

PURDUE AGRICULTURAL ECONOMICS REPORT

DECEMBER 1993

Results of the Indiana Farm Finance Survey for 1993*

*Freddie L. Barnard, Associate Professor; Kevin T. McNamara, Associate Professor;
and Jeurene Falck, Computer Programmer*

Summary and Implications

Key findings and implications of the 1993 farm finance survey are that:

- On average, net farm income increased in 1992 compared to 1991. About 18% of all respondents in 1992 had net farm incomes of \$20,000 and greater, up from the 15% reported for 1991. The percentage of all respondents in 1992 who had a net loss, 30%, is slightly lower than the 31% in 1991. The percentage of full-time farmers who reported a net loss in 1992 is 12%, down from 15% in 1991.
- The economic condition of farmers is influenced strongly by conditions in the nonfarm sector, because many part-time farmers depend on income from off-farm work. About 57% of all operators

and 48% of all spouses reported off-farm earnings in 1992. The average total gross off-farm income for respondents reporting off-farm income in 1992 was about \$34,238.

- The average debt-asset ratio for respondents in 1993 is about the same as the average ratio for respondents in 1992. The debt-asset ratio in 1993 is 22%, compared to 23% reported in 1992. The average debt-asset ratio in 1993 for respondents with GFI of \$100,000 or more is 30%.
- The delinquency rate on farm real estate debt in 1993, 5%, is up from the 3% reported in 1992. The 9% delinquency rate on farm nonreal estate debt in 1993 is down from 11% reported in 1992, and is below the 14% in 1986 (the highest percentage during the "Farm Crisis") and the 14% in

1989 (year following the 1988 drought). The delinquency rates on farm real estate and nonreal estate debt in 1993 for respondents with GFI of \$100,000 or more is 4% and 8%, respectively. The delinquency rate on real estate debt for respondents with \$100,000 or more GFI is up from 1% in 1992.

- The percentage of Hoosier farmers who applied for a new farm loan or additions to existing farm loans for the 1993 crop year and were turned down, 12%, equals the 12% reported in 1992, but is below the 16% in 1986. The percentage of full-time farmers who applied for a loan in 1993 and were turned down is 9%, down from 10% in 1992.
- The percentage of applicants in 1993 who applied for a loan but were turned down because the lender is not interested in making agricultural loans, 26%, is up from 13% in 1992. The percentage of respondents unable to get a loan for the 1993 crop, 3% of those who applied, equals the percentage in 1992.
- The percentage of all respondents in 1993 with debt-asset ratios less than 40%, 77%, equals the percentage for 1992. The percentage of farmers in 1993 with gross

* Financing for this study was provided by a Crossroads Project of the Purdue Cooperative Extension Service and the Purdue Agricultural Experiment Station. Thanks are extended to the farmers who completed the questionnaires and to Ralph W. Gann, head of the Department of Agricultural Statistics at Purdue University, for helpful suggestions regarding design of the questionnaire and for supervising the collection of the survey information in March-May 1993. Helpful comments on the manuscript by Lee F. Schrader, John E. Kadlec, Christopher A. Hurt, and Gene W. Danekas are acknowledged.

farm incomes \$100,000 or more and debt-asset ratios less than 40%, 65%, is slightly lower than the 66% for 1992.

- The percentage of all respondents in 1993 with debt-asset ratios greater than 70%, 5%, equals the 5% reported in 1992. The percentage of farmers in 1993 with gross farm incomes \$100,000 or more and with debt-asset ratios greater than 70%, 5%, is down from 9% in 1992.
- The percentage of debt held by all respondents in 1993 with 100% or higher debt-asset ratios, 1%, is down from 2% reported in 1992 and considerably below the 10% in 1988, which is the highest percentage reported since the survey started in 1985.
- During the past year, "reducing debt" was the most frequently mentioned adjustment for respondents, followed by "hiring others to do custom work with their machinery." "Reducing debt" was the most frequently mentioned adjustment for the upcoming year, followed by "keeping more complete records."

Purdue Agricultural Economics Report is a quarterly newsletter published by the staff of the Department of Agricultural Economics, Purdue University.

Editor

Chris Hurt

Editorial Board

Lee Schrader

Stephen B. Lovejoy

Layout and Design

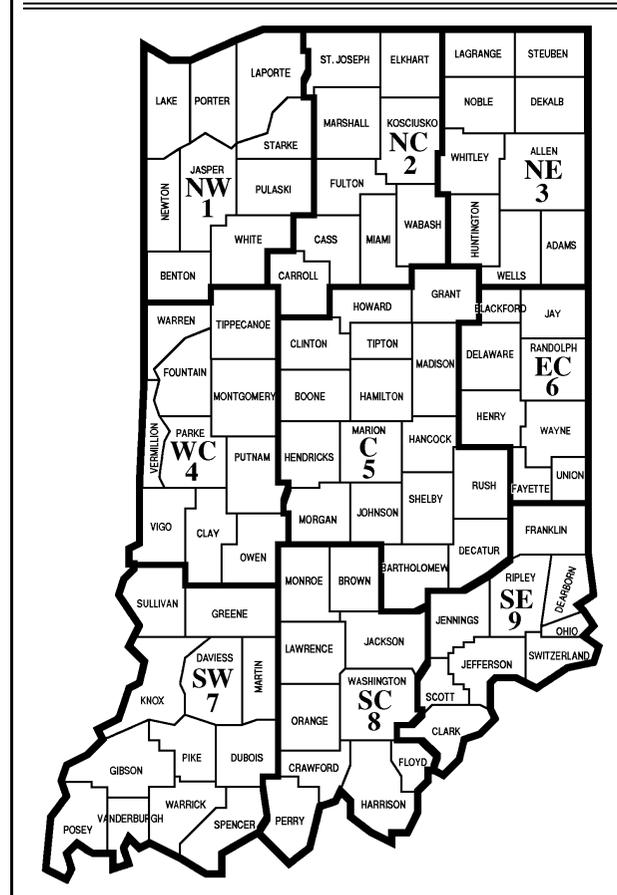
Cathy Malady

Circulation Manager

Judy Conner

Purdue University
Cooperative Extension Service,
West Lafayette, IN

Figure 1. Geographic Regions Used in the Cross-state Comparisons of the Indiana Farm Finance Survey Data, 1993. District numbers correspond to agricultural statistics districts.



Data from the 1993 survey indicate financial stress levels are not as severe as during the "Farm Crisis" in 1985-86 or even following the 1988 drought. The primary reason for this finding is the continuing effort of Hoosier farmers to reduce costs, improve efficiency, and reduce risks. The results of those efforts are reflected in the financial strength of Hoosier farmers following the 1991 drought.

Introduction

Key indicators from the Indiana Farm Finance Survey for 1993 suggest that the financial condition of many Hoosier farmers showed a slight improvement from 1992. Delinquency rates for nonreal estate loans, debt-asset ratios, interest rates paid on farm debt, and the percentage of debt held by producers with debt-asset ratios 70% and

higher, all fell below 1992 levels. The percentage of respondents turned down when applying for a loan remained the same. The delinquency rate on farm real estate loans increased. Farmers continued to adopt management practices that increase their efficiency and reduce costs, and plan to continue these practices during the next 12 months.

Indiana Farm Finance Surveys were conducted in March-June in 1985, 1986, 1988, and yearly during 1990-1993, by the Departments of Agricultural Economics and Agricultural Statistics at Purdue University. An abbreviated survey of a smaller sample was conducted in February-March 1989. This article reports on the 1993 survey, compares the 1993 results to the findings for 1992 and to selected findings for previous years.

Procedure

In March 1993, a farm finance questionnaire was sent to about 5,000 Indiana farmers by the Department of Agricultural Statistics at Purdue University. Approximately 1,000 farmers who had responded to the 1992 farm finance questionnaire were included in the sample, together with a random sample of an additional 4,000 farmers. Three weeks after the initial mailing, a reminder questionnaire was mailed to nonrespondents. In May 1993, a telephone survey of 134 non-respondents was conducted mainly to determine if they differed from those who had responded, particularly whether nonrespondents were in worse financial condition than respondents. Respondents to the telephone survey farmed slightly fewer acres (320) than respondents to the mail survey (333). In general, financial measures were better for telephone respondents than for mail respondents; the delinquency rate for real estate and nonreal estate loans, the debt-asset ratio, and percentage with debt-asset ratios exceeding 70% were all lower for telephone respondents. No other differences in characteristics could be detected in the responses obtained by telephone. Hence, the results obtained by telephone were included with those obtained by mail questionnaires to produce the summaries appearing in this article. 1,663 questionnaires contained usable responses for a response rate of 33%. However, as noted in the summary tables, the number of usable

responses varied substantially from question to question.

