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# ***Staff Paper***

## **2003 Business Dairy Grazing Farm Business Analysis Summary**

Eric Wittenberg  
And  
Christopher Wolf

**Staff Paper 2004-20**

**November, 2004**



Department of Agricultural Economics  
MICHIGAN STATE UNIVERSITY  
East Lansing, Michigan 48824

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# 2003 Michigan Dairy Grazing Farm Business Analysis Summary

By

Eric Wittenberg and Christopher Wolf<sup>1</sup>

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<sup>1</sup> Co-workers in the TelFarm project were: R. Betz, L. Borton, B. Battel, W. Schauer, D. Stein, and V. Varner with the assistance of Michigan State University Extension Agents. AgriSolutions co-workers were Kelly Tobin, Steve Eshelman, Janice Raymond, Tiffany Aldrich, Anne Gerke, Kathleen Spranger, Sonya Pentecost, and Lynette Wood. Farm Credit Services of Wisconsin co-worker was Steve Zimmerman.

## Executive Summary

This report summarizes the financial and production records of 9 dairy grazing farms across Michigan. Intensive grazing implies providing as much of the needed roughages from pasture. These 9 farms indicated that they grazed dairy cows at least three months of the year and that grazing provided more than 30 percent of the forage consumed during the year. To be included, the farms must have produced at least 50 percent of gross cash farm income from milk and dairy animal sales. The farms in this report were located throughout Michigan. The records came from Michigan State University's TelFarm/MicroTel project, the Farm Credit Service system, or by AgriSolutions in Michigan. The values were pooled into averages for reporting purposes. Farm records checked for accuracy. While considerable variation in the data exists, average values are reported in the summary tables and discussion that follows.

In 2003, the average size dairy farm in the business analysis had 114 cows producing an average of 16,392 pounds of milk per cow (Table 1). Milk price, based on gross income, averaged \$12.81/cwt. The average cropped acres per cow for the 9 dairy grazing farms was 4.2.

**Table 1. Ave. 2003 Michigan Dairy Grazing Farm Characteristics**

Average number of cows	114
Milk sold per cow (pounds)	16,392
Average price of milk sold (\$/cwt)	12.81
Total acres owned	417
Total crop acres	479
Cropped acres per Cow	4.2
Number of farms	9

Net farm income is the return to operator unpaid management, labor and capital invested. Net farm income in 2003 averaged \$17,150 (Table 2). This average somewhat obscures a very large range of net farm income values. The median was \$23,700 and the standard deviation was \$38,337.

**Table 2. Average 2003 Michigan Dairy Grazing Farm Income Statement**

	2003
	(\$)
Gross cash farm income	297,148
Total cash expense	262,301
Net cash farm income	34,847
Inventory change*	-3,637
Depreciation and capital adjustments*	-14,060
Net farm income	17,150

\*Changes calculated as ending value minus beginning value.

Gross cash farm income averaged \$297,148 in 2003. The largest component of these revenues was milk sales, which averaged \$235,274. Average total cash expenses were \$262,301 and average net cash farm income was \$34,847. Inventory changes were a negative \$3,637 while depreciation and capital adjustments averaged a negative \$14,060. The net farm income value is the return to operator unpaid management, labor and capital invested averaged \$17,150 in 2003 (Table 2).

To put the profit values in perspective, we calculate profitability ratios. Rate of return on assets (ROA) is the farm operating profit (equal to net farm income plus interest expense less value of operator labor and management) divided by average total farm asset value (valued at current market value). Rate of return on assets is a measure of how much profit the farm business assets generated. The average 2003 dairy farm ROA (Market) was 0.1 percent, which was an improved over 2002 but still far below 2000 and 2001 (Table 3). Return on equity tells a similar story. Operating profit margin is the operating profit (as defined in ROA above) divided by gross revenues. Operating profit margin measures the dollars of profit generated per dollar of revenue. In 2003, Michigan dairy grazing farms generated 0.6 cents of profit per dollar of revenue. Asset turnover is the gross farm revenues divided by average asset value. Asset turnover measures the efficiency with which farm assets generate revenue. This value declined slightly in 2003 to an average of 25.7 percent.

