22	$1.33	$4.02	$4.09	$0.00
Machinery repair ($/ac.).....	$8.96	$1.68	$7.54	$9.29	$0.00
Interest on non labor direct costs ($/ac)...	$2.31	$0.41	$2.02	$2.06	$0.00
Labor charge($/ac.).....	$8.58	$3.06	$19.33	$9.18	$0.00
II. Total direct (operating) costs.....	$49.91	$10.48	$55.52	$46.11	$0.00
Income over direct costs (I minus II)....	$76.53	($10.48)	$115.46	$114.58	$0.00
Breakeven price per unit (direct costs)..	$0.69	$4.37	$1.67	$1.04	ERR
FIXED COSTS:					
Interest, Housing & Ins. on machinery ($/ac)	$13.68	$2.44	$15.01	$14.99	$0.00
Deprec. on machinery and equipment ($/ac.)..	$15.49	$2.39	$16.50	$16.53	$0.00
Real estate taxes ($/ac.).....	$5.25	$5.25	$5.25	$5.25	$0.00
III. Total fixed costs.....	$34.42	$10.08	$36.76	$36.77	$0.00
IV. Production costs ($/ac., excluding land) (II plus III)	$84.33	$20.56	$92.28	$82.88	$0.00
Production costs ($/unit)...	$1.16	$8.57	$2.78	$1.88	ERR
V. Land charges ($/ac.).....	$21.00	$21.00	$21.00	$21.00	$0.00
VI. Total production and land costs ($/ac.). (IV plus V)	$105.33	$41.56	$113.28	$103.88	$0.00
Production and land costs ($/unit).....	$1.45	$17.32	$3.41	$2.35	ERR
Breakeven yield (units/ac.)..... (at selling price)	65.8	ERR	22.0	41.1	ERR
VII. Income over all costs ($/acre)..... (I minus IV)	$21.11	($41.56)	$57.70	$56.81	$0.00
Income over all costs ($/unit).....	$0.29	($17.32)	$1.74	$1.29	ERR

ALTERNATIVE ROTATION 1987 : FARMING SYSTEMS STUDY II
SUMMARY DATA FOR REPRESENTATIVE FARM IN NORTHEAST SOUTH DAKOTA.

	Oats	S.Clover	Soybean	S.Wheat	Set Aside	Total
Farm Program Set-aside Requirement (%).....	20	0	0	27.5	0	
Crop Distribution (acres)..	135	135	135	135	0	540
Income Over All Costs..... ($/acre)	$21.11	($41.56)	$57.70	$56.81	$0.00	
Income Over All Costs..... ($/crop)	$2,849	($5,611)	$7,790	$7,670	$0	$12,698

Dollars/acre

Gross Income	Direct costs (excl. labor)	Income over non-labor & non-land costs	Inc. over non-land costs	Inc. over all costs
$115	$30	$60	$50	$24



INPUT SUMMARY AND RESULTS-- ALTERNATIVE ROTATION 1988 : Farming Systems Study II

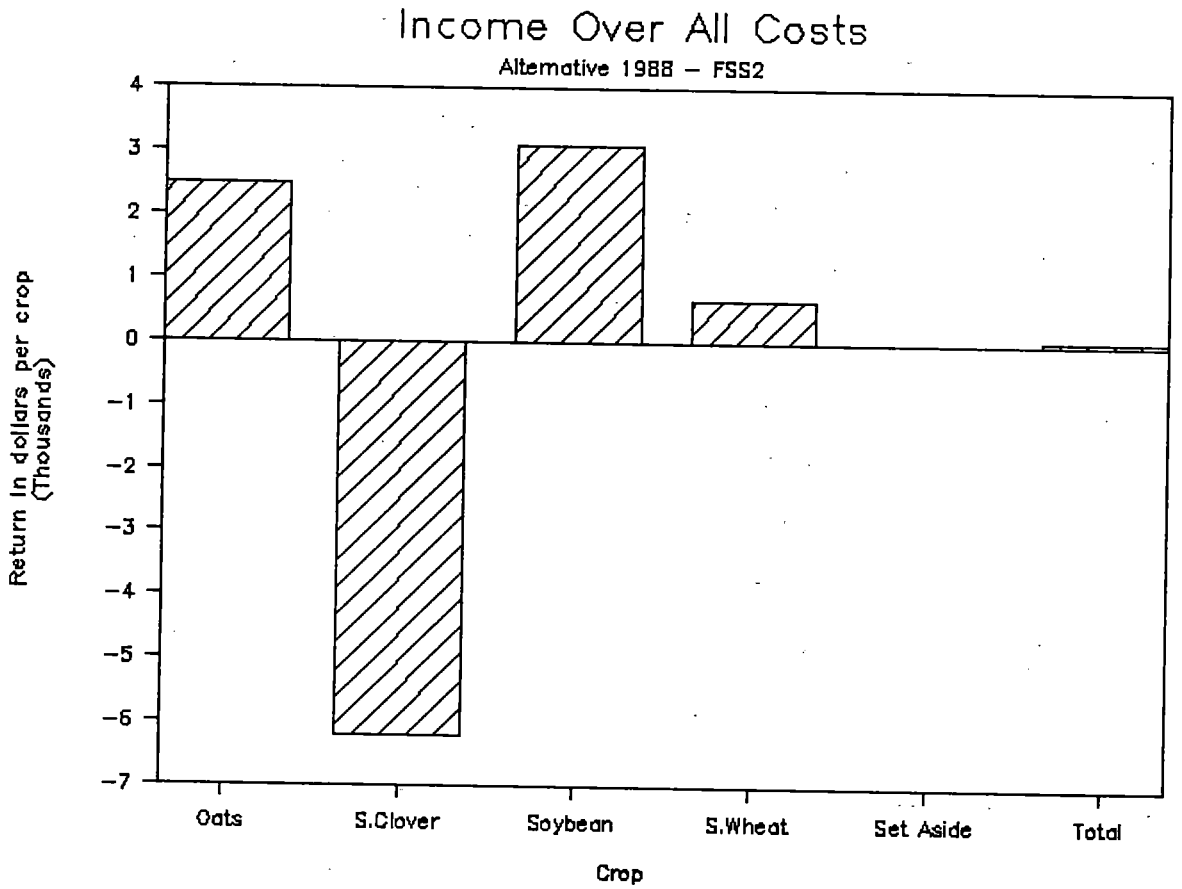
	Oats	S.Clover	Soybean	S.Wheat	Set Aside
RECEIPTS:					
Estimated grain yield (units/ac.).....	44	0.9	16.5	20	0
Estimated selling price or value ($/unit)...	$2.60	$0.00	$7.65	$3.95	$0.00
GOVERNMENT PAYMENT:					
Base yield (units/ac.).....	53	0	0	27	0
Deficiency payment ($/unit).....	$0.00	$0.00	$0.00	$0.58	$0.00
I. Total income per acre.....	$113.88	$0.00	$126.23	$94.66	$0.00
DIRECT COSTS:					
Seed ($/ac.).....	$11.85	$0.00	$8.50	$7.56	$0.00
Fertilizer ($/ac.).	$0.00	$0.00	$0.00	$0.00	$0.00
Fertilizer application ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Herbicide ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Herbicide application ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Insecticide ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Insecticide application ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Crop insurance ($/ac.).....	$1.18	$0.00	$2.45	$1.82	$0.00
Storage ($/ac.).....	$4.86	$0.00	$1.83	$2.22	$0.00
Drying ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Overhead ($/ac.).....	$5.00	$4.00	$5.50	$5.00	$0.00
Custom machine hire ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Fuel and lubrication ($/ac.).....	$2.63	$1.93	$3.95	$3.92	$0.00
Machinery repair ($/ac.).....	$8.41	$2.25	$7.65	$7.64	$0.00
Interest on non labor direct costs ($/ac)...	$2.01	$0.48	$1.77	$1.67	$0.00
Labor charge($/ac.).....	$7.03	$4.26	$14.06	$8.10	$0.00
II. Total direct (operating) costs.....	$42.98	$12.92	$45.70	$37.93	$0.00
Income over direct costs (I minus II)....	$70.90	($12.92)	$80.52	$56.73	$0.00
Breakeven price per unit (direct costs)..	$0.98	$14.05	$2.77	$1.90	ERR
FIXED COSTS:					
Interest, Housing & Ins. on machinery ($/ac)	$12.13	$3.43	$14.93	$11.91	$0.00
Deprec. on machinery and equipment ($/ac.)..	$14.03	$3.40	$16.44	$13.62	$0.00
Real estate taxes ($/ac.).....	$5.25	$5.25	$5.25	$5.25	$0.00
III. Total fixed costs.....	$31.41	$12.08	$36.62	$30.78	$0.00
IV. Production costs ($/ac., excluding land) (II plus III)	$74.39	$25.00	$82.32	$68.71	$0.00
Production costs ($/unit)...	$1.70	$27.18	$4.99	$3.44	ERR
V. Land charges ($/ac.).....	$21.00	$21.00	$21.00	$21.00	$0.00
VI. Total production and land costs ($/ac.). (IV plus V)	$95.39	$46.00	$103.32	$89.71	$0.00
Production and land costs ($/unit).....	$2.18	$50.00	$6.26	$4.49	ERR
Breakeven yield (units/ac.)..... (at selling price)	36.7	ERR	13.5	22.7	ERR
VII. Income over all costs ($/acre)..... (I minus IV)	$18.49	($46.00)	$22.90	$4.95	$0.00
Income over all costs ($/unit).....	$0.42	($50.00)	$1.39	$0.25	ERR

ALTERNATIVE ROTATION 1988 : FARMING SYSTEMS STUDY II
SUMMARY DATA FOR REPRESENTATIVE FARM IN NORTHEAST SOUTH DAKOTA.