Many results are reported below as averages for Indiana and for the northern, central, and southern regions of the state (Figure 1).

Data from the balance sheets of respondents are as of January 1, 1993. The data on loan delinquencies and loan turndowns are as of the spring of 1993. The data on farm and off-farm income are for calendar year 1992.

Background Statistics on Characteristics of Respondents

The background statistics appearing in Table 1 were used for assessing the representativeness of the sample and for making certain cross-tabulations reported later. The average age and average number of years of experience as a farm operator of respondents were 53 and 26 years, respectively, and did not vary substantially either across the three regions of the state or from the results of the 1992 survey (Table 1). Acreage operated and acreage owned per farm in the 1993 sample were similar to the 1992 sample. The number of acres operated and acreage owned tend to be larger than the average for all farms in Indiana.

Measures Describing the Financial Condition of Indiana Farmers

Several statistics from the Farm Finance Survey are used to draw inferences about the financial condition of Indiana farmers. Gross and

net farm income, debt-asset ratios, delinquency rates for loans, loan rejection rates, and principal payments in addition to scheduled payments statistics are used in this section to characterize the general financial condition of Indiana farms.

Gross and Net Farm Income.

Gross farm income is the income generated by a farm before any expenses are subtracted. About 24% of the respondents had gross farm incomes over \$100,000 and are classified as full time farms (Table 2). In 1991, 22% of the sample farms were in the full time class. In southern Indiana, only 16% of the respondents had 1992 gross farm incomes greater than \$100,000, compared to 26% and 28% in central Indiana and in northern Indiana, respectively. Because the financial characteristics of part-time farms differ from those of full-time farms, certain statistics will be presented separately in the article for farmers with gross incomes of \$100,000 or more per year.

Operators of many small, part-time Indiana farms obtained large percentages of their incomes from nonfarm sources. Only 32% of the farm operators with gross farm incomes of \$100,000 or more worked at an off-farm job.

Respondents reported net cash farm income and net farm income figures for 1992. For purposes of the survey, net cash farm income was defined as total cash receipts minus total cash operating expenses. Net farm income was defined as net cash farm income minus depreciation. Neither of the two measures of farm income is adjusted to reflect changes in inventories.

Net farm income is commonly defined as the return to unpaid operator and family labor, management, and equity capital. Net cash farm income represents the amount of money available to farmers to repay the principal on intermediate and long-term debt, purchase capital assets, pay family living expenses, pay income taxes, and use as a financial reserve for the farming operation.

The delayed impact of the 1991 drought and the effect of low grain

Table 1. Respondents' age, experience as farm operator, and acres farmed 1992 and 1993

Characteristics of respondents	North	Central	South	State		Number of usable responses in 1993 ¹
	1993	1993	1993	1992	1993	
Operator age (years)	52	53	53	52	53	1,628
Spouse Age (years)	50	51	51	NA	50	1,437
Years as farm operator	26	26	26	26	26	1,574
Acres in farming operation						
a. Owned	174	159	158	160	164	
b. Rented from others	214	200	100	177	176	
c. Rented to others	4	13	9	8	9	
Total acres operated (a + b - c)	384	346	249	329	331	1,279

¹ Some responses for items were not usable because of missing numbers and inconsistencies.

prices in 1992 can be seen by examining the 1992 earnings of respondents. About 23% of the respondents reported negative net **cash** farm incomes for 1992; and about 30% of the respondents reported negative net farm incomes (Table 2), nearly equal to the 23% and 31%, respectively, in 1991. These percentages were 17% and 24%, respectively, in 1990. The percentage of respondents which reported net losses in 1992 was largest in southern Indiana. The percentage of respondents with \$100,000 or more of gross farm income (GFI) which reported net losses was 12%, down from 15% in 1991. The percentage was 9% in 1990.

About 82% of all respondents had net farm incomes of less than \$20,000 in 1992, compared to 85% in

1991. Of those with \$100,000 or more GFI, 49% reported net farm incomes less than \$20,000, compared to 50% in 1991. Given family living expenses, these farmers probably would have had difficulty making debt payments from 1992 net farm incomes. Of course, some could have made debt payments using depreciation allowances and income obtained from nonfarm sources.

Many Indiana farmers supplement farm income with income from off-farm sources. The average gross off-farm income for all respondents reporting off-farm income in 1992 was \$34,238.

Balance Sheet Information Used to Obtain Measures of Solvency. A balance sheet is a financial picture of an individual or firm at a point in time. It shows assets (what

is owned), liabilities (what is owed), and owner equity. Respondents were asked to provide an estimate of their nonreal estate and real estate assets and liabilities as of January 1, 1993. Caution should be used when interpreting data about reported values. The value of total assets is the average amount reported by each respondent and no mechanism was employed for verifying the accuracy of these estimates. Hence, the real estate and farm machinery values, which made up a large portion of most respondents' assets, are subject to biases, differences in evaluation methods, and levels of market knowledge.

The average value of farm real estate assets reported by respondents as of January 1, 1993 was \$239,043, ranging from \$203,174 in

Table 2. Percentage of all respondents in gross and net farm income categories, 1991 and 1992; and percentage of respondents with gross farm income (GFI) \$100,000 or more in gross and net farm income categories, 1991 and 1992

Farm income category ²	All Respondents					Respondents with GFI \$100,000 or more	
	North	Central	South	State		State	
	1992	1992	1992	1991	1992	1991	1992
Gross income categories	----- percentage -----						
0 to \$99,999	72	74	84	78	76	0	0
\$100,000 to \$249,999	20	21	11	16	17	73	73
\$250,000 to \$499,999	7	4	4	5	5	21	22
\$500,000 or more	<u>2</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>6</u>	<u>5</u>
Totals	101	100	100	100	99 ³	100	100 ⁶
Net cash farm income categories							
Net Loss	20	21	29	23	23	11	7
0 to \$19,999	50	52	56	55	53	21	27
\$20,000 to \$49,999	23	20	10	17	18	45	41
\$50,000 or more	<u>7</u>	<u>7</u>	<u>5</u>	<u>5</u>	<u>6</u>	<u>24</u>	<u>25</u>
Totals	100	100	100	100	100 ⁴	101	100 ⁷
Net farm income categories							
Net Loss	27	28	34	31	30	15	12
0 to \$19,999	51	51	54	54	52	35	37
\$20,000 to \$49,999	18	15	9	12	14	36	36
\$50,000 or more	<u>4</u>	<u>5</u>	<u>3</u>	<u>3</u>	<u>4</u>	<u>15</u>	<u>15</u>
Totals	100	99	100	100	100 ⁵	101	100 ⁸

² Income categories were defined to include income obtained from government payments. Net cash farm income equals total cash receipts minus total cash expenses. Net farm income equals net cash farm income minus depreciation.

³ 1993 usable responses were 1,571.

⁴ 1993 usable responses were 1,463.

⁵ 1993 usable responses were 1,409.

⁶ 1993 usable responses were 371.

⁷ 1993 usable responses were 348.

⁸ 1993 usable responses were 339.

Also, each number reported is rounded to the nearest whole number; thus, the sum is not always equal to 100 percent.

southern Indiana to \$260,230 in central Indiana (Table 3). The average value of farm real estate assets reported by respondents with gross farm income (GFI) \$100,000 or more was \$447,146. Farm nonreal estate assets averaged \$112,564 in value for the state, with the lowest value (\$100,239) in southern Indiana and the highest value (\$124,119) in northern Indiana. Farm nonreal estate assets averaged \$229,115 for farmers with GFI \$100,000 or more.

For all respondents, the average amount of real estate debt was \$48,977, ranging from \$37,715 in southern Indiana to \$55,698 in central Indiana. The average amount of real estate debt for farmers with GFI \$100,000 or more was \$110,994. The nonreal estate debt (state average) was \$22,239, varying from \$16,587 in southern Indiana to \$27,752 in northern Indiana. The average amount of nonreal estate debt for farmers with GFI \$100,000 or more was \$58,328.