**Table 3. Average Michigan Dairy Grazing Farm Profitability Indicators, 2000-2003**

	2000	2001	2002	2003
	(percent)			
Rate of return on assets*	5.3	2.4	-2.8	0.1
Rate of return on equity	4.6	-0.5	-9.3	-1.4
Operating profit margin	11.2	5.1	-7.3	0.6
Asset turnover rate*	46.9	47.1	38.8	25.7

\* Assets valued at market value (rather than cost).

### *Per Unit Income and Expenses*

Table 4 displays average income and expenses items per hundredweight (cwt.) of milk and per cow across 9 dairy grazing farms. Both income and expenses were adjusted to an accrual basis where detailed financial information was provided. Average, accrual adjusted income and expenses per cropped acre are also included.

Income items related to the dairy herd are included in the first section. Government payments include all farm government payments—not just those related to the dairy herd. It was not possible to separate crop payments from dairy payments. Given the low milk prices in 2003, a large portion of government payments were likely in

the form of the Milk Income Loss Contract (MILC). *This table should not be interpreted as an estimate of the true cost of producing milk.* All farm sales are not included in the income items—only those that are related to the milking herd. Also, unpaid factors, including labor, management and capital, are not accounted for in the expense items. In addition, the allocation of resources amongst farm enterprises is not accurately reflected leaving the milking herd as the residual claimant on all expenses (especially labor costs).

The largest expense was purchased feed at \$3.93/cwt. and hired labor was the second largest at \$1.91/cwt. Repairs and milk marketing and trucking combined were also significant expenses for 2003.

The bottom of Tables 4 presents crop related expenses divided by the total cropped acres. To accurately calculate a crop cost of production requires labor and management (among other) expenses that were not separated out in the financial records.

**Table 4. Average income and expenses across all farms\*, 2003**

<b>Income Items:</b>	<b>Per cwt.</b>	<b>Per Cow</b>
Milk	\$12.81	\$2,082.45
Cull Cows and Calves	\$0.86	\$135.55
Dairy Steers	\$0.48	\$63.71
Dairy Heifers	\$0.05	\$9.66
Government Payments	\$1.44	\$231.85
Patronage Dividends, cash	\$0.09	\$13.54
Crop Sales	\$0.44	\$85.91
Other Cash Income	\$0.20	\$36.42
<b>Expense Items:</b>	<b>Per cwt.</b>	<b>Per Cow</b>
Purchased Feeds	\$3.93	\$640.53
Breeding Fees	\$ 0.12	\$22.61
Veterinary	\$0.35	\$58.27
Livestock Supplies	\$0.66	\$108.50
DHIA	\$0.02	\$4.68
Milk & Livestock Mkt. & Trucking	\$0.79	\$127.91
Interest	\$0.52	\$84.15
Fuel and Oil	\$0.44	\$70.91
Repairs	\$1.18	\$188.36
Custom Hire	\$0.35	\$64.92
Hired Labor	\$1.91	\$298.68
Leases	\$0.13	\$22.37
Real Estate Taxes	\$0.20	\$29.37
Farm Insurance	\$0.24	\$38.65
Utilities	\$0.44	\$70.81
Dues, Professional Fees	\$0.09	\$15.81
Miscellaneous	\$0.65	\$110.49
Machinery Depreciation	\$0.62	\$110.75
Building Depreciation	\$0.16	\$27.15
<b>Expense Items per Cropped Acre:</b>	<b>Per Acre</b>	
Seed	\$15.42	
Fertilizer	\$19.78	
Crop Chemicals	\$9.46	
Crop Insurance	\$0.28	
Crop Miscellaneous	\$3.41	
Land Rent	\$21.60	

\* All income and expense items averaged across all 9 farms whether they had this income or expense item or not. Other cash income includes custom work, insurance claims, and miscellaneous income.