	Oats	S.Clover	Soybean	S.Wheat	Set Aside	Total
Farm Program Set-aside Requirement (%).....	5	0	0	27.5	0	
Crop Distribution (acres)..	135	135	135	135	0	540
Income Over All Costs..... ($/acre)	$18.49	($46.00)	$22.90	$4.95	$0.00	
Income Over All Costs..... ($/crop)	$2,497	($6,211)	$3,092	$669	$0	$46

Dollars/acre

Gross Income	Direct costs (excl. labor)	Income over non-labor & non-land costs	Inc. over non-land costs	Inc. over all costs
$84	$27	$34	$26	$0



INPUT SUMMARY AND RESULTS--CONVENTIONAL ROTATION 1985 : FARMING SYSTEMS STUDY II

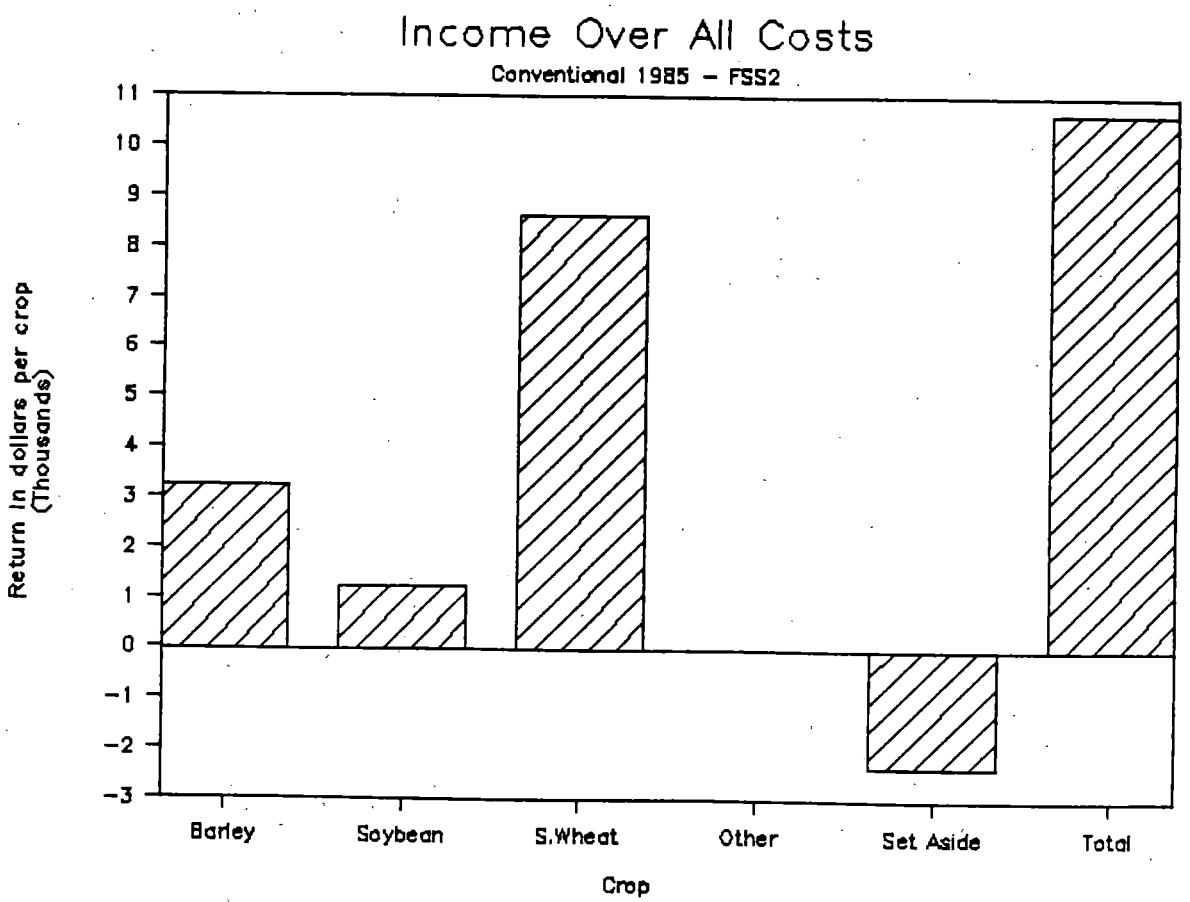
	Barley	Soybean	S. Wheat	Other	Set Aside
RECEIPTS:					
Estimated grain yield (units/ac.).....	67	25	47	0	0
Estimated selling price or value ($/unit)...	$2.00	$4.89	$3.41	$0.00	$0.00
GOVERNMENT PAYMENT:					
Base yield (units/ac.).....	41	0	27	0	0
Deficiency payment ($/unit).....	$0.52	$0.00	$1.08	$0.00	$0.00
I. Total income per acre.....	$154.32	$121.76	$189.09	$0.00	$0.00
DIRECT COSTS:					
Seed ($/ac.).....	$4.06	$8.50	$8.10	$0.00	$0.00
Fertilizer ($/ac.).	$18.00	$0.00	$18.00	$0.00	$0.00
Fertilizer application ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Herbicide ($/ac.).....	$3.02	$16.17	$3.01	$0.00	$4.15
Herbicide application ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Insecticide ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Insecticide application ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Crop insurance ($/ac.).....	$3.46	$3.69	$4.27	$0.00	$0.00
Storage ($/ac.).....	$7.38	$2.76	$5.21	$0.00	$0.00
Drying ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Overhead ($/ac.).....	$5.00	$5.50	$5.00	$0.00	$2.50
Custom machine hire ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Fuel and lubrication ($/ac.).....	$5.27	$2.59	$5.12	$0.00	$1.12
Machinery repair ($/ac.).....	$10.65	$6.31	$10.39	$0.00	$1.00
Interest on non labor direct costs ($/ac)...	$3.36	$2.69	$3.50	$0.00	$0.52
Labor charge($/ac.).....	$11.16	$11.98	$10.68	$0.00	$2.10
II. Total direct (operating) costs.....	$71.36	$60.20	$73.27	$0.00	$11.39
Income over direct costs (I minus II)....	$82.96	$61.56	$115.82	$0.00	($11.39)
Breakeven price per unit (direct costs)..	$1.07	$2.42	$1.56	ERR	ERR
FIXED COSTS:					
Interest, Housing & Ins. on machinery ($/ac)	$17.67	$13.01	$17.43	$0.00	$1.85
Deprec. on machinery and equipment ($/ac.)..	$18.96	$14.80	$18.73	$0.00	$1.75
Real estate taxes ($/ac.).....	$5.25	$5.25	$5.25	$0.00	$5.25
III. Total fixed costs.....	$41.88	$33.06	$41.41	$0.00	$8.85
IV. Production costs ($/ac., excluding land) (II plus III)	$113.24	$93.26	$114.68	$0.00	$20.24
Production costs ($/unit)...	$1.70	$3.75	$2.45	ERR	ERR
V. Land charges ($/ac.).....	$21.00	$21.00	$21.00	$0.00	$21.00
VI. Total production and land costs ($/ac.). (IV plus V)	$134.24	$114.26	$135.68	$0.00	$41.24
Production and land costs ($/unit).....	$2.02	$4.59	$2.89	ERR	ERR
Breakeven yield (units/ac.)..... (at selling price)	67.1	23.4	39.8	ERR	ERR
VII. Income over all costs ($/acre)..... (I minus IV)	$20.08	$7.50	$53.41	$0.00	($41.24)
Income over all costs ($/unit).....	$0.30	$0.30	$1.14	ERR	ERR

CONVENTIONAL ROTATION 1985 : FARMING SYSTEMS STUDY II
SUMMARY DATA FOR REPRESENTATIVE FARM IN NORTHEAST SOUTH DAKOTA.