The owner equity (total assets minus total liabilities) of respondents averaged \$280,391 for the state. It was highest in northern Indiana (\$294,576) and lowest in southern Indiana (\$249,111) (Table 3). The average owner equity of respondents with GFI \$100,000 or more was \$506,939.

The percentage of all respondents carrying real estate and nonreal estate debt in 1993 and the average interest rates paid by the respondents on the debt are also listed in Table 3. Note that about 41% of all respondents reported zero debt in 1993. This zero debt figure is about 1 percentage point higher than the comparable number for 1992. About 48% of the respondents in southern Indiana reported they had no debt on January 1, 1993. About 19% of the respondents with \$100,000 or more of gross farm income had zero debt in 1992, which is 4 percentage points higher than the figure reported in 1992 (15%) and considerably

lower than the percentage of all respondents.

Nearly 41% of the respondents with debt made principal payments on real estate loans in addition to scheduled payments during the past year. The comparable figure was 52% for nonreal estate loans. Respondents with debt and \$100,000 or more GFI also paid ahead; about 39% and 55% made principal payments in addition to scheduled payments on real estate and nonreal estate loans, respectively.

Respondents reported average interest rates on real estate and nonreal estate debt in 1993 of 8.4% and 9.3%, respectively. Rates paid by respondents with \$100,000 or more GFI were lower for both real estate and nonreal estate debt in 1993 averaging 8.2% and 8.6%, respectively.

Solvency measures describe the amount of money a farmer would have remaining after all assets are converted to cash and debts retired. Solvency ratios measure the

Table 3. Balance sheet, debt, loan repayment, interest rate, delinquency rate, and loan rejection rate information for all respondents, 1992 and 1993; and for respondents with gross farm income (GFI) \$100,000 or more, 1992 and 1993

Item	Average value of characteristics for all respondents					For respondents with GFI \$100,000 or more	
	North	Central	South	State		State	
	1993	1993	1993	1992	1993	1992	1993
Balance sheet information:							
Real estate assets (\$)	\$250,833	\$260,230	\$203,174	\$237,950	\$239,043	\$467,245	\$447,146
Nonreal estate assets (\$)	124,119	110,706	100,239	119,247	112,564	241,062	229,115
Real estate liabilities (\$)	52,624	55,698	37,715	54,377	48,977	133,031	110,994
Nonreal estate liabilities (\$)	27,752	21,128	16,587	26,872	22,239	73,546	58,328
Owner Equity (\$)	294,576	294,110	249,111	275,948	280,391	501,730	506,939
Debt (liability)/asset ratio (%)	23	24	19	23	22	29	30
Percentage of respondents with:							
Real estate debt	51	50	43	49	48	72	71
Nonreal estate debt	46	44	36	41	42	70	67
No real estate or nonreal estate debt	37	40	48	40	41	15	19
Percentage of respondents who made principal payments in addition to scheduled payments in the past year on:							
Real estate loans	42	40	42	39	41	36	39
Nonreal estate loans	54	52	49	46	52	44	55
Interest rate paid on:							
Real estate debt (%)	8.2	8.5	8.5	8.9	8.4	8.7	8.2
Nonreal estate debt (%)	9.1	9.3	9.7	9.9	9.3	9.1	8.6
Percentage of respondents delinquent on principal and/or interest payments for:							
Real estate loans	6	3	6	3	5	1	4
Nonreal estate loans	10	10	8	11	9	8	8
Percentage of respondents turned down when applying for a loan							
	16	10	10	12	12	10	9

relationship between claims on the business (liabilities) and either total assets or owner equity. Using debt-asset ratios obtained in this survey as an indicator of the financial condition of Indiana farmers requires caution. The total debt component of the ratio (liabilities) does not take into account how the debt is structured. Debt structure impacts farmers' ability to service debt, and consequently, their financial condition.

Problems discussed earlier about the difficulty of establishing farm asset values also impact the reliability of the debt-asset ratio. Calculations of change in owner equity can be the result of a profit or loss in a previous year and/or the result of an increase or decrease in the asset values. Such a change also influences the ratio. Without an income statement and the knowledge of asset values on the previous balance sheet, it is difficult to identify the reasons for the change in owner equity for an individual operation.

The statewide average debt-asset ratio of 22% as of January 1, 1993 (Table 3) was about the same as reported in 1992 (23%). The ratio was highest in central Indiana (24%) and lowest in southern Indiana (19%). The average debt-asset ratio for full-time farmers (\$100,000 and more GFI) was considerably higher at 30%.

Guidelines for using debt-asset ratios to describe the financial stress on farmers are:

Debt-asset ratio	Status of farmer
Under 40%	No immediate danger of insolvency
40% - 70%	Serious financial problems could lead to insolvency
70% - 100%	Serious financial problems will likely lead to insolvency
Over 100%	Technically insolvent

About 23% of those responding had debt-asset ratios exceeding 40% in 1993. This is slightly lower than the 24% found in 1992, which is much lower than the 32% in 1985, (the highest percentage during the "Farm Crisis"). About 5% had debt-asset ratios exceeding 70% in 1993,

down from 6% in 1992 and 13% in 1985. The guidelines discussed above suggest that serious financial problems could cause up to 5% of all Indiana respondents to become insolvent; however, this tends to oversimplify the problem. For example, some skilled managers who carry a relatively small proportion of their debt in the form of land debt may be in satisfactory financial condition despite having a debt-asset ratio exceeding 70%. Additional analyses involving subsets of respondents and cross-tabulations will be reported later to assess more fully the debt-asset ratio figures.

About 35% of respondents which reported gross farm incomes of \$100,000 or more had debt-asset ratios exceeding 40% in 1993, up slightly from the 34% in 1992. About 5% had debt-asset ratios exceeding 70% in 1993, down from the 9% in 1992, and still below the 13% in 1989 (the highest percentage during the "Farm Crisis"). The guidelines discussed previously suggest that about 5% of Indiana respondents with \$100,000 or more gross farm income could face extreme financial difficulties.

Delinquency Rates. A second measure of financial condition is the rate of delinquency of loan payments. Those respondents having real estate loans (48% of all respondents) were asked if their principal and interest payments were current. For all respondents who had real estate debt, 5% said "no" (Table 3). This is 2 percentage points higher than the 3% reported in 1992, but nearly 4 percentage points lower than the 9% reported in 1986 (the highest percentage during the "Farm Crisis"). Also, about 50% of those who were delinquent on their real estate loans were current on the interest payments and delinquent only on principal payments.

About 9% of the respondents having nonreal estate loans (42% of all respondents) indicated that their payments were not current (Table 3), about two percentage points lower than in 1992. Comparable figures for 1985 and 1986 were 22% and 14%, respectively. About 65% of those who were delinquent

on their nonreal estate loans were current on the interest payments and delinquent only on principal payments.

Delinquency rates for respondents with gross farm incomes \$100,000 or more were lower than the delinquency rates for all respondents. The delinquency rate for real estate loans was 4%, up from the 1% reported in 1992. The delinquency rate for nonreal estate loans equals 8% in 1993, the same as reported in 1992. Also, about 45% of those who were delinquent on their real estate loans were current on the interest payments and delinquent only on principal payments. That percentage for nonreal estate loans was 72%.

Loan Requests Rejected. A third indicator of financial condition is the percentage of loan applications turned down by a lender. Respondents were asked if they were turned down for a 1993 farm loan and, if so, why the loan request was rejected. Only results for respondents who actually applied for a loan were considered. Of the 312 respondents indicating they applied for a loan (21% of all respondents), about 12% (2.5% of all respondents) indicated they were turned down. This figure equals the 12% in 1992 (Table 3), but is below the highest percentage reported during the "Farm Crisis" (16%).

Respondents were asked to indicate the reasons their loan applications were rejected. Their responses, ranked by frequency, appear in the following schedule:

Reason loan request was rejected	Percentage of total rejections
Low farm income	32
Lender not interested in making agricultural loans	26
Insufficient equity	15
Previous loan repayment problems	15
Other	<u>12</u>
Total	100

The percentage of respondents who indicated they were turned down because the lender is not interested in making agricultural loan is 26%.