Table 5

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Crop Production and Marketing Summary  
**Michigan Dairy Grazing, 2003**  
(Farms Sorted By Rate of Return on Assets - Mkt)

---

	Avg. Of All Farms
Dairy	
Number of farms	9
Average number of Cows	114
Milk production per Cow, lbs.	16,392
Average milk price per cwt.	\$12.81
Cropped Acres per Cow	4.2
Acreage Summary	
Total acres owned	417
Total crop acres	479
Crop acres owned	224
Crop acres cash rented	256
Crop acres share rented	-
Total pasture acres	16

Table 6

Farm Income Statement  
**Michigan Dairy Grazing, 2003**  
(Farms Sorted By Rate of Return on Assets - Mkt)

	Avg. Of All Farms
Number of farms	9
Cash Farm Income	
Corn	503
Hay, Alfalfa	260
Hay, Mixed	2,817
Soybeans	3,234
Wheat, Winter	1,052
Dairy, Milk	235,274
Dairy, Dairy Calves	1,625
Dairy Heifers (for sale)	400
Dairy Steers	7,109
Cull breeding livestock	13,699
Misc. livestock income	67
Direct & CC govt payments	4,115
Other government payments	21,834
Custom work income	470
Patronage dividends, cash	1,420
Insurance income	121
Cash from hedging accts	1,000
Other farm income	2,147
Gross Cash Farm Income	297,148

Table 6, (continued)

Farm Income Statement  
**Michigan Dairy Grazing, 2003**  
(Farms Sorted By Rate of Return on Assets - Mkt)

	Avg. Of All Farms
Number of farms	9
Cash Farm Expense	
Seed	7,175
Fertilizer	10,714
Crop chemicals	3,023
Crop insurance	133
Irrigation energy	1,046
Crop hauling and trucking	264
Crop miscellaneous	274
Feeder livestock purchase	55
Purchased feed	68,983
Breeding fees	1,989
Veterinary	7,516
Livestock supplies	10,845
DHIA	805
Livestock utilities	431
Livestock hauling and trucking	1,391
Marketing	11,712
Bedding	25
Interest	10,176
Fuel & oil	8,219
Repairs	24,053
Custom hire	9,662
Hired labor	40,188
Land rent	11,761
Machinery & bldg leases	3,227
Real estate taxes	2,685
Farm insurance	4,234
Utilities	7,272
Hauling and trucking	781
Dues & professional fees	1,419
Miscellaneous	12,241
Total cash expense	262,301
Net cash farm income	34,847
Inventory Changes	
Crops and feed	1,791
Market livestock	-2,662
Accounts receivable	-1,770
Prepaid expenses and supplies	2,340
Accounts payable	-3,336
Total inventory change	-3,637
Net operating profit	31,210
Depreciation and Other Capital Adjustments	
Breeding livestock	-302
Machinery and equipment	-11,588
Buildings and improvements	-2,247
Other farm capital	76
Total depr. and other capital adj	-14,060
Net farm income	17,150

Table 7

Inventory Changes  
**Michigan Dairy Grazing, 2003**  
(Farms Sorted By Rate of Return on Assets - Mkt)

	Avg. Of All Farms
Number of farms	9
Net cash farm income	34,847
Crops and Feed	
Ending inventory	53,158
Beginning inventory	51,367
Inventory change	1,791
Market Livestock	
Ending inventory	3,576
Beginning inventory	6,238
Inventory change	-2,662
Accts Receivable & Other Current Assets	
Ending inventory	17,443
Beginning inventory	19,213
Inventory change	-1,770
Prepaid Expenses and Supplies	
Ending inventory	6,024
Beginning inventory	3,685
Inventory change	2,340
Accounts Payable & Accrued Expenses	
Beginning inventory	14,816
Ending inventory	18,152
Inventory change	-3,336
Total inventory change	-3,637
Net operating profit	31,210

Table 8

Depreciation and Other Capital Adjustments  
**Michigan Dairy Grazing, 2003**  
(Farms Sorted By Rate of Return on Assets - Mkt)

	Avg. Of All Farms
Number of farms	9
Net operating profit	31,210
Breeding Livestock	
Ending inventory	211,914
Capital sales	7,771
Beginning inventory	217,407
Capital purchases	2,581
Depreciation, capital adjust.	-302
Machinery and Equipment	
Ending inventory	43,988
Capital sales	167
Beginning inventory	45,862
Capital purchases	9,880
Depreciation, capital adjust.	-11,588
Buildings and Improvements	
Ending inventory	28,017
Capital sales	-
Beginning inventory	21,469
Capital purchases	8,795
Depreciation, capital adjust.	-2,247
Other Capital Assets	
Ending inventory	13,624
Capital sales	3,100
Beginning inventory	16,177
Capital purchases	471
Depreciation, capital adjust.	76
Total depreciation, capital adj.	-14,060
Net farm income	17,150