	Barley	Soybean	S.Wheat	Other	Set Aside	Total
Farm Program Set-aside Requirement (%).....	10	0	20.0	0	0	
Crop Distribution (acres)..	161	161	161	0	57	540
Income Over All Costs..... ($/acre)	$20.08	$7.50	$53.41	$0.00	($41.24)	
Income Over All Costs..... ($/crop)	$3,232	$1,208	$8,599	$0	($2,351)	$10,688

Dollars/acre

Gross Income	Direct costs (excl. labor)	Income over non-labor & non-land costs	Inc. over non-land costs	Inc. over all costs
$139	$52	$56	$46	$20



INPUT SUMMARY AND RESULTS--CONVENTIONAL ROTATION 1986 : FARMING SYSTEMS STUDY II

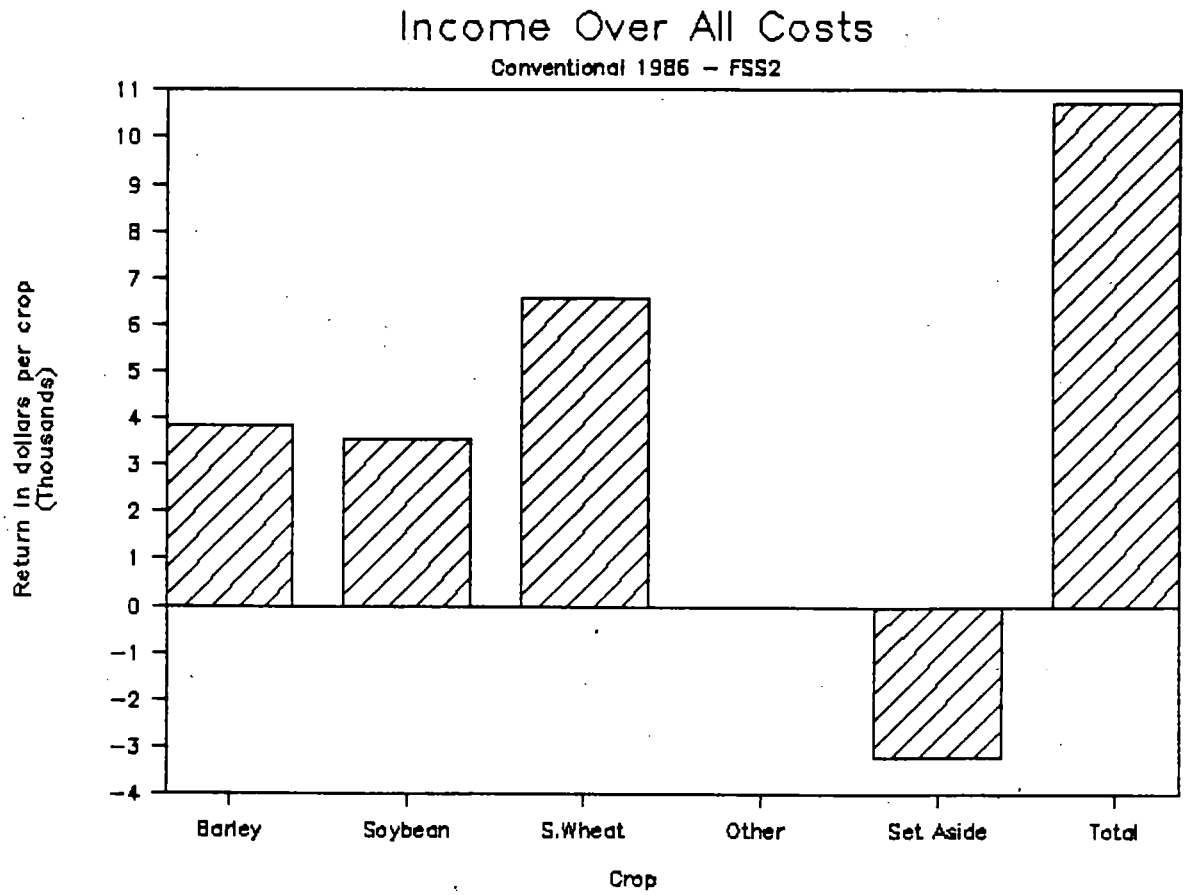
	Barley	Soybean	S. Wheat	Other	Set Aside
RECEIPTS:					
Estimated grain yield (units/ac.).....	89	29	56	0	0
Estimated selling price or value ($/unit)...	$1.45	$4.58	$2.42	$0.00	$0.00
GOVERNMENT PAYMENT:					
Base yield (units/ac.).....	41	0	27	0	0
Deficiency payment ($/unit).....	$0.99	$0.00	$1.98	$0.00	$0.00
I. Total income per acre.....	$169.50	$134.65	$189.95	$0.00	$0.00
DIRECT COSTS:					
Seed ($/ac.).....	$4.06	$8.50	$8.10	$0.00	$0.00
Fertilizer ($/ac.).	$12.60	$0.00	$16.20	$0.00	$0.00
Fertilizer application ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Herbicide ($/ac.).....	$13.12	$5.04	$13.12	$0.00	$4.15
Herbicide application ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Insecticide ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Insecticide application ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Crop insurance ($/ac.).....	$4.62	$4.36	$5.13	$0.00	$0.00
Storage ($/ac.).....	$9.87	$3.26	$6.26	$0.00	$0.00
Drying ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Overhead ($/ac.).....	$5.00	$5.50	$5.00	$0.00	$2.50
Custom machine hire ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Fuel and lubrication ($/ac.).....	$5.61	$3.65	$5.36	$0.00	$1.12
Machinery repair ($/ac.).....	$11.02	$7.29	$10.59	$0.00	$1.00
Interest on non labor direct costs ($/ac)...	$3.90	$2.23	$4.13	$0.00	$0.52
Labor charge($/ac.).....	$12.00	$14.41	$11.28	$0.00	$2.10
II. Total direct (operating) costs.....	$81.80	$54.23	$85.17	$0.00	$11.39
Income over direct costs (I minus II)....	$87.70	$80.42	$104.78	$0.00	($11.39)
Breakeven price per unit (direct costs)..	$0.92	$1.84	$1.51	ERR	ERR
FIXED COSTS:					
Interest, Housing & Ins. on machinery ($/ac)	$17.60	$14.84	$17.21	$0.00	$1.85
Deprec. on machinery and equipment ($/ac.)..	$18.95	$16.40	$18.58	$0.00	$1.75
Real estate taxes ($/ac.).....	$5.25	$5.25	$5.25	$0.00	$5.25
III. Total fixed costs.....	$41.80	$36.49	$41.04	$0.00	$8.85
IV. Production costs ($/ac., excluding land) (II plus III)	$123.60	$90.72	$126.21	$0.00	$20.24
Production costs ($/unit)...	$1.39	$3.09	$2.24	ERR	ERR
V. Land charges ($/ac.).....	$21.00	$21.00	$21.00	$0.00	$21.00
VI. Total production and land costs ($/ac.). (IV plus V)	$144.60	$111.72	$147.21	$0.00	$41.24
Production and land costs ($/unit).....	$1.63	$3.80	$2.61	ERR	ERR
Breakeven yield (units/ac.)..... (at selling price)	99.7	24.4	60.8	ERR	ERR
VII. Income over all costs ($/acre)..... (I minus IV)	$24.90	$22.93	$42.74	$0.00	($41.24)
Income over all costs ($/unit).....	$0.28	$0.78	$0.76	ERR	ERR

CONVENTIONAL ROTATION 1986 : FARMING SYSTEMS STUDY II
SUMMARY DATA FOR REPRESENTATIVE FARM IN NORTHEAST SOUTH DAKOTA.