Respondents whose loan requests were rejected were asked if they eventually obtained loans for the 1993 crop year. Sixty-nine percent of these respondents said "yes." Thus, about 3% of those who applied for loans for the 1993 crop year were unable to get loan funds, which is equal to the 3% in 1992. However, it is important to note this is less than 1% of all 1,540 respondents. The sources of loan funds for the 69% who eventually received loans are ranked by frequency:

Eventual source of loan funds for those turned down	Percentage of total loans
Lenders other than FmHA	33%
Farm suppliers	19
Relatives	15
FmHA	11
Machinery dealers	7
All other sources	<u>15</u>
Total	100%

The 11% of the respondents who received loans from FmHA is lower than the 24% reported in 1992. This finding probably reflects the impact of the 1991 drought and the need for an increased number of borrowers to seek funds from FmHA in 1992.

Forty percent of respondents with \$100,000 or more GFI applied for a 1993 farm loan. Of that number,

about 9% were turned down, less than the 10% reported in 1992. Only four of those turned down indicated denial because the lender was not interested in making farm loans, and only one person turned down for a loan was unable to get loan funds.

During the past 12 months, Indiana farmers have expressed concerns to the authors about the availability of loan funds. Farmers are concerned that some lenders in Indiana have stopped making loans to farmers and that lenders have therefore restricted loan funds for farmers.

Consequently, further analysis was conducted on the twelve individuals who indicated they were turned down because the "lender is not interested in making agricultural loans." All twelve respondents are located in the northern and central districts. Eight of the twelve had gross farm incomes less than \$100,000. Only 10 respondents provided data on net farm income. Nine of the 10 had net farm income in 1992 less than \$20,000. The average debt-to-asset ratio for the nine answering the question was 34.3%, and all had debt-to-asset ratios less than 70.0 percent. Eight had real estate loans and all were current with their payments. Eleven had nonreal estate loans, but only seven were current with their payments. Eight of the nine respondents who

answered the question did acquire loan funds from another lender: Three from lenders other than FmHA; one each from FmHA, input suppliers, and machinery dealers; and two from other sources.

Thus, the majority of the respondents who indicated they were turned down for a loan because, "the lender is not making agricultural loans," were part-time farmers who had net farm income less than \$20,000, for the most part, and had a debt-to-asset ratio less than 70.0%.

Additional Information on the Incidence of Farm Financial Stress

In this section, debt-asset ratios for all farms and those with gross farm incomes of \$100,000 or more are presented. Other statistics relate debt-asset ratios to debt differentiated by gross income levels.

Debt-Asset Ratios by Size of Farm. Table 4 shows the percentage of all farmers and the percentage of farmers with gross incomes of \$100,000 or more per year by debt-asset ratio in 1993. Less than one-fourth of all respondents had debt-asset ratios of 40% or more compared to about 35% of those with gross incomes of \$100,000 or more. The percentage of respondents in this higher debt category equals the percentage for all farmers in 1992, but increased about 1 percentage point for those with the higher gross incomes (Table 4).

Amount of Debt Owed by Respondents in Different Debt-Asset and Gross Farm Income Categories. Debt is becoming less concentrated in the hands of those respondents in the higher debt-asset ratio categories. As noted in the figures for 1993, about 11% of the debt was owed by respondents with debt-asset ratios of 70% or higher and about 2% of the debt was owed by respondents who were technically insolvent. The 2% is down from 4% in 1992, and from 10% reported in 1988. The respondents who are technically insolvent and some respondents in the 70.0% to 99.9% debt-asset ratio category presumably are vulnerable to future financial adversities.

Table 4. Distribution of farms according to debt-asset ratio for all farmers in surveys and farmers in surveys with gross farm incomes \$100,000 or more per year

Year and debt-asset ratio category	Percentage of respondents in category based on figures for	
	All farms	Farms with gross incomes \$100,000 or more
1992 debt-asset ratio:		
Under 40.0%	77%	66%
40.0% - 69.9%	18	25
70.0% - 99.9%	3	7
100.0% or more	<u>2</u>	<u>2</u>
Totals	100%	100%
1993 debt-asset ratio:		
Under 40%	77%	65%
40.0% - 69.9%	18	30
70.0% - 99.9%	4	4
100.0% or more	<u>1</u>	<u>1</u>
Totals	100%	100%

Debt-asset ratio category	Percentage of respondents	Percentage of debt
Under 40.0%	77%	42%
40.0% - 69.9%	18	47
70.0% - 99.9%	4	9
100.0% or more	<u>1</u>	<u>2</u>
Total	100%	100%

Farm Adjustments

Farmers were asked to review a list of 23 possible adjustments and to identify the adjustments they had made during the past 12 months and those they expected to make during the next 12 months. Respondents

could also add adjustments to the list. The adjustments identified by respondents, ranked according to frequency of mention using the state figures for all respondents, appear in Table 5. Each adjustment (made or expected to be made) which accounted for less than 5% of the total, was lumped together in the "other adjustments" item in Table 5. The adjustments indicated by respondents with \$100,000 or more GFI are also reported in Table 5.

Past 12 Months. The adjustments made during the previous 12 months that were most frequently mentioned by respondents were "reduced debt," "hired others to do

custom work with their machinery," "purchased new/additional machinery," "increased off-farm work," "bought crop insurance," "kept more complete records," and other adjustments (Table 5). Several of the adjustments made during the past 12 months can be categorized as changes which helped them to reduce costs (e.g., those relating to reducing debt, reducing living expenses, and hiring others to do custom work), to diversify and reduce risks (e.g., used my machinery to do custom work for others, adding or expanding livestock enterprises, increasing off-farm work and buying crop insurance), and to more

Table 5. Adjustments made by respondents in farming operations to deal with the farm financial situation

Adjustment item and period	Percentage of total adjustments accounted for by item				
	All Respondents				Respondents with GFI \$100,000 or more
	North	Central	South	State	State
Past 12 months					
Reduced debt	14.0	11.7	13.5	13.1	13.2
Hired others to do custom work with their machinery	10.7	10.9	12.4	11.2	7.8
Purchased new/additional machinery	10.0	10.5	9.2	10.0	12.9
Increased off-farm work	9.0	9.4	10.8	9.6	4.8
Bought crop insurance	8.0	10.9	4.1	7.9	9.0
Kept more complete records	7.5	7.0	7.4	7.3	7.6
Used my machinery to do custom work for others	6.0	8.2	6.2	6.8	9.2
Increased or added a livestock enterprise	4.4	4.6	7.7	5.3	4.1
Reduced living expenses	6.1	4.7	4.7	5.3	4.1
Other adjustments ⁹	<u>24.3</u>	<u>22.1</u>	<u>24.0</u>	<u>23.5</u>	<u>27.3</u>
Totals	100.0	100.0	100.0	100.0 ¹⁰	100.0 ¹²
Next 12 months					
Reduce debt	14.2	12.3	11.7	12.9	14.1
Keep more complete records	9.4	9.0	9.8	9.4	9.0
Hire others to do custom work with their machinery	7.8	9.2	9.3	8.7	6.8
Purchase new/additional machinery	8.7	8.2	8.0	8.4	9.1
Increase off-farm work	7.5	7.6	9.0	7.9	5.2
Increase or add a livestock enterprise	6.5	7.2	9.1	7.4	4.7
Use my machinery to do custom work	6.2	7.1	7.0	6.7	9.5
Buy crop insurance	7.0	8.1	4.4	6.7	8.0
Reduce living expenses	6.4	5.8	5.4	5.9	5.1
Other adjustments ⁹	<u>26.3</u>	<u>25.5</u>	<u>26.3</u>	<u>26.0</u>	<u>28.5</u>
Totals	100.0	100.0	100.0	100.0 ¹¹	100.0 ¹³

⁹ Adjustments, each of which accounted for less than 5% of the state total.

¹⁰ In 1993 usable responses were 937.

¹¹ In 1993 usable responses were 920.

¹² In 1993 usable responses were 263.

¹³ In 1993 usable responses were 252.

accurately measure farm costs and returns (e.g., keeping more complete records).

Respondents with \$100,000 or more GFI placed much more emphasis on certain adjustments than respondents in general. Those adjustments include "reduced debt," "purchased new/additional machinery," "used my machinery to do custom work for others," and "bought crop insurance." Respondents with \$100,000 or more GFI placed less emphasis on "increased off-farm work," "reduced living expenses," and "increased or added a livestock enterprise" than all respondents.

Next 12 Months. Many of the adjustments planned for the next 12

months by the respondents are similar to those made during the previous 12 months and to those reported on previous surveys.

