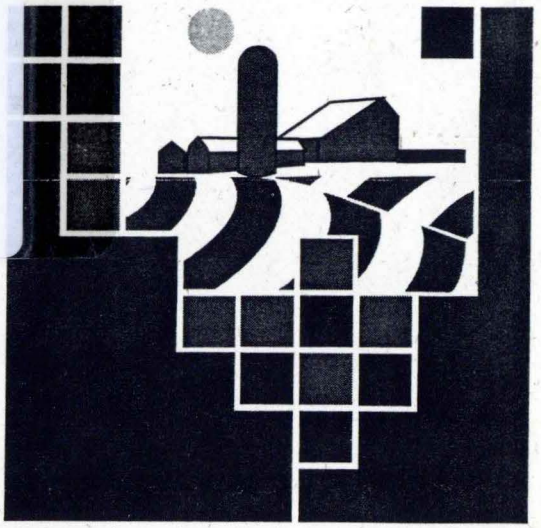

MODEL FARMS DEMONSTRATION PROJECT FINAL REPORT

A Case Study in Promoting Integrated Crop Management

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Iowa's Model Farms Demonstration Project Final Report

A Case Study in promoting Integrated Crop Management

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Introduction

Long-term, voluntary adoption of sustainable practices requires that farmers change some of their fundamental thinking and approaches to management planning and problem solving. The Iowa Model Farms Demonstration Program (IMFDP) was designed to begin encouraging these fundamental changes by providing educational opportunities in an environment where there was continuous dialogue between the farmer and the individual providing assistance; by actively involving farmers in their on-farm decision making, by making farmers aware of what their farming practices were, and what steps were needed in order for practices to be more environmentally benign, yet maintain acceptable production and profit levels.

IMFDP had three Iowa sites where Integrated Crop Management (ICM) services were provided to "cooperator" farmers by professional crop consultants. These three sites were in Kossuth, Sioux, and Carroll-Audubon Counties. The services provided included consultation/advice on overall crop management planning (i.e. pest and nutrient management plans) and assistance with enterprise records, as well as in-the-field services such as soil testing and grid sampling, and scouting for weeds, insects and diseases.

A graduated user fee was established, in which services were provided at no cost to the cooperators involved in year one, but increased in successive years to the level where they were fully self supporting by the end of the three year project. The underlying assumption in the program was that perceived/documented benefit would be sufficient to retain cooperators' interest, who would gradually commit themselves financially to the project.

This report evaluates outcomes of the Model Farms experience for promoting intensive management in several ways; by testing the assumption that opportunities for making refinement do indeed exist, by examining changes made over the projects' three years, and by evaluating retention of producers in the project.

Analysis

Methodology

A case study was conducted, as well as a survey of participants, their neighbors and a random sample of area farmers. Various characteristics of the farm operators, their farm practices, attitudes, and operations inventory were analyzed for significant differences between the groups, at the onset of the project, during the project, and at the projects' end.

In 1989, 188 farmers who initially indicated interest in the project as a cooperator were interviewed. In 1992, 166 of these were interviewed again. During the three years of the Model Farms Demonstration Project, 54 percent of the original participants left the project. For analyses purposes, the group was split between those who remained in the project, and those who did not. The former group will be referred to as 'cooperators', with the latter referred to as 'former cooperators'. A neighbor/random sample of farmers is also included. This analysis includes only those individuals who responded to both the 1989 and 1992 surveys. A total of 74 cooperators, 74 former cooperators, and 262 respondents in the neighbor/random sample were interviewed, providing a response rate of 91%, 78%, and 43% respectively. During the project "replacement" cooperators were recruited in the program. The data analyzed for this report do not include cooperators who joined the project after the first year.

Independent t-tests were performed when comparing the mean differences between the groups. Paired t-tests were performed when analyzing changes within the groups over the three-year time span. Chi-square tests were also performed on selected variables. Statistical significance was set at $p < .05$, and numbers were rounded, which will account for minor differences in various calculations.

Opportunities for on-farm refinements

To test the assumption that opportunities exist for on-farm refinements, a case study of two operators is presented, one operator who remained in the project the entire three years (Farmer #1) as well as one who dropped out of the project after the first year (Farmer #2). For comparative purposes, the two individuals were selected based on three criteria; each resides in the same geographical area and therefore received similar services by the Model Farms crop consultant in that area, each farms at least 360 acres, and neither has livestock operations. While their educational level is similar, the cooperator is older and does not rely on on-farm income as much as the former cooperator (Table 1).

Examination of various farming practices for the two reveals striking differences in management techniques and changes made since 1989, the year both operators became involved in IMFDP. Changes in nitrogen rates/acre made from 1989 to 1992 were examined. The cooperator decreased his rate by 50 pounds while the former cooperator increased his rate of nitrogen by 16 pounds. In 1992, the cooperator not only uses an average of 36 pounds less nitrogen/acre, but also varies this rate by field, based on corn suitability ratings, and takes nutrient credit from legumes. The former cooperator does not vary nitrogen rates.