	Barley	Soybean	S.Wheat	Other	Set Aside	Total
Farm Program Set-aside Requirement (%).....	17.5	0	22.5	0	0	
Crop Distribution (acres)..	154	154	154	0	78	540
Income Over All Costs..... ($/acre)	$24.90	$22.93	$42.74	$0.00	($41.24)	
Income Over All Costs..... ($/crop)	$3,835	$3,531	$6,582	$0	($3,217)	$10,731

Dollars/acre

Gross Income	Direct costs (excl. labor)	Income over non-labor & non-land costs	Inc. over non-land costs	Inc. over all costs
$141	$54	$57	$46	$20



INPUT SUMMARY AND RESULTS--CONVENTIONAL ROTATION 1987 : FARMING SYSTEMS STUDY II

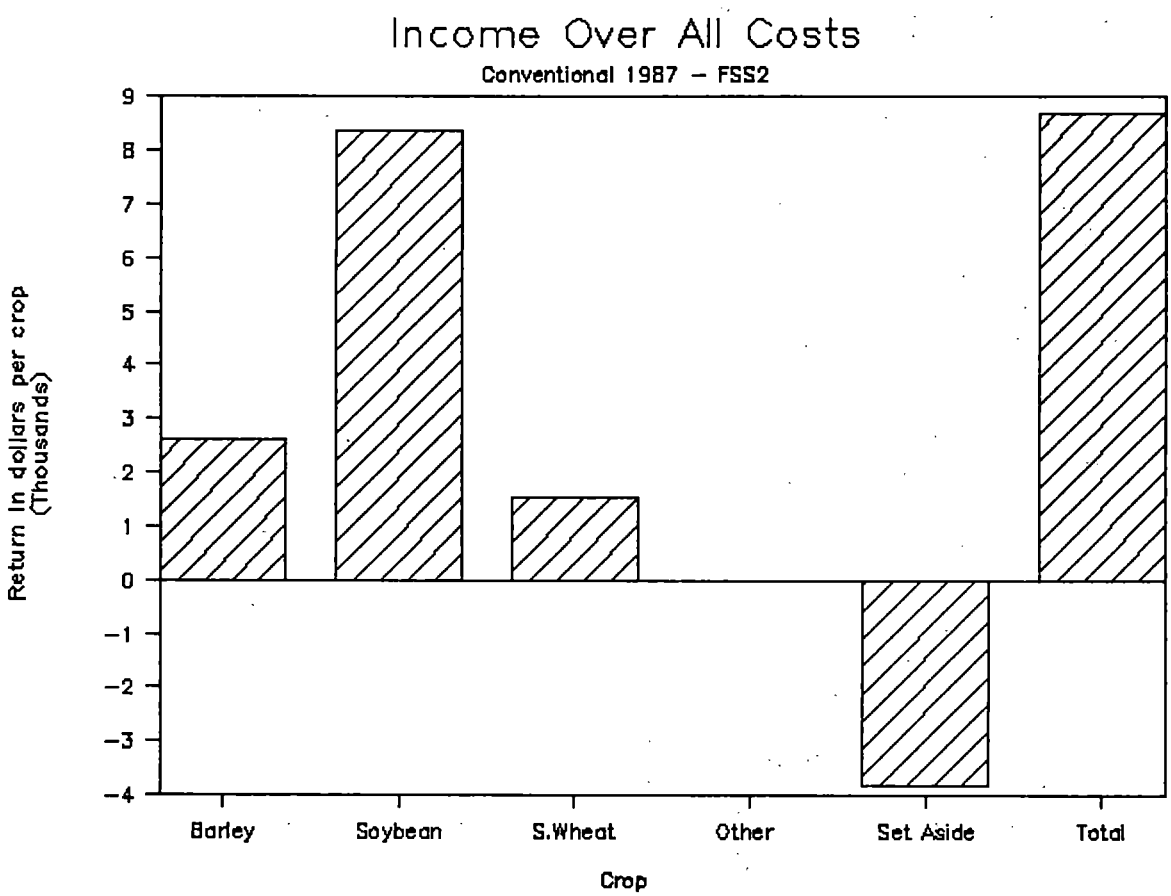
	Barley	Soybean	S. Wheat	Other	Set Aside
RECEIPTS:					
Estimated grain yield (units/ac.)	81	33	45	0	0
Estimated selling price or value ($/unit)	$1.45	$5.15	$2.53	$0.00	$0.00
GOVERNMENT PAYMENT:					
Base yield (units/ac.)	41	0	27	0	0
Deficiency payment ($/unit)	$0.79	$0.00	$1.81	$0.00	$0.00
I. Total income per acre	$149.55	$168.92	$161.96	$0.00	$0.00
DIRECT COSTS:					
Seed ($/ac.)	$4.06	$8.50	$7.56	$0.00	$0.00
Fertilizer ($/ac.)	$6.66	$0.00	$19.44	$0.00	$0.00
Fertilizer application ($/ac.)	$0.00	$0.00	$0.00	$0.00	$0.00
Herbicide ($/ac.)	$9.06	$5.04	$17.84	$0.00	$4.15
Herbicide application ($/ac.)	$0.00	$0.00	$0.00	$0.00	$0.00
Insecticide ($/ac.)	$0.00	$0.00	$0.00	$0.00	$0.00
Insecticide application ($/ac.)	$0.00	$0.00	$0.00	$0.00	$0.00
Crop insurance ($/ac.)	$4.20	$4.86	$4.07	$0.00	$0.00
Storage ($/ac.)	$8.97	$3.64	$4.96	$0.00	$0.00
Drying ($/ac.)	$0.00	$0.00	$0.00	$0.00	$0.00
Overhead ($/ac.)	$5.00	$5.50	$5.00	$0.00	$2.50
Custom machine hire ($/ac.)	$0.00	$0.00	$0.00	$0.00	$0.00
Fuel and lubrication ($/ac.)	$5.70	$3.67	$5.44	$0.00	$1.12
Machinery repair ($/ac.)	$10.98	$7.34	$10.50	$0.00	$1.00
Interest on non labor direct costs ($/ac)	$3.23	$2.28	$4.43	$0.00	$0.52
Labor charge($/ac.)	$12.12	$14.33	$11.31	$0.00	$2.10
II. Total direct (operating) costs	$69.98	$55.17	$90.55	$0.00	$11.39
Income over direct costs (I minus II)	$79.57	$113.75	$71.41	$0.00	($11.39)
Breakeven price per unit (direct costs)	$0.87	$1.68	$2.03	ERR	ERR
FIXED COSTS:					
Interest, Housing & Ins. on machinery ($/ac)	$17.16	$14.88	$16.73	$0.00	$1.85
Deprec. on machinery and equipment ($/ac.)	$18.60	$16.43	$18.19	$0.00	$1.75
Real estate taxes ($/ac.)	$5.25	$5.25	$5.25	$0.00	$5.25
III. Total fixed costs	$41.01	$36.56	$40.17	$0.00	$8.85
IV. Production costs ($/ac., excluding land) (II plus III)	$110.99	$91.73	$130.72	$0.00	$20.24
Production costs ($/unit)	$1.37	$2.80	$2.92	ERR	ERR
V. Land charges ($/ac.)	$21.00	$21.00	$21.00	$0.00	$21.00
VI. Total production and land costs ($/ac.). (IV plus V)	$131.99	$112.73	$151.72	$0.00	$41.24
Production and land costs ($/unit)	$1.63	$3.44	$3.39	ERR	ERR
Breakeven yield (units/ac.) (at selling price)	91.0	21.9	60.0	ERR	ERR
VII. Income over all costs ($/acre) (I minus IV)	$17.56	$56.19	$10.24	$0.00	($41.24)
Income over all costs ($/unit)	$0.22	$1.71	$0.23	ERR	ERR

CONVENTIONAL ROTATION 1987 : FARMING SYSTEMS STUDY II
SUMMARY DATA FOR REPRESENTATIVE FARM IN NORTHEAST SOUTH DAKOTA.

	Barley	Soybean	S.Wheat	Other	Set Aside	Total
Farm Program Set-aside Requirement (%).....	20	0	27.5	0	0	
Crop Distribution (acres)..	149	149	149	0	93	540
Income Over All Costs..... ($/acre)	$17.56	$56.19	$10.24	$0.00	($41.24)	
Income Over All Costs..... ($/crop)	$2,616	$8,373	$1,526	$0	($3,835)	$8,680

Dollars/acre

Gross Income	Direct costs (excl. labor)	Income over non-labor & non-land costs	Inc. over non-land costs	Inc. over all costs
$133	$51	$53	$42	$16