"Reducing debt" topped the list followed by "keeping more complete records," "hiring others to do custom work with their machinery," "purchasing new/additional machinery," "increasing off-farm work," and "increase or add a livestock enterprise." Several of the adjustments planned for the next 12 months can be categorized as changes which will help them reduce costs (e.g., reducing debt, hiring others to do custom work with their machinery and reducing living expenses), more accurately measure farm costs and

returns (e.g., keeping more complete records), diversify and reduce risks (e.g., increasing off-farm work, increasing or adding a livestock enterprise, buying crop insurance and using my machinery to do custom work for others) and upgrade capital (e.g., purchasing new/additional machinery).

As was the case for the past 12 months, respondents with \$100,000 or more GFI placed much less importance on "increasing off-farm work," "reduce living expenses," and "increase or add a livestock enterprise" than all respondents. "Operating more land" was planned as an adjustment by more of these farmers (6.2%) than all respondents.

The Agricultural Implications of the North American Free Trade Agreement*

Marshall A. Martin, Professor

Background

After intense negotiations, Presidents Bush, Salinas, and Mulroney from the United States, Mexico, and Canada, respectively, signed the North American Free Trade Agreement (NAFTA) on December 17, 1992. On November 3, 1993 the Clinton Administration introduced into the U.S. Congress the NAFTA document plus several side agreements on labor and the environment. On November 17, 1993 the U.S. House of Representatives approved NAFTA (234 to 200). It was ratified by the U.S. Senate on November 20, 1993 (61 to 38). The Canadian and Mexican parliaments also have ratified NAFTA.

NAFTA is scheduled to go into effect January 1, 1994. The Agreement calls for the eventual elimination of all tariffs, quotas, and licenses that act as trade barriers.

Some trade barriers will be eliminated immediately, while others would be reduced gradually over a period of up to 15 years. NAFTA is primarily a trade agreement and does not call for monetary nor political union as in the case of the Maastricht Treaty in the European Community.

Because of the way that Canada protects its agricultural sector, Canada was unwilling to liberalize agricultural trade with Mexico as much as was the United States. Hence, the primary focus of this article is on the expected agricultural trade impacts of NAFTA on the United States and Mexico. Some background on NAFTA is presented, the key agricultural trade provisions are outlined, and some of the economic implications of the agricultural provisions for the United States, and Indiana, are analyzed.

The Setting

For any analysis of the economic impacts of NAFTA it is important to keep the relative size of the two countries in proper perspective. The Gross Domestic Product (GDP) and population of the United States are

both quite large relative to Mexico. NAFTA will bring together a \$6.5 trillion North American Trade Bloc (\$5.7, \$0.5, and \$0.3 trillion in the United States, Canada, and Mexico, respectively) with a combined population of 363 million people (253, 27, and 83 million in the United States, Canada, and Mexico, respectively) (Table 1). Mexico's population equals the combined population of the five most populous U.S. states (California, New York, Texas, Florida, and Pennsylvania) [U.S. Department of Commerce]. Per capita GDP in the United States is over six times that of Mexico (\$22,530 compared to \$3,614).

Agriculture is relatively more important in Mexico. U.S. agriculture accounts for about three percent of GDP compared to nine percent in Mexico. Two percent of the U.S. population is employed in agriculture compared to nearly one-third of the Mexican population. U.S. agricultural exports and imports represent about 7 and 9 percent of GDP compared to 16 and 15 percent in Mexico.

Mexico is only one-fifth the size of the United States. Mexico's total

* This article draws heavily from Marshall A. Martin, *The North American Free Trade Agreement: Implications for Agricultural Trade*, *Atlantic Economic Society Best Papers Proceedings*, 3(2):133-138. July 1993.

land area equals the combined area of Alaska and Texas, our two largest states. About two-thirds of the climate in Mexico is arid or semi-arid, which limits agricultural production. Mexico's cropland area is about 61 million acres compared to 469 million acres in the United States (Table 1). This translates into 0.7 acres per capita in Mexico compared to 1.9 acres per capita in the United States.

Irrigation is critical to crop production in many regions of Mexico. Since most irrigation water comes from surface storage rather than underground aquifers, available irrigation water is highly dependent on rainfall. Only 10 percent of U.S. arable land is irrigated compared to 20 percent in Mexico.

In 1992, total U.S. exports to Mexico were \$40.6 billion. These exports are estimated to support about 700,000 jobs (Office of the U.S. Trade Representative). Mexico is the second largest market for U.S. manufactured exports.

Mexico is currently the third most important market for U.S. agricultural exports (\$3.8 billion for fiscal year 1993), with Japan and Canada ranking first and second (\$8.2 and \$5.1 billion, respectively, for fiscal year 1993) [USDA, 1993]. Agricultural exports to Mexico in 1992 accounted for about 111,000 jobs. The U.S. agricultural trade balance with Mexico is currently positive (\$3.8 billion exports versus \$2.9 billion imports for fiscal 1993). Corn and soybeans normally account for at least one-third of total U.S. agricultural exports to Mexico. Other important exports are red meat,

poultry, processed fruits and vegetables, dairy products, and limited amounts of wheat and rice.

After Canada (\$4.4 billion in fiscal year 1993), Mexico is the next most important source for U.S. agricultural imports (\$2.9 billion in fiscal 1993). Fruits and vegetables account for one-half of total U.S. agricultural imports from Mexico. Fresh winter vegetables are especially important. Tropical products such as coffee, bananas, and tea represent slightly less than one-fifth of U.S. agricultural imports from Mexico. Mexico also exports feeder cattle to the United States.

After becoming a member of the General Agreement on Tariffs and Trade (GATT) in 1986, Mexico has substantially liberalized its trade policies. Tariffs have been reduced sharply, especially for industrial goods. However, Mexico's average tariffs are about 2.5 times higher than those for the United States (10 versus 4 percent) [Office of the U.S. Trade Representative]. Import licenses that formerly were required for nearly all agricultural imports have been retained for only a few products such as corn, poultry, grapes, and wood products. Although the licensing arrangements affect less than 6 percent of all Mexican tariff categories, these commodities represent about one-third of U.S. agricultural exports to Mexico.

The Basic Provisions of the Agreement

Under NAFTA, Mexico and the United States will eliminate all non-tariff barriers governing agricultural

trade. Non-tariff barriers will be converted to "tariff-rate-quotas" (TRQs). Under TRQs, no tariff will be imposed on quantities below the quota amount. Imports above the quota limit will be subject to tariffs that will be gradually phased down over a transition period. Tariffs on a broad range of agricultural products will be eliminated immediately on about one-half of the bilateral trade between Mexico and the United States. Remaining tariff barriers will be phased out over a 10-year period. More sensitive commodities will have a 15-year transition period. Sensitive commodities include corn, dry beans, and nonfat dry milk for Mexico, and sugar, orange juice, and peanuts for the United States [USDA, 1992(a), 1992(b), 1992(c)].

Each country will move towards agricultural income and price support policies that are not trade-distorting and that are in compliance with the final outcome of the current GATT negotiations. In general, export subsidies will be eliminated. Efforts will be made to harmonize agricultural product classification, grading, and marketing standards.

U.S. agricultural imports from Mexico and Canada must meet all standards set by U.S. regulatory agencies. NAFTA contains an administrative procedure to resolve disputes over health and sanitary standards to avoid regulations disguised as trade barriers.

Rules of origin have been developed to prevent non-NAFTA countries from benefitting from the trade preferences in the Agreement. For example, milk from the European

Table 1. North America: Some Comparative Statistics

	GDP (\$ Billion)	Population (Million)	GDP/Capita(\$)	Total Agricultural Land ¹ Million acres	Crop Land Million acres	Permanent Pasture Land Million Acres	Total Land (1000 sq. miles)
United States	5,700	253	22,530	1,721	469	596	3,619
Mexico	300	83	3,614	357	61	184	761
Canada	500	27	18,519	998	116	77	3,852
Total	6,500	363	17,906	3,076	646	857	8,232

¹ Agricultural land includes annual and permanent crops, all pastures, and forests.

Source: USDA and FAO.

Community cannot be shipped to Mexico, processed into cheese or yogurt, and then shipped duty-free into the United States.