Table 9

Profitability Measures  
**Michigan Dairy Grazing, 2003**  
(Farms Sorted By Rate of Return on Assets - Mkt)

	Avg. Of All Farms
Number of farms	9
Profitability (assets valued at cost)	
Net farm income	17,150
Labor and management earnings	62
Rate of return on assets	-0.9 %
Rate of return on equity	-5.2 %
Operating profit margin	-2.0 %
Asset turnover rate	43.6 %
Interest on farm net worth	17,088
Farm interest expense	10,141
Value of operator lbr and mgmt.	31,905
Return on farm assets	-4,614
Average farm assets	516,237
Return on farm equity	-14,755
Average farm equity	284,798
Value of farm production	225,167
	Avg. Of All Farms
Number of farms	9
Profitability (assets valued at market)	
Net farm income	23,077
Labor and management earnings	-15,626
Rate of return on assets	0.1 %
Rate of return on equity	-1.4 %
Operating profit margin	0.6 %
Asset turnover rate	25.7 %
Interest on farm net worth	38,703
Farm interest expense	10,141
Value of operator lbr and mgmt.	31,905
Return on farm assets	1,313
Average farm assets	876,496
Return on farm equity	-8,828
Average farm equity	645,057
Value of farm production	225,167

Table 10

Liquidity Measures  
**Michigan Dairy Grazing, 2003**  
(Farms Sorted By Rate of Return on Assets - Mkt)

	Avg. Of All Farms
Number of farms	9
Liquidity (cash)	
Net cash farm income	34,847
Net nonfarm income	1,779
Family living and taxes	32,092
Real estate principal payments	5,343
Cash available for interm. debt	-809
Average intermediate debt	80,795
Years to turnover interm. debt	**
Expense as a % of income	88 %
Interest as a % of income	3 %
Liquidity (accrual)	
Total accrual farm income	294,507
Total accrual operating expense	263,297
Net accrual operating income	31,210
Net nonfarm income	1,779
Family living and taxes	32,092
Real estate principal payments	5,343
Available for intermediate debt	-4,446
Average intermediate debt	80,795
Years to turnover interm. debt	**
Expense as a % of income	89 %
Interest as a % of income	3 %

\*\* Income insufficient to meet debt servicing requirements

Table 11

Balance Sheet at Cost Values  
**Michigan Dairy Grazing, 2003**  
(Farms Sorted By Rate of Return on Assets - Mkt)

	Avg. Of All Farms	
Number of farms	9	
	Beginning	Ending
<b>Assets</b>		
<b>Current Farm Assets</b>		
Cash and checking balance	2,475	9,402
Prepaid expenses & supplies	3,685	6,024
Growing crops	13,515	12,466
Accounts receivable	5,643	4,977
Hedging accounts	0	0
Crops held for sale or feed	51,367	53,158
Crops under government loan	0	0
Market livestock held for sale	6,238	3,576
Other current assets	55	0
<b>Total current farm assets</b>	<b>82,978</b>	<b>89,604</b>
<b>Intermediate Farm Assets</b>		
Breeding livestock	217,407	211,914
Machinery and equipment	45,862	43,988
Titled vehicles	0	0
Other intermediate assets	8,244	5,103
<b>Total intermediate farm assets</b>	<b>271,513</b>	<b>261,005</b>
<b>Long Term Farm Assets</b>		
Farm land	129,691	131,743
Buildings and improvements	21,469	28,017
Other long-term assets	7,933	8,521
<b>Total long-term farm assets</b>	<b>159,093</b>	<b>168,281</b>
<b>Total Farm Assets</b>	<b>513,584</b>	<b>518,890</b>
<b>Total Nonfarm Assets</b>	<b>30,166</b>	<b>32,800</b>
<b>Total Assets</b>	<b>543,749</b>	<b>551,691</b>
<b>Liabilities</b>		
<b>Current Farm Liabilities</b>		
Accrued interest	1,779	1,744
Accounts payable	13,037	16,408
Current notes	24,949	28,194
Government crop loans	0	0
Principal due on term debt	29,166	28,862
<b>Total current farm liabilities</b>	<b>68,931</b>	<b>75,207</b>
<b>Total intermediate farm liabs</b>	<b>73,121</b>	<b>41,415</b>
<b>Total long term farm liabilities</b>	<b>84,087</b>	<b>120,117</b>
<b>Total farm liabilities</b>	<b>226,139</b>	<b>236,739</b>
<b>Total nonfarm liabilities</b>	<b>3,696</b>	<b>3,886</b>
<b>Total liabilities</b>	<b>229,835</b>	<b>240,625</b>
<b>Net worth (farm and nonfarm)</b>	<b>313,914</b>	<b>311,066</b>
<b>Net worth change</b>		<b>-2,848</b>
<b>Ratio Analysis</b>		
Current farm liabilities / assets	83 %	84 %
Curr. & interm farm liab. / assets	40 %	33 %
Long term farm liab. / assets	53 %	71 %
Total debt to asset ratio	42 %	44 %