INPUT SUMMARY AND RESULTS--CONVENTIONAL ROTATION 1988 : FARMING SYSTEMS STUDY II

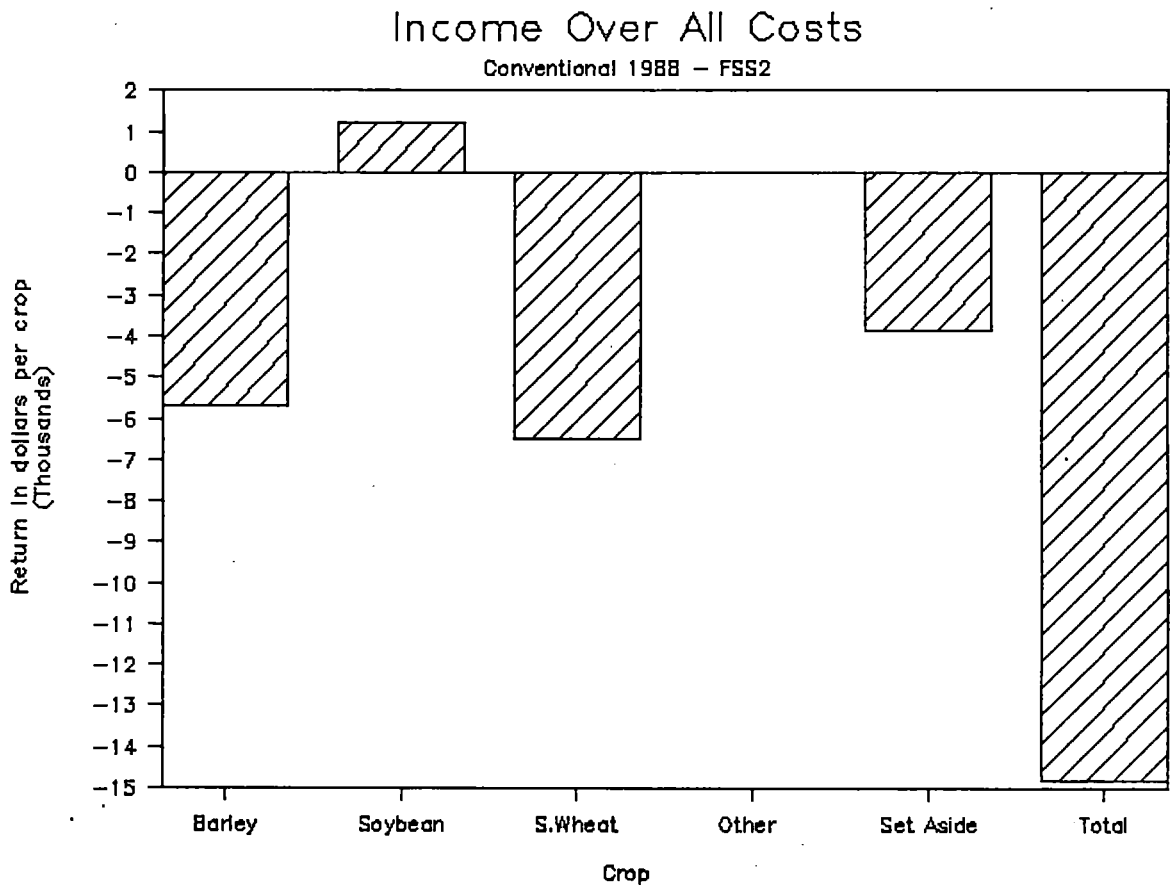
	Barley	Soybean	S. Wheat	Other	Set Aside
RECEIPTS:					
Estimated grain yield (units/ac.).....	29	14	18	0	0
Estimated selling price or value ($/unit)...	$2.50	$7.65	$3.95	$0.00	$0.00
GOVERNMENT PAYMENT:					
Base yield (units/ac.).....	41	0	27	0	0
Deficiency payment ($/unit).....	$0.00	$0.00	$0.58	$0.00	$0.00
I. Total income per acre.....	$71.25	$107.87	$87.95	$0.00	$0.00
DIRECT COSTS:					
Seed ($/ac.).....	$4.06	$8.50	$7.56	$0.00	$0.00
Fertilizer ($/ac.).	$5.40	$0.00	$14.40	$0.00	$0.00
Fertilizer application ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Herbicide ($/ac.).....	$6.04	$5.04	$17.84	$0.00	$4.15
Herbicide application ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Insecticide ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Insecticide application ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Crop insurance ($/ac.).....	$1.48	$2.09	$1.67	$0.00	$0.00
Storage ($/ac.).....	$3.16	$1.57	$2.03	$0.00	$0.00
Drying ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Overhead ($/ac.).....	$5.00	$5.50	$5.00	$0.00	$2.50
Custom machine hire ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Fuel and lubrication ($/ac.).....	$4.62	$3.41	$5.09	$0.00	$1.12
Machinery repair ($/ac.).....	$9.85	$7.35	$8.75	$0.00	$1.00
Interest on non labor direct costs ($/ac)...	$2.34	$1.98	$3.69	$0.00	$0.52
Labor charge($/ac.).....	$9.36	$9.29	$9.84	$0.00	$2.10
II. Total direct (operating) costs.....	$51.32	$44.72	$75.87	$0.00	$11.39
Income over direct costs (I minus II)....	$19.93	$63.14	$12.08	$0.00	($11.39)
Breakeven price per unit (direct costs)..	$1.80	$3.17	$4.15	ERR	ERR
FIXED COSTS:					
Interest, Housing & Ins. on machinery ($/ac)	$15.15	$13.66	$13.96	$0.00	$1.85
Deprec. on machinery and equipment ($/ac.)..	$16.62	$15.14	$15.51	$0.00	$1.75
Real estate taxes ($/ac.).....	$5.25	$5.25	$5.25	$0.00	$5.25
III. Total fixed costs.....	$37.02	$34.05	$34.72	$0.00	$8.85
IV. Production costs ($/ac., excluding land) (II plus III)	$88.34	$78.77	$110.59	$0.00	$20.24
Production costs ($/unit)...	$3.10	$5.59	$6.04	ERR	ERR
V. Land charges ($/ac.).....	$21.00	$21.00	$21.00	$0.00	$21.00
VI. Total production and land costs ($/ac.). (IV plus V)	$109.34	$99.77	$131.59	$0.00	$41.24
Production and land costs ($/unit).....	$3.84	$7.08	$7.19	ERR	ERR
Breakeven yield (units/ac.)..... (at selling price)	43.7	13.0	33.3	ERR	ERR
VII. Income over all costs ($/acre)..... (I minus IV)	($38.09)	$8.09	($43.64)	$0.00	($41.24)
Income over all costs ($/unit).....	($1.34)	$0.57	($2.38)	ERR	ERR

CONVENTIONAL ROTATION 1988 : FARMING SYSTEMS STUDY II
SUMMARY DATA FOR REPRESENTATIVE FARM IN NORTHEAST SOUTH DAKOTA.

	Barley	Soybean	S.Wheat	Other	Set Aside	Total
Farm Program Set-aside Requirement (%).....	20	0	27.5	0	0	
Crop Distribution (acres)..	149	149	149	0	93	540
Income Over All Costs..... ($/acre)	($38.09)	$8.09	($43.64)	$0.00	($41.24)	
Income Over All Costs..... ($/crop)	($5,675)	$1,205	($6,502)	$0	($3,835)	($14,808)

Dollars/acre

Gross Income	Direct costs (excl. labor)	Income over non-labor & non-land costs	Inc. over non-land costs	Inc. over all costs
$74	$41	$7	($1)	($27)