The NAFTA text calls for economic development in North America in an environmentally sound manner. Under NAFTA, the United States is allowed to maintain its own current stringent health, safety, and environmental standards. The Agreement prohibits the lowering of these standards to attract investment in Mexico. Both the United States and Mexico have committed resources to clean up the water and air in their common border area. Mexico has committed \$460 million over three years and the United States has committed \$241 million for fiscal 1993, double the amount spent in 1992. For the long-term, NAFTA calls for cooperative programs covering pollution control, pesticides, waste management, and emergency responses.

The Agreement includes provisions on intellectual property rights. All three countries will be required to prevent infringements against patents, copyrights, trademarks, and trade secrets, both internally and at the border. This is especially important for plant breeders and seed producers, agricultural chemical companies, and animal health product companies; and should facilitate technology transfer. Other general provisions include investment opportunities in agriculture, new international cargo markets for the trucking and railroad industries, and expanded trade in wood products.

A review of some of the provisions for the major agricultural commodities covered in NAFTA is informative. The tariff-rate-quota and transition period will differ for each commodity depending on its economic importance and sensitivity.

After 10 years, all U.S. livestock and products will be exported to Mexico duty-free. TRQs will apply during the 10-year transition period.

The current trade balance for fruits and vegetables is heavily in Mexico's favor. To minimize any adverse economic impacts, 10- to 15-year TRQ safeguards will be used, depending on the sensitivity of the product. In general, the higher

the current tariff, the longer the transition period.

Corn is the single most sensitive commodity for Mexico. Initially, a tariff-free import quota of 2.5 million tons will be established by Mexico. This is about twice the current annual volume of U.S. corn exports to Mexico. The duty-free quota will increase three percent per year over a 15-year period at which time corn will enter duty-free. Sorghum will enter duty-free immediately, while wheat and barley trade will be gradually liberalized.

Mexico is a good market for U.S. soybeans, about 13 percent of total U.S. soybean exports and 6 percent of soybean meal exports. The current 15 percent duty will be reduced to 10 percent, and then phased out over 10 years.

General Economic Implications

The U.S. Department of Agriculture has estimated that by 2008 when NAFTA is fully implemented U.S. agricultural exports would reach \$10.1 billion, \$2.6 billion more than without NAFTA. Also this increase in U.S. agricultural exports to Mexico would generate about 56,000 more U.S. jobs.

The desire for more rapid economic growth and job creation is a major force driving the Mexican government toward a trade agreement. In the first half of the 1980s, Mexico experienced rapid inflation, a recession, and a decline in per capita food consumption [Martin]. Since then, the Mexican government has shifted from a closed, inward-looking economic policy regime towards one that is more export oriented and open. Economic growth has accelerated from less than two percent per year in 1982-88 to 3.5 percent per year in 1989-91. Increased trade opportunities under NAFTA are expected to result in continued rapid economic growth into the next century.

Continued strong per capita income growth, coupled with a population in excess of 83 million people that is growing about two percent per year, will result in rapid growth in Mexican food demand in the 1990s. This will be especially true

for foods such as livestock products for which demand growth is closely associated with increases in per capita income growth. The demand for livestock products could increase about 3.0 to 3.5 percent per year. And, if Mexico wishes to help people increase their per capita consumption of livestock products at lower real prices, livestock supplies will need to increase even faster. Mexico will need to import from the United States both feedgrains and oilseeds to produce more livestock in Mexico, import live animals for slaughter, and import processed meats and dairy products [Martin].

A second implication of economic growth in Mexico will be to stimulate the Mexican demand for fruits and vegetables. Hence, Mexico is expected to devote an increasing amount of land, labor, fertilizer, credit, and scarce irrigation water to the production of fruits and vegetables. This will create jobs, especially for people with limited skill levels, and also will increase rural wages and help reduce immigration into the United States.

The implementation of NAFTA will stimulate Mexican production and export of fresh and processed fruits and vegetables. Mexican exports to the United States of fresh winter vegetables such as tomatoes, bell peppers, and cucumbers as well as exports of fresh fruits such as strawberries and mangos are expected to increase. Mexican exports to the United States of processed vegetables such as frozen broccoli and cauliflower will likely increase also.

Economic Implications for Major Commodities

NAFTA has important economic implications for several major agricultural commodities. A few key implications are outlined below [USDA, 1992(a), 1992(b), 1992(c); U.S. Congress].

Livestock and Products

Under NAFTA, bilateral beef trade will likely increase. In 1991, the United States exported about 64,000 tons of beef and 140,000 head of slaughter cattle to Mexico. The

United States also imported around one million head of feeder cattle from Mexico. The United States would have imported more feeder cattle if Mexico had not imposed an export tax of about \$60 per head. USDA estimates suggest that under NAFTA by the year 2008 when it is fully implemented annual U.S. beef exports could grow to about 200,000 tons plus one million head for slaughter in Mexico. Also more feeder cattle will likely leave Mexico for U.S. feedyards. Lack of concentrate feed and limited water and pasture land will encourage Mexico to export more feeder cattle. However, this may be offset by rising per capita incomes in Mexico that will increase the demand for beef. Live cattle prices in the United States might increase by one percent as a result of NAFTA.

U.S. pork exports to Mexico are expected to double by the end of the 10-year transition period, but remain small as a percent of U.S. swine production. Elimination of Mexican import tariffs and per capita income growth in Mexico will contribute to the growth in U.S. pork exports to Mexico. Import tariffs on slaughter animals and pork products are now about 20 percent, and will be eliminated over a 10-year transition period. The United States will not import live hogs or fresh or frozen pork from Mexico because of disease problems, mainly hog cholera which has been eradicated in the United States. Market hog prices in the United States might be about \$1.00 per hundredweight higher under NAFTA.

Mexico is the number one importer of powdered milk from the United States. Mexican tariffs (up to 20 percent) are the major barrier to U.S. dairy exports to Mexico. Depending on the specific dairy product, under NAFTA all tariffs will be reduced over a 10- to 15-year period. Dairy imports by the United States are subject to Section 22 of the U.S. Agricultural Adjustment Act of 1933 which severely restricts the quantity of dairy products imported in order to maintain U.S. dairy price supports. The United States will increase the duty-free quantities of

dairy imports from Mexico by three percent per year over a 10-year period at which time U.S. tariffs will be eliminated.

Under NAFTA, income growth and the removal of import licenses will expand the Mexican market for eggs. Over the 10-year transition period, U.S. egg exports to Mexico are expected to increase 4- or 5-fold.

Fruits and Vegetables

While currently ranging from 0 to 30 percent, U.S. import tariffs on vegetables, many applied seasonally, will gradually be eliminated under NAFTA. The United States currently imports about \$1 billion of vegetables and melons from Mexico annually. Fruit and vegetable imports are expected to increase gradually over the phase-in period.

The United States will have greater access under NAFTA to the Mexican market for temperate climate fruits such as peaches, apples, and pears. Mexico will have greater access to the U.S. market for strawberries and grapes.

The United States and Mexico currently engage in two-way trade in oranges. With the elimination of trade barriers, U.S. exports to Mexico of fresh oranges are expected to increase. Mexico is likely to increase its exports of orange juice concentrate to the United States. Overall, NAFTA's impact on U.S./Mexican citrus trade will be small, perhaps a 3-4 percent increase over the transition period.

Grains

The United States supplies most of Mexico's corn and sorghum imports. As tariffs on corn are eliminated over the 15-year transition period, USDA estimates that the volume of Mexican imports of corn from the United States, mainly to satisfy an expanding livestock sector, will increase about 50 percent. While the United States is a major wheat supplier to Mexico, these exports represent only about two percent of total U.S. wheat exports. With the elimination of tariffs, U.S. wheat exports to Mexico are expected to increase about 40 percent.

Oilseeds

NAFTA is expected to have only a modest impact on the U.S. soybean industry. Mexico prefers to import soybeans for crushing since it needs both cooking oil and meal for livestock. Exports of U.S. soybeans to Mexico are estimated to increase about 20 percent under NAFTA.

Implications for Indiana

In 1992, Indiana exports to Mexico were \$359 million, up 33 percent since 1987—the first year after Mexico joined the GATT and began to reduce major trade barriers (Table 2). Agricultural exports to Mexico from Indiana were \$1.7 million with about 85 percent of this being grain and oilseed crops. Food product exports from Indiana to Mexico last year totaled \$4.9 million. While crop, livestock, and processed food exports from Indiana to Mexico are a small fraction of the State's total exports to Mexico their significance has increased over the past 5 years.