Table 12

## Balance Sheet at Market Values

## Michigan Dairy Grazing, 2003

(Farms Sorted By Rate of Return on Assets - Mkt)

	Avg. Of All Farms	
Number of farms	9	
	Beginning	Ending
<b>Assets</b>		
<b>Current Farm Assets</b>		
Cash and checking balance	2,475	9,402
Prepaid expenses & supplies	3,685	6,024
Growing crops	13,515	12,466
Accounts receivable	5,643	4,977
Hedging accounts	0	0
Crops held for sale or feed	51,367	53,158
Crops under government loan	0	0
Market livestock held for sale	6,238	3,576
Other current assets	55	0
Total current farm assets	82,978	89,604
<b>Intermediate Farm Assets</b>		
Breeding livestock	217,407	211,914
Machinery and equipment	138,032	140,579
Titled vehicles	0	0
Other intermediate assets	8,605	5,464
Total intermediate farm assets	364,043	357,958
<b>Long Term Farm Assets</b>		
Farm land	357,301	366,657
Buildings and improvements	58,622	59,374
Other long-term assets	7,933	8,521
Total long-term farm assets	423,857	434,551
Total Farm Assets	870,878	882,113
Total Nonfarm Assets	136,132	167,006
Total Assets	1,007,010	1,049,119
<b>Liabilities</b>		
<b>Current Farm Liabilities</b>		
Accrued interest	1,779	1,744
Accounts payable	13,037	16,408
Current notes	24,949	28,194
Government crop loans	0	0
Principal due on term debt	29,166	28,862
Total current farm liabilities	68,931	75,207
Total intermediate farm liabs	73,121	41,415
Total long term farm liabilities	84,087	120,117
Total farm liabilities	226,139	236,739
Total nonfarm liabilities	3,696	3,886
Total liabs excluding deferreds	229,835	240,625
Total deferred liabilities	0	0
Total liabilities	229,835	240,625
Retained earnings	313,914	311,066
Market valuation equity	463,261	497,428
Net worth (farm and nonfarm)	777,175	808,494
Net worth excluding deferreds	777,175	808,494
Net worth change		31,318
<b>Ratio Analysis</b>		
Current farm liabilities / assets	83 %	84 %
Curr. & interm farm liab. / assets	32 %	26 %
Long term farm liab. / assets	20 %	28 %
Total debt to asset ratio	23 %	23 %
Debt to assets excl deferreds	23 %	23 %

Table 13

Statement Of Cash Flows  
**Michigan Dairy Grazing, 2003**  
(Farms Sorted By Rate of Return on Assets - Mkt)

	Avg. Of All Farms
Number of farms	9
Beginning cash (farm & nonfarm)	2,475
Cash From Operating Activities	
Gross cash farm income	297,148
Net nonfarm income	1,779
Total cash farm expense	-262,301
Apparent family living expense	-26,183
Income and social security tax	-5,909
Cash from operations	4,534
Cash From Investing Activities	
Sale of breeding livestock	7,771
Sale of machinery & equipment	167
Sale of titled vehicles	-
Sale of farm land	-
Sale of farm buildings	-
Sale of other farm assets	3,100
Sale of nonfarm assets	-
Purchase of breeding livestock	-2,581
Purchase of machinery & equip.	-9,880
Purchase of titled vehicles	-
Purchase of farm land	-2,664
Purchase of farm buildings	-8,795
Purchase of other farm assets	-471
Purchase of nonfarm assets	-222
Cash from investing activities	-13,575
Cash From Financing Activities	
Money borrowed	48,745
Cash gifts and inheritances	9,854
Principal payments	-42,625
Dividends paid	-
Gifts given	-7
Cash from financing activities	15,968
Net change in cash balance	6,927
Ending cash (farm & nonfarm)	9,402