INPUT SUMMARY AND RESULTS--MINIMUM TILL ROTATION 1985 : FARMING SYSTEMS STUDY II

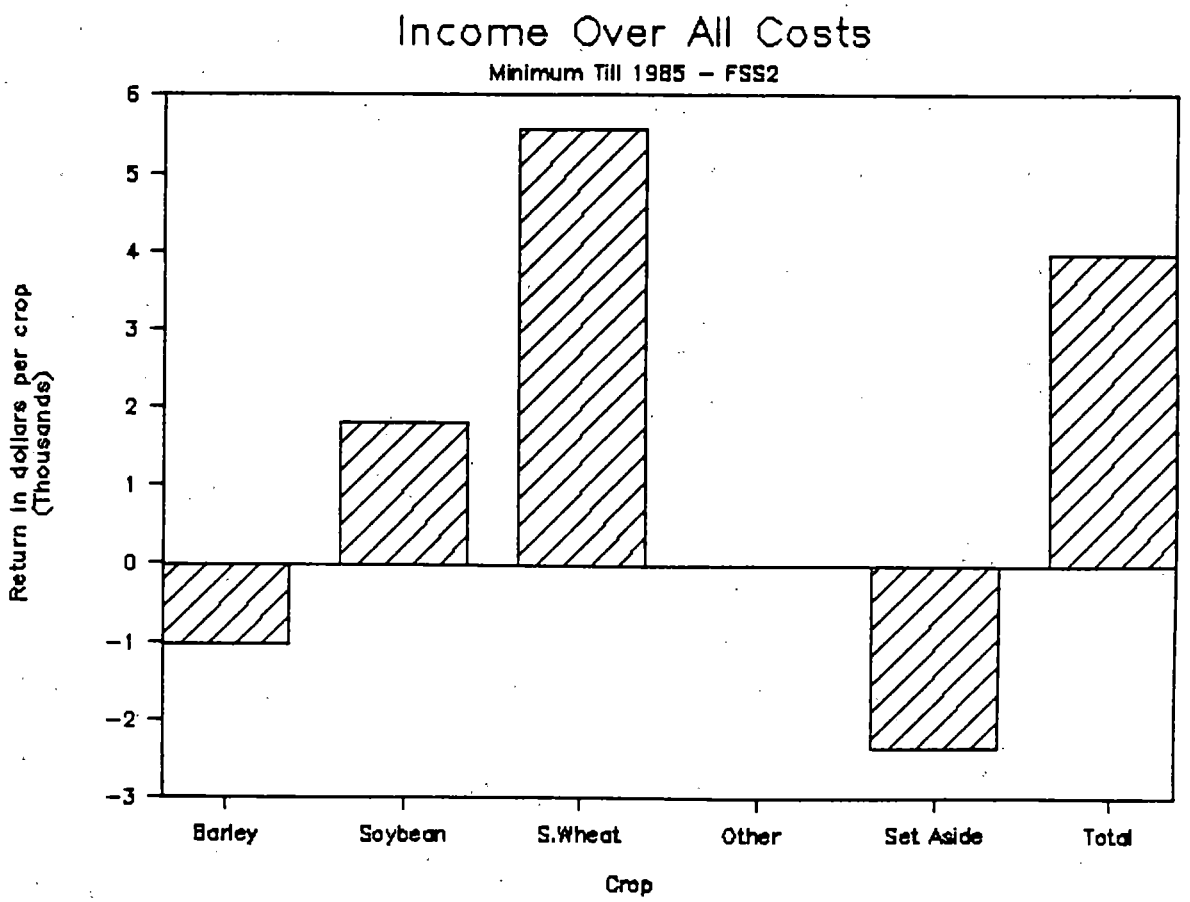
	Barley	Soybean	S. Wheat	Other	Set Aside
RECEIPTS:					
Estimated grain yield (units/ac.).....	46	25	38	0	0
Estimated selling price or value ($/unit)...	$2.00	$4.89	$3.41	$0.00	$0.00
GOVERNMENT PAYMENT:					
Base yield (units/ac.).....	41	0	27	0	0
Deficiency payment ($/unit).....	$0.52	$0.00	$1.08	$0.00	$0.00
I. Total income per acre.....	$112.92	$124.21	$157.72	$0.00	$0.00
DIRECT COSTS:					
Seed ($/ac.).....	$4.06	$8.50	$8.10	$0.00	$0.00
Fertilizer ($/ac.).	$18.00	$0.00	$18.00	$0.00	$0.00
Fertilizer application ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Herbicide ($/ac.).....	$3.02	$16.17	$3.02	$0.00	$4.15
Herbicide application ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Insecticide ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Insecticide application ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Crop insurance ($/ac.).....	$2.38	$3.76	$3.43	$0.00	$0.00
Storage ($/ac.).....	$5.08	$2.82	$4.18	$0.00	$0.00
Drying ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Overhead ($/ac.).....	$5.00	$5.50	$5.00	$0.00	$2.50
Custom machine hire ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Fuel and lubrication ($/ac.).....	$3.92	$2.64	$3.86	$0.00	$1.12
Machinery repair ($/ac.).....	$9.16	$6.43	$9.05	$0.00	$1.00
Interest on non labor direct costs ($/ac)...	$3.00	$2.71	$3.23	$0.00	$0.52
Labor charge($/ac.).....	$8.58	$10.34	$8.36	$0.00	$2.10
II. Total direct (operating) costs.....	$62.20	$58.88	$66.24	$0.00	$11.39
Income over direct costs (I minus II)....	$50.72	$65.33	$91.48	$0.00	($11.39)
Breakeven price per unit (direct costs)..	$1.36	$2.32	$1.76	ERR	ERR
FIXED COSTS:					
Interest, Housing & Ins. on machinery ($/ac)	$14.70	$13.02	$14.60	$0.00	$1.85
Deprec. on machinery and equipment ($/ac.)..	$16.23	$14.81	$16.14	$0.00	$1.75
Real estate taxes ($/ac.).....	$5.25	$5.25	$5.25	$0.00	$5.25
III. Total fixed costs.....	$36.18	$33.08	$35.99	$0.00	$8.85
IV. Production costs ($/ac., excluding land) (II plus III)	$98.38	$91.96	$102.23	$0.00	$20.24
Production costs ($/unit)...	$2.15	$3.62	$2.71	ERR	ERR
V. Land charges ($/ac.).....	$21.00	$21.00	$21.00	$0.00	$21.00
VI. Total production and land costs ($/ac.). (IV plus V)	$119.38	$112.96	$123.23	$0.00	$41.24
Production and land costs ($/unit).....	$2.61	$4.45	$3.27	ERR	ERR
Breakeven yield (units/ac.)..... (at selling price)	59.7	23.1	36.1	ERR	ERR
VII. Income over all costs ($/acre)..... (I minus IV)	($6.46)	$11.25	$34.49	$0.00	($41.24)
Income over all costs ($/unit).....	($0.14)	$0.44	$0.91	ERR	ERR

MINIMUM TILL ROTATION 1985 : FARMING SYSTEMS STUDY II
SUMMARY DATA FOR REPRESENTATIVE FARM IN NORTHEAST SOUTH DAKOTA.

	Barley	Soybean	S.Wheat	Other	Set Aside	Total
Farm Program Set-aside Requirement (%).....	10	0	20.0	0	0	
Crop Distribution (acres)..	161	161	161	0	57	540
Income Over All Costs..... ($/acre)	($6.46)	$11.25	$34.49	$0.00	($41.24)	
Income Over All Costs..... ($/crop)	($1,040)	$1,811	$5,553	$0	($2,351)	$3,973

Dollars/acre

Gross Income	Direct costs (excl. labor)	Income over non-labor & non-land costs	Inc. over non-land costs	Inc. over all costs
$118	$49	$42	$33	$7