It has been estimated that under the full implementation of NAFTA by 2008, Indiana's agricultural receipts will increase \$100 million per year or about 2.2 percent [Paarlberg]. Most of this increase will be from the higher price and export sales of corn and soybeans. In addition, increased exports of livestock and livestock products is expected, especially pork and poultry. It also has been estimated that 2,629 agriculturally related jobs will be generated in Indiana [Broomhall].

Table 2. Indiana Exports to Mexico: 1987, 1992

	1987	1992	%
	--- (\$1,000) ---		Change
Agriculture	320	1,700	431
Crops	250	1,448	479
Livestock	70	252	260
Mining	2	41	1,950
Manufacturing	270,607	357,466	32
Total	270,929	359,207	33

Source: Office of U.S. Trade Representative

Conclusions

NAFTA is expected to increase employment and income in Mexico, Canada, and the United States. While the agricultural provisions will have some modest negative economic impacts, overall Mexican and U.S. agriculture is expected to gain economically from the Agreement. Some jobs and income may be lost in the U.S. winter vegetable region, but Mexico will gain from increased vegetable production and exports to the United States and Canada. U.S., and Indiana, oilseed and grain producers, as well as livestock producers, will benefit from increased exports to Mexico as growth in per capita income expands the Mexican demand for livestock products.

The Agreement addresses several controversial issues related to agricultural trade such as intellectual property rights, environmental quality, and food safety. The Clinton Administration has drafted legislation to clarify some of these concerns.

From an agricultural perspective, NAFTA will be beneficial to consumers and most farmers in all three countries. However, economic adjustments will be difficult for some less technically advanced farmers in Mexico and for U.S. winter vegetable growers.

References

- Broomhall, David E. *Impacts of NAFTA on Income and Employment in Indiana*, unpublished manuscript, Department of Agricultural Economics, Purdue University, November 1993, 1 pp.
- Food and Agriculture Organization, *FAO Production Yearbook*, United Nations, Rome, 1987.
- Martin, Marshall A. *United States-Mexico Agricultural Trade Relations*, Unpublished manuscript prepared for the U.S. Council of the Mexico-U.S. Business Committee, 1990, 35 pp.
- Office of U.S. Trade Representative, *The NAFTA: Expanding U.S. Exports, Jobs, and Growth*, Washington, D.C., July 1993, 11 pp.
- Paarberg, Philip L., *Impacts of NAFTA on Indiana Agriculture*, unpublished manuscript, Department of Agricultural Economics, Purdue University, November 1993, 2 pp.
- U.S. Congress, Office of Technology Assessment, *U.S.-Mexico Trade: Pulling Together or Pulling Apart?*, ITE-545, Washington D.C., U.S. Government Printing Office, October 1992, 225 pp.
- U.S. Department of Agriculture, *Agriculture in a North American Free Trade Agreement: An Analysis of Liberalizing Trade Between the United States and Mexico*, Foreign Agricultural Economic Report 246, Economic Research Service, Washington D.C., September 1992(a), 167 pp.
- U.S. Department of Agriculture, *Preliminary Analysis of the Effects of the North American Free Trade Agreement on U.S. Agricultural Commodities*, Office of Economics, Washington D.C., September 1992(b), 26 pp.
- U.S. Department of Agriculture, "U.S.-Mexico Agricultural Trade Under a NAFTA", *Agricultural Outlook*, AO-186, June 1992(c), pp. 32-37.
- U.S. Department of Agriculture, *Outlook for U.S. Agricultural Exports*, Washington, D.C., August 27, 1993, 22 pp.
- U.S. Department of Commerce, *Statistical Abstract of the United States*, U.S. Government Printing Office, Washington, D.C., 112th edition, 1992.

Does No-Till Spark Lease Changes?

J. H. Atkinson, Professor

Increased No-Till Acreage

A 1993 Purdue/SCS survey revealed an increase in Indiana no-till crop acreage of nearly a half-million acres or 18% since 1990. The no-till system was used on 25% of Indiana's cropland in 1993. The Purdue land values survey respondents estimated that 72% of Indiana farmers were no-tilling at least some of their acreage, and that a third of farmers had half or more of their acreage in no-till.

The ASCS/SCS conservation compliance provisions have been a factor in the adoption of reduced tillage practices but economics also has played a role. Fewer trips over the ground and lower horsepower requirements have generally resulted in lower total machinery cost. In addition, lower labor requirements reduce labor costs, and allow more acres to be farmed with the same labor. Only a part of these

savings have been off-set by higher herbicide costs and, in some situations, slightly lower yields.

The Landlord's Question

Some landlords are asking whether changes should be made in 50-50 share leases. The argument goes like this: "My tenant plans to go to no-till next year. He will save on machinery and labor costs but herbicide costs will be higher. Under our present lease, I would pay for half the higher herbicide cost and would not share in the cost savings. In addition, any yield reduction due to minimum tillage would put me even further behind. How can I change our lease agreement so that I will at least be as well off as under conventional tillage?"

Are Lease Terms Changing?

The answer to this question varies, depending upon who answers it. A sample of the participants in the

1993 Top Crop Workshop at Purdue were asked the following questions:

1. Have you changed tillage in the past 5 years? Ninety-four percent replied that they had changed.
2. How has tillage change affected your lease changes? Of those who had made a tillage change, 94% said that the tillage change had not affected lease changes.
3. How have your tillage changes affected your farm size? A little over 50% replied that farm size had increased while the remainder reported no change in size caused by changes in tillage.

Answers to the third question support the assumption that changes in tillage may result in increased farm size. The way the first question was asked limits the usefulness of replies to the second question. Any kind of

tillage change was the basis for an affirmative answer to the first question, not just reduced tillage changes. In fact a change *from* no till or ridge till to a more conventional system might have been included. Furthermore, these farmers might have made a tillage change on owned land but not on rented ground. Nevertheless, the results are a reminder that tillage changes do not inevitably lead to lease changes.

Several hundred appraisers, farm managers, farm lenders, extension educators, farm land brokers, farm operators, ASCS county directors, and farm land owners were asked in 1993 whether they had noticed changes in leasing arrangements because of the shift to no-till. Eighty-three percent of those responding said no change had occurred. Changes reported by the remaining 17% are listed as follows with the percent reporting:

► **More cash rent or higher cash rent, 35% of those reporting changes. Individual comments included:**

"50/50 share is no longer as popular. No-till costs the owner more. Cash rent bids are a little higher. Custom work is less expensive and easier to find good operators."

"Some criticism by older landlords that the farmer is doing less, one farm shifted from 2/3rd's share to \$95/acre cash rent."

"Some farmers who no-till are paying more for land rent and increasing the acres they farm by 25% or more."

► **Increase the share of herbicide cost the tenant pays, 31%. Typical comments included:**

"Tenant pays more than 50% of the herbicide costs. My landlord and I agreed for 93 to add \$1 to the 92 soy herbicide costs, and landlord pays 1/2 of that and I will pay the remainder."

"Most that no-till pay for any burn down chemicals that may be applied."

"Some no-till operators are paying a higher portion of chemical costs."

► **More custom drilling of beans and equipment leasing, 13%. Comments:**

"All grower co-op outlets have new no-till drills and are contracting to drill soybeans for \$12.50/acre. Owners are doing their own soybeans without an operator on some small farms."

"Local equipment dealers leasing more no-till drills and planters."

► **Reduce the harvest costs paid by share landlords, 7%.**

► **Miscellaneous, 14%. Comments:**

"Sometimes results in change of tenants."

"Adjusting from 50/50 to 55/45 or similar terms to adjust to equal return relative to investment."

"Some landlords are requiring conservation plans, due in part to CRP."

Suggested Changes

This same group was asked if they thought any change should be made in a 50-50 lease with a tenant who plans to adopt no-till on all the acreage. A little less than half (44%) of the respondents thought no change should be made. Some of these replies pointed out benefits to the landlord (higher yields, erosion control). Others advised trying no-till for a few years before making changes and a few suggested that the tenant try to reduce costs or do a better job or production.

Following are selected comments by respondents who suggested no change.

"No change if the tenant is a good operator, manager, successful, good character, etc. A good tenant is worth something and since the net income will be little if any less, I suggest not to change."

"Keep records for a year and compare. Then make changes in lease arrangements."