Table 14

Financial Standards Measures  
**Michigan Dairy Grazing, 2003**  
(Farms Sorted By Rate of Return on Assets - Mkt)

	Avg. Of All Farms
Number of farms	9
Liquidity	
Current ratio	1.19
Working capital	14,397
Solvency (market)	
Farm debt to asset ratio	27 %
Farm equity to asset ratio	73 %
Farm debt to equity ratio	37 %
Profitability (cost)	
Rate of return on farm assets	-0.9 %
Rate of return on farm equity	-5.2 %
Operating profit margin	-2.0 %
Net farm income	17,150
Repayment Capacity	
Term debt coverage ratio	36 %
Capital replacement margin	-26,650
Efficiency	
Asset turnover rate (cost)	43.6 %
Operating expense ratio	86.0 %
Depreciation expense ratio	4.8 %
Interest expense ratio	3.4 %
Net farm income ratio	5.8 %

Table 15

## Operator and Labor Information

**Michigan Dairy Grazing, 2003**

(Farms Sorted By Rate of Return on Assets - Mkt)

	Avg. Of All Farms
Number of farms	9
Operator Information	
Average number of operators	1.3
Average age of operators	52.9
Average number of years farming	28.8
Results Per Operator	
Working capital	10,798
Total assets (market)	786,839
Total liabilities	180,469
Net worth (market)	606,370
Net worth excl deferred liabs	606,370
Gross farm income	220,881
Total farm expense	208,018
Net farm income	12,862
Net nonfarm income	1,334
Family living & tax withdrawals	24,069
Total acres owned	276.1
Total crop acres	359.4
Crop acres owned	167.7
Crop acres cash rented	191.7
Crop acres share rented	-
Total pasture acres	11.9
Labor Analysis	
Number of farms	9
Total unpaid labor hours	3,233
Total hired labor hours	2,916
Total labor hours per farm	6,150
Unpaid hours per operator	2,425
Value of farm production / hour	36.61
Net farm income / unpaid hour	5.30

Table 16

Financial Summary  
**Michigan Dairy Grazing, 2003**  
(Farms Sorted By Rate of Return on Assets - Mkt)

	Avg. Of All Farms
Number of farms	9
Income Statement	
Gross cash farm income	297,148
Total cash farm expense	262,301
Net cash farm income	34,847
Inventory change	-3,637
Depreciation and capital adjust	-14,060
Net farm income	17,150
Profitability (cost)	
Labor and management earnings	62
Rate of return on assets	-0.9 %
Rate of return on equity	-5.2 %
Operating profit margin	-2.0 %
Asset turnover rate	43.6 %
Profitability (market)	
Labor and management earnings	-15,626
Rate of return on assets	0.1 %
Rate of return on equity	-1.4 %
Operating profit margin	0.6 %
Asset turnover rate	25.7 %
Liquidity	
Ending current ratio	1.19
Ending working capital	14,397
End working capital to gross inc	4.8 %
Term debt coverage ratio	35.6 %
Expense as a percent of income	89.4 %
Interest as a percent of income	3.4 %
Solvency (cost)	
Number of farms	9
Ending farm assets	518,890
Ending farm liabilities	236,739
Ending total assets	551,691
Ending total liabilities	240,625
Ending net worth	311,066
Net worth change	-2,848
Ending farm debt to asset ratio	46 %
Beg total debt to asset ratio	42 %
End total debt to asset ratio	44 %
Solvency (market)	
Number of farms	9
Ending farm assets	882,113
Ending farm liabilities	236,739
Ending total assets	1,049,119
Ending total liabilities	240,625
Ending net worth	808,494
Net worth change	31,318
Ending farm debt to asset ratio	27 %
Beg total debt to asset ratio	23 %
End total debt to asset ratio	23 %
Nonfarm Information	
Net nonfarm income	1,779
Crop Acres	
Total acres owned	417
Total crop acres	479
Total crop acres owned	224
Total crop acres cash rented	256
Total crop acres share rented	-