INPUT SUMMARY AND RESULTS--MINIMUM TILL ROTATION 1986 : FARMING SYSTEMS STUDY II

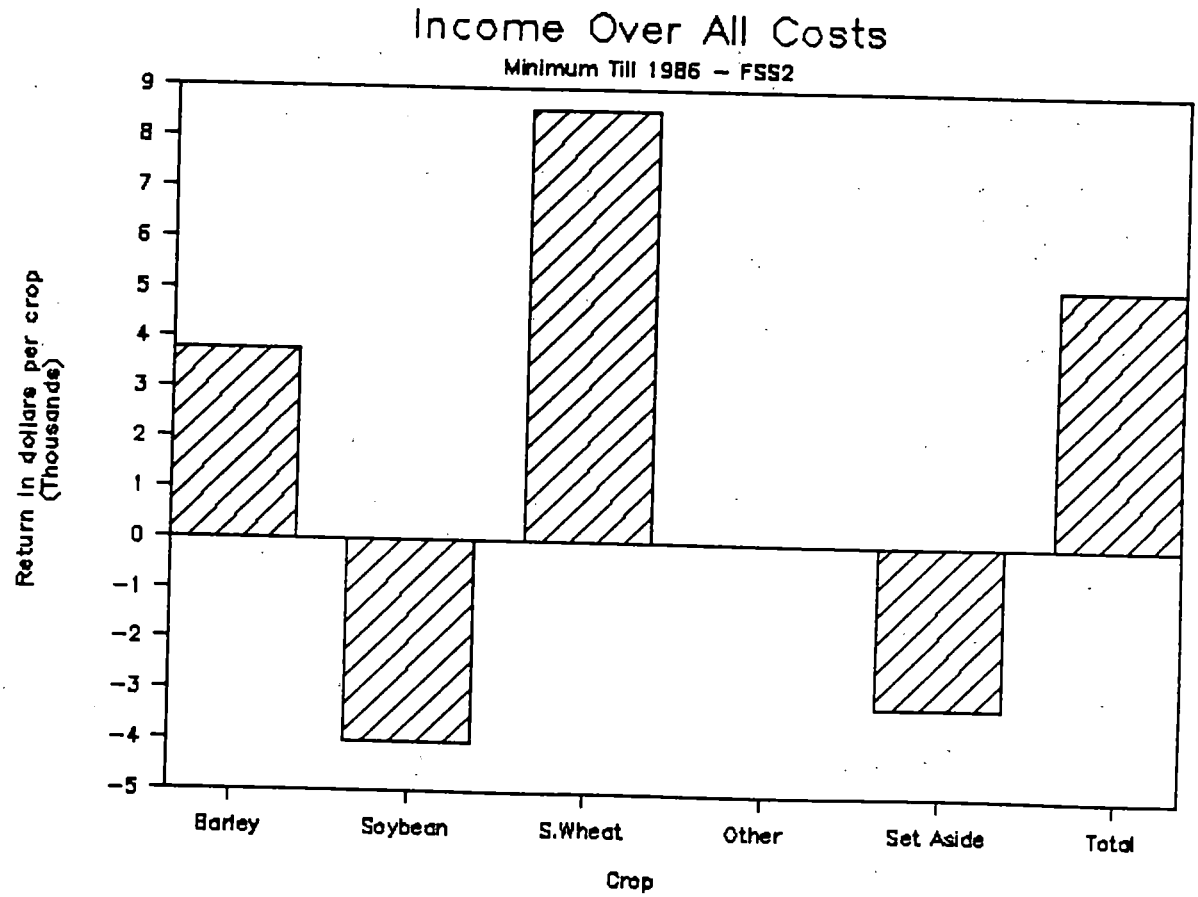
	Barley	Soybean	S. Wheat	Other	Set Aside
RECEIPTS:					
Estimated grain yield (units/ac.).....	77	33	56	0	0
Estimated selling price or value ($/unit)...	$1.45	$4.58	$2.42	$0.00	$0.00
GOVERNMENT PAYMENT:					
Base yield (units/ac.).....	41	0	27	0	0
Deficiency payment ($/unit).....	$0.99	$0.00	$1.98	$0.00	$0.00
I. Total income per acre.....	$152.10	$152.51	$188.50	$0.00	$0.00
DIRECT COSTS:					
Seed ($/ac.).....	$4.06	$8.50	$8.10	$0.00	$0.00
Fertilizer ($/ac.).	$12.60	$0.00	$16.20	$0.00	$0.00
Fertilizer application ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Herbicide ($/ac.).....	$13.12	$72.68	$13.12	$0.00	$4.15
Herbicide application ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Insecticide ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Insecticide application ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Crop insurance ($/ac.).....	$4.00	$4.94	$5.08	$0.00	$0.00
Storage ($/ac.).....	$8.54	$3.70	$6.19	$0.00	$0.00
Drying ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Overhead ($/ac.).....	$5.00	$5.50	$5.00	$0.00	$2.50
Custom machine hire ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Fuel and lubrication ($/ac.).....	$3.73	$3.29	$3.57	$0.00	$1.12
Machinery repair ($/ac.).....	$9.08	$6.96	$8.80	$0.00	$1.00
Interest on non labor direct costs ($/ac)...	$3.56	$6.25	$3.91	$0.00	$0.52
Labor charge($/ac.).....	$8.39	$11.98	$7.90	$0.00	$2.10
II. Total direct (operating) costs.....	$72.07	$123.79	$77.86	$0.00	$11.39
Income over direct costs (I minus II)....	$80.03	$28.73	$110.63	$0.00	($11.39)
Breakeven price per unit (direct costs)..	$0.94	$3.72	$1.40	ERR	ERR
FIXED COSTS:					
Interest, Housing & Ins. on machinery ($/ac)	$13.74	$13.57	$13.49	$0.00	$1.85
Deprec. on machinery and equipment ($/ac.)..	$15.32	$15.17	$15.08	$0.00	$1.75
Real estate taxes ($/ac.).....	$5.25	$5.25	$5.25	$0.00	$5.25
III. Total fixed costs.....	$34.31	$33.99	$33.82	$0.00	$8.85
IV. Production costs ($/ac., excluding land) (II plus III)	$106.38	$157.78	$111.68	$0.00	$20.24
Production costs ($/unit)...	$1.38	$4.74	$2.00	ERR	ERR
V. Land charges ($/ac.).....	$21.00	$21.00	$21.00	$0.00	$21.00
VI. Total production and land costs ($/ac.). (IV plus V)	$127.38	$178.78	$132.68	$0.00	$41.24
Production and land costs ($/unit).....	$1.66	$5.37	$2.38	ERR	ERR
Breakeven yield (units/ac.)..... (at selling price)	87.8	39.0	54.8	ERR	ERR
VII. Income over all costs ($/acre)..... (I minus IV)	$24.72	($26.26)	$55.81	$0.00	($41.24)
Income over all costs ($/unit).....	$0.32	($0.79)	$1.00	ERR	ERR

MINIMUM TILL ROTATION 1986 : FARMING SYSTEMS STUDY II
SUMMARY DATA FOR REPRESENTATIVE FARM IN NORTHEAST SOUTH DAKOTA.

	Barley	Soybean	S.Wheat	Other	Set Aside	Total
Farm Program Set-aside Requirement (%).....	17.5	0	22.5	0	0	
Crop Distribution (acres)..	154	154	154	0	78	540
Income Over All Costs..... ($/acre)	$24.72	($26.26)	$55.81	$0.00	($41.24)	
Income Over All Costs..... ($/crop)	$3,807	($4,045)	$8,595	$0	($3,217)	$5,141

Dollars/acre

Gross Income	Direct costs (excl. labor)	Income over non-labor & non-land costs	Inc. over non-land costs	Inc. over all costs
$141	$71	$44	$36	$10