"Leave the lease the same. The landlord will reap many benefits of no-till that saves money for him in the long run. Examples, less erosion, reduced soil compaction, better drainage, more organic matter, more wildlife, etc."

"If you are happy with your current tenant keep him with his new proposal. The farmer is only trying to become more efficient. It is only the most efficient farmers who will be in business this century. If you have decided that you must have a new lease arrangement, be fair about it. Assuming your tenant is a good operator and steward of the land, he will have a sharp pencil as well. You may be better off to take just a little less and retain a good tenant than to get more and lose your tenant."

"In my opinion, your tenant using no-till practices is actually doing you a favor in the long run by saving your top soil and increasing the land's productivity. Besides that, I don't think that what the farmer is saving in machinery cost is going to make him rich. I would give the no-till some time to see what kind of effect it is going to have on the land, the bills and the crop yields before renegotiating the lease, but it might be a good idea to keep your tenant clued in to the fact that you may need to renegotiate in the future."

"From my personal standpoint, I'm glad to pay additional herbicide costs to offset his taking better care of my land investment."

"If you're happy with the tenant, and satisfied he's treating you fair, you'd better leave him alone and let him farm."

Six in 10 of the suggested changes shifted more expense to the tenant, most often involving herbicides. These included "tenant pay for the burn-down," "tenant pay 60% of herbicide," and "establish a maximum for landlord to pay." "Reduce harvesting charge to landlord" was mentioned several times.

The remaining 40% of the replies suggested changing the type of lease, most often to cash. The 2/3 - 1/3 arrangement was mentioned several times.

Finding a Solution - If There's a Problem!

A rapid shift to no-till is occurring in Indiana. Changes in share leasing arrangements related to this shift are progressing at a slower rate. Opinion is divided as to whether no-till should or will result in changes in share leasing arrangements. One survey respondent wrote *"We're seeing a few landlords who only want to rent to producers who will no-till their farm and some who are the exact opposite!"*

A number of survey respondents suggested basing lease changes on analysis of costs and returns. In Purdue publication ID-191 on the tillage economics of one planter farms, estimates are given for various tillage systems on three different soil types. Based largely on these estimates, and assuming a 50-50 share lease, comparisons were made as follows:

1. Crosby and similar light, low organic matter, somewhat poorly drained silty clay loams, level to 6% slopes: fall chisel plow versus no-till, half corn/half soybean rotation; machinery overhead included in costs, real estate taxes and other land costs not included, no storage costs included; corn price, \$2.40/bu, beans, \$6.00/bu; corn and bean yields (bu/A) were, respectively, 122 and 39 with fall chisel and 120 and 38 with no-till. (Table 1)

Table 1. Costs-Returns, Crosby Soils

Item	Landlord		Tenant	
	chisel plow	no-till	chisel plow	no-till
Gross return	\$132	\$129	\$132	\$129
Machinery	8	8	47	29
Herbicide	12.50	16.50	12.50	16.50
Part-time labor	-	-	5	1
Fert/lime	15.50	15.00	12.50	12.00
Seed	7.50	7.50	7.50	7.50
Drying	2.50	2.50	2.50	2.50
Interest	3	3.50	4	4.50
Misc & Ins	<u>4</u>	<u>4</u>	<u>6</u>	<u>6</u>
Total Expense	\$53	\$57	\$97	\$79
Residual (Gross minus Total Exp.)	\$79	\$72	\$35	\$50

Based on these figures, the residual for the tenant would increase by \$15.00 per acre and would decline by \$7.00 per acre for the landlord. The tenant's cost was \$18.00 per acre less with no-till and gross return declined by \$3 per acre. The landlord's drop in returns resulted from an increase of \$4.00 in costs and the \$3.00 per acre decrease in gross receipts.

2. By way of contrast, both the tenant and landlord gain (as was suggested by a number of survey respondents) from the shift from disc and field cultivator to no-till on highly erodible land (HEL) as follows: Miami and similar light (color and texture), sloping, eroded soils: disc/field cultivate versus no-till; corn and bean yields (bu/A) were, respectively, 101 and 33 with disc/field cultivate and 108 and 35 with no-till; other assumptions same as #1 above. (Table 2)

On this sloping, eroded land, yields increase about 10% (probably over a period of years), expenses drop by 7% and residual increases about 28%. Both tenant and landlord show an increase in their residuals; however most of the total increase in residual goes to the tenant (\$21.50 of \$24 total).

The two cases presented above illustrate the wide differences

caused by soils in the results of changing to no-till. There also are wide differences in results obtained by different operators. (Some no-till operators claim their herbicide costs are no more than with conventional tillage; others experience weed and insect problems even with higher pesticide costs). Operator experience, know-how and equipment no doubt affect results. Finally, climatic conditions, either year to year or by location in the same year, affect results. All this causes uncertainty about no-till results and suggests that a true picture of an individual farmer's operating results must be based on several years' experience.

Conclusions and Suggestions

There is no easy answer, no "pat" answer to the question of whether or not changes should be made in 50-50 lease arrangements when no-till is adopted. Over a period of a few years, the land rental market will answer the question. In the meantime, tenants and landlords need to examine their own situation and try to arrive at a mutually agreeable arrangement. Listed below are suggestions which might be helpful in lease negotiations:

1. Remember that one year's results of no-till may not give a true picture and that the full effects may come over several years; however, operators need to know *their* costs and returns.

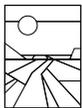
Table 2. Costs-Returns, Miami Soils

Item	Landlord		Tenant	
	disc/ f-cult	no-till	disc/ f-cult	no-till
Gross return	\$110	\$117.50	\$110	\$117.50
Mach. eqpt.	8	8	43	27
Herbicide	12	16	12	16
Part-time labor	-	-	4	1
Fert/lime	13.50	14	10.50	11
Seed	6.50	7	6.50	7
Drying	2	2	2	2
Interest	2	2	4	4
Misc & Ins	<u>4</u>	<u>4</u>	<u>5</u>	<u>5</u>
Total Exp.	\$48	\$53	\$87	\$73
Residual	\$62	\$64.50	\$23	\$44.50

- 2. Don't over-estimate machinery cost savings. These savings may require several years to be realized, especially if conventional back-up machinery is retained until the new system is operating smoothly.
- 3. Remember that machinery and labor cost savings which tend to allow an increase in acreage will be divided between the landowner and the operator. Tenants will offer more cash rent or make concessions in share lease arrangements but they will not bid away all of the expected savings. They must be rewarded for the risks of making changes and the management needed to make them successful.
- 4. On level to slightly sloping heavy soils, consider a change in the 50-50 agreement which would leave the landlord at least as well off after the shift to no-till as before.
 - a. Tenant pays for burn-down or,
 - b. Tenant pays the landlord a set amount based on cost/return analysis. (This would allow the supplier to continue to bill on a 50-50 basis) or,
 - c. Reduce the harvesting or trucking charges paid by the landlord to the tenant.
- 5. On farms which consist of a mixture of some level, heavy soils and some HEL soils, review the lease with a view toward making changes which should be made regardless of tillage system. Plan to review the arrangement annually after beginning no-till and make appropriate changes.
- 6. On farms with mostly HEL, landlords would be well advised to encourage tenants to change to no-till and consider changes in leases later. Both are likely to have higher returns and meet SCS conservation compliance requirements.
- 7. If a satisfactory 50-50 agreement cannot be reached, consider cash rent. This may have special appeal to older landlords who are ready to give up some of the risk and responsibility of a share lease. A percentage lease might also be considered, 1/3-2/3, for example. Tenants should recognize that a cash or percentage lease involves more risk while, at the same time, providing the opportunity to retain the gains of superior management and innovation.
- 8. Watch for new research results which will help determine the impact of no-till on yields, variability of yields and production costs.

In this Issue	
Results of the Indiana Farm Finance Survey for 1993	Freddie L. Barnard, Kevin T. McNamara and Jeurene Falck
The Agricultural Implications of the North American Free Trade Agreement	Marshall A. Martin
Does No-Till Spark Lease Changes?	J.H. Atkinson

Purdue University is an affirmative action/equal opportunity institution.



Department of Agricultural Economics
 Chris Hurt
 1145 Krannert Building, Room 575
 West Lafayette, IN 47907-1145

Non-profit Organization
U.S. Postage
PAID
 Lafayette, Indiana
Permit No. 221