INPUT SUMMARY AND RESULTS--MINIMUM TILL ROTATION 1987 : FARMING SYSTEMS STUDY II

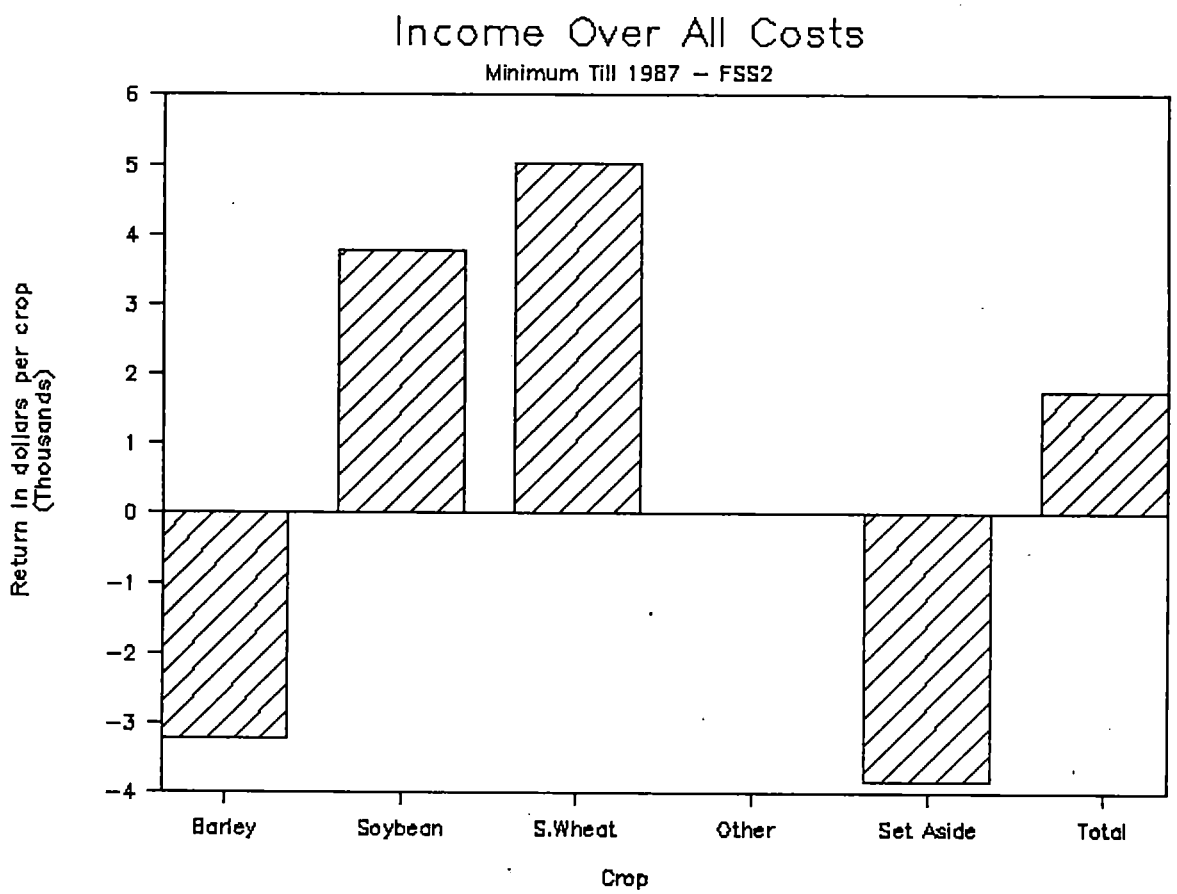
	Barley	Soybean	S.Wheat	Other	Set Aside
RECEIPTS:					
Estimated grain yield (units/ac.).....	47	32	49	0	0
Estimated selling price or value ($/unit)...	$1.45	$5.15	$2.53	$0.00	$0.00
GOVERNMENT PAYMENT:					
Base yield (units/ac.).....	41	0	27	0	0
Deficiency payment ($/unit).....	$0.79	$0.00	$1.81	$0.00	$0.00
I. Total income per acre.....	$99.82	$162.74	$172.33	$0.00	$0.00
DIRECT COSTS:					
Seed ($/ac.).....	$4.06	$8.50	$7.56	$0.00	$0.00
Fertilizer ($/ac.).	$13.86	$0.00	$19.44	$0.00	$0.00
Fertilizer application ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Herbicide ($/ac.).....	$9.06	$31.41	$17.84	$0.00	$4.15
Herbicide application ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Insecticide ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Insecticide application ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Crop insurance ($/ac.).....	$2.42	$4.68	$4.44	$0.00	$0.00
Storage ($/ac.).....	$5.16	$3.51	$5.42	$0.00	$0.00
Drying ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Overhead ($/ac.).....	$5.00	$5.50	$5.00	$0.00	$2.50
Custom machine hire ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Fuel and lubrication ($/ac.).....	$4.10	$3.54	$3.52	$0.00	$1.12
Machinery repair ($/ac.).....	$9.24	$7.28	$8.70	$0.00	$1.00
Interest on non labor direct costs ($/ac)...	$3.13	$3.81	$4.26	$0.00	$0.52
Labor charge($/ac.).....	$8.89	$12.98	$7.74	$0.00	$2.10
II. Total direct (operating) costs.....	$64.92	$81.21	$83.91	$0.00	$11.39
Income over direct costs (I minus II)....	$34.89	$81.53	$88.42	$0.00	($11.39)
Breakeven price per unit (direct costs)..	$1.40	$2.57	$1.72	ERR	ERR
FIXED COSTS:					
Interest, Housing & Ins. on machinery ($/ac)	$14.37	$14.11	$13.41	$0.00	$1.85
Deprec. on machinery and equipment ($/ac.)..	$15.98	$15.77	$15.01	$0.00	$1.75
Real estate taxes ($/ac.).....	$5.25	$5.25	$5.25	$0.00	$5.25
III. Total fixed costs.....	$35.60	$35.13	$33.67	$0.00	$8.85
IV. Production costs ($/ac., excluding land) (II plus III)	$100.52	$116.34	$117.58	$0.00	$20.24
Production costs ($/unit)...	$2.16	$3.68	$2.41	ERR	ERR
V. Land charges ($/ac.).....	$21.00	$21.00	$21.00	$0.00	$21.00
VI. Total production and land costs ($/ac.). (IV plus V)	$121.52	$137.34	$138.58	$0.00	$41.24
Production and land costs ($/unit).....	$2.61	$4.35	$2.84	ERR	ERR
Breakeven yield (units/ac.)..... (at selling price)	83.8	26.7	54.8	ERR	ERR
VII. Income over all costs ($/acre)..... (I minus IV)	($21.71)	$25.40	$33.75	$0.00	($41.24)
Income over all costs ($/unit).....	($0.47)	$0.80	$0.69	ERR	ERR

MINIMUM TILL ROTATION 1987 : FARMING SYSTEMS STUDY II
SUMMARY DATA FOR REPRESENTATIVE FARM IN NORTHEAST SOUTH DAKOTA.

	Barley	Soybean	S.Wheat	Other	Set Aside	Total
Farm Program Set-aside Requirement (%).....	20	0	27.5	0	0	
Crop Distribution (acres)..	149	149	149	0	93	540
Income Over All Costs..... ($/acre)	($21.71)	$25.40	$33.75	$0.00	($41.24)	
Income Over All Costs..... ($/crop)	($3,234)	$3,784	$5,029	$0	($3,835)	$1,743

Dollars/acre

Gross Income	Direct costs (excl. labor)	Income over non-labor & non-land costs	Inc. over non-land costs	Inc. over all costs
$120	$57	$38	$29	$3



INPUT SUMMARY AND RESULTS--MINIMUM TILL ROTATION 1988 : FARMING SYSTEMS STUDY II

	Barley	Soybean	S. Wheat	Other	Set Aside
RECEIPTS:					
Estimated grain yield (units/ac.).....	28	17	17	0	0
Estimated selling price or value ($/unit)...	$2.50	$7.65	$3.95	$0.00	$0.00
GOVERNMENT PAYMENT:					
Base yield (units/ac.).....	41	0	27	0	0
Deficiency payment ($/unit).....	$0.00	$0.00	$0.58	$0.00	$0.00
I. Total income per acre.....	$70.75	$128.52	$82.81	$0.00	$0.00
DIRECT COSTS:					
Seed ($/ac.).....	$4.06	$8.50	$7.56	$0.00	$0.00
Fertilizer ($/ac.).	$13.86	$0.00	$18.90	$0.00	$0.00
Fertilizer application ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Herbicide ($/ac.).....	$6.04	$16.17	$17.84	$0.00	$4.15
Herbicide application ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Insecticide ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Insecticide application ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Crop insurance ($/ac.).....	$1.47	$2.49	$1.55	$0.00	$0.00
Storage ($/ac.).....	$3.14	$1.86	$1.89	$0.00	$0.00
Drying ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Overhead ($/ac.).....	$5.00	$5.50	$5.00	$0.00	$2.50
Custom machine hire ($/ac.).....	$0.00	$0.00	$0.00	$0.00	$0.00
Fuel and lubrication ($/ac.).....	$3.77	$3.06	$3.68	$0.00	$1.12
Machinery repair ($/ac.).....	$9.04	$6.88	$8.89	$0.00	$1.00
Interest on non labor direct costs ($/ac)...	$2.74	$2.63	$3.86	$0.00	$0.52
Labor charge($/ac.).....	$7.92	$10.97	$7.66	$0.00	$2.10
II. Total direct (operating) costs.....	$57.05	$58.06	$76.83	$0.00	$11.39
Income over direct costs (I minus II)....	$13.70	$70.46	$5.98	$0.00	($11.39)
Breakeven price per unit (direct costs)..	$2.02	$3.46	$4.52	ERR	ERR
FIXED COSTS:					
Interest, Housing & Ins. on machinery ($/ac)	$13.77	$13.09	$13.63	$0.00	$1.85
Deprec. on machinery and equipment ($/ac.)..	$15.24	$14.69	$15.11	$0.00	$1.75
Real estate taxes ($/ac.).....	$5.25	$5.25	$5.25	$0.00	$5.25
III. Total fixed costs.....	$34.26	$33.03	$33.99	$0.00	$8.85
IV. Production costs ($/ac., excluding land) (II plus III)	$91.31	$91.09	$110.82	$0.00	$20.24
Production costs ($/unit)...	$3.23	$5.42	$6.52	ERR	ERR
V. Land charges ($/ac.).....	$21.00	$21.00	$21.00	$0.00	$21.00
VI. Total production and land costs ($/ac.). (IV plus V)	$112.31	$112.09	$131.82	$0.00	$41.24
Production and land costs ($/unit).....	$3.97	$6.67	$7.75	ERR	ERR
Breakeven yield (units/ac.)..... (at selling price)	44.9	14.7	33.4	ERR	ERR
VII. Income over all costs ($/acre)..... (I minus IV)	($41.56)	$16.43	($49.01)	$0.00	($41.24)
Income over all costs ($/unit).....	($1.47)	$0.98	($2.88)	ERR	ERR

MINIMUM TILL ROTATION 1988 : FARMING SYSTEMS STUDY II
SUMMARY DATA FOR REPRESENTATIVE FARM IN NORTHEAST SOUTH DAKOTA.

	Barley	Soybean	S.Wheat	Other	Set Aside	Total
Farm Program Set-aside Requirement (%).....	20	0	27.5	0	0	
Crop Distribution (acres)..	149	149	149	0	93	540
Income Over All Costs..... ($/acre)	($41.56)	$16.43	($49.01)	$0.00	($41.24)	
Income Over All Costs..... ($/crop)	($6,192)	$2,447	($7,303)	$0	($3,835)	($14,882)

Dollars/acre

Gross Income	Direct costs (excl. labor)	Income over non-labor & non-land costs	Inc. over non-land costs	Inc. over all costs
$78	$47	$6	($2)	($28)