Changes in pesticide management since 1989 also differed distinctly between the two. The cooperator made several positive changes towards ICM. These changes included a decrease in use of 'restricted use' products, increase in use of post-emergence products, banding of herbicides, scouting before treatment, and using less than 'label' rates. The cooperator also indicated he increased his use of spot treating rather than broadcasting, and chose a less toxic product and decreased rate applications. The former cooperator made only one change which could be deemed a component of ICM, an increase in use of post-emergence herbicide products.

Through open-ended comments on the benefit of record keeping, the analysis reveals the cooperator recognizes the importance of maintaining records (the former cooperator does not keep detailed records), the economic benefits of doing so, and their usefulness to intensive management. This difference in management style is also apparent in the cooperators' attitude towards several items; with his agreeing that he 'would like to use some means other than chemicals to protect crops from weeds, insects and diseases', and that 'costs saved from detailed farm records are worth the added time and effort'. The former cooperator disagrees with the first statement, and is undecided on the latter.

An estimated increase in profit was calculated by the consultant. The figure is based on practices and products/product quantity the farmer was using at the beginning of the project. Increased profit is defined as reduced cost and improved use of product. Included are costs of nitrogen, phosphorous and potassium, and herbicide and tillage practices. The consultant estimated that the cooperator's profit increased by $11,002 over the life of the project due to ICM changes. The same consultant estimated total ICM related increase in profit for the former cooperator to be only $2,354, a less positive impact on profit, although there was potential for considerably more changes to increase profits. There are

several possible reasons for this. Perhaps the former cooperator did not remain in the project long enough to see the potential for increased economic benefits, and/or he was reluctant to make changes in the management of his farm operation. As one might expect, the cooperator believes the economic benefits of the program were worth the added time and effort. In contrast, the former cooperator left the program after the first year (before a user fee was implemented), stating he could not afford the service and his present practices/equipment were too inflexible to remain in the project.

Opportunities for on-farm refinements clearly existed for both the cooperator and former cooperator. The consultant saw major opportunities for improvement with both operators, yet these opportunities were not always taken. While this comparison contains only one individual from each group, these individual responses are illustrative of those in their respective groups, especially when examining changes made and attitudes maintained.

Changes within the groups from 1989 to 1992

The analysis now examines the second question posed; were changes made over the lifetime of the project? This analysis uses the survey data and the discussion focuses on changes made within all three groups (cooperators, former cooperators, neighbor/random sample) between 1989 and 1992, primarily examining cooperators compared to former cooperators and the neighbor/random sample.

The groups were first examined for significant differences at the start of the project (1989—see Appendix). At the onset of the Model Farms Project, no significant differences existed between cooperators and former cooperators with respect to acres farmed and livestock operations. Two significant differences existed between cooperators and the neighbor/random sample, with cooperators having larger operations and farming more corn acres. Cooperators were significantly younger and had been involved in farming fewer years than the former cooperators and neighbor/random sample respondents. Cooperators also relied on off-farm income more, and held a higher level of education.

In examining selected farm practices, cooperators used higher rates of nitrogen per acre than the others on their corn after soybeans and corn after corn rotations. Little difference in record keeping and pesticide practices were found in 1989 among the groups. Forty-one percent of the neighbor/random sample indicated they kept detailed records, compared to 37% of cooperators and 30% of former cooperators. Cooperators were the most knowledgeable about IPM, with 85% indicating they had

heard of this approach, compared to 81% of former cooperators and 57% of the neighbor/random sample, the only statistically significant difference between the three groups.

There were also few differences among the groups on the attitudinal items. Therefore, the overall analysis reveals that in 1989 the groups' farming and operator characteristics were similar on almost all items. We now turn to changes made within and among the groups over the three year time span.

Analysis of the groups on farmland inventory reveals consistency on changes made during the life of the project (Table 2). Corn for grain acres increased for all three groups, significantly for cooperators and the neighbor/random sample. Soybean acres also increased for all three groups, significantly for former cooperators. Corn and soybean yields increased significantly for all groups during the three years. Oat and wheat acres decreased significantly for cooperators in the three year time span. No significant changes occurred among the groups' livestock operations from 1989 to 1992.

Nitrogen rates/acre on corn/soybean and corn/corn rotations were also examined (Table 3). While rates decreased for both cooperators and the neighbor/random sample on their rotations, the only significant decrease occurred on cooperators' corn/soybean rotation. Former cooperators significantly increased their use of nitrogen on corn after corn.

Respondents were asked about changes they made in pesticide management since 1989 (Figure 1). Consistently, cooperators reported a larger increase over the other two groups in the use of several ICM practices: scouting before treatment, spot treating rather than broadcasting, use of post-emergence herbicide products, using less than "label" rates, and use of banding. The largest reported percentage increase was for cooperators in scouting before treatment (72%). These differences between the three groups were statistically significant based on chi-square.

Large differences were also revealed between the groups with regards to record keeping practices, another ICM component (Figure 2). Forty-six percent more cooperators in 1992 indicated they keep detailed records. This compares to 30% more former cooperators, and 8% more in the neighbor/random sample moving in that same direction since 1989. Again, differences between the three groups were statistically significant based on Chi-square analysis.

Mean changes in selected attitude items from the three year time span were analyzed (Table 4). Out of the three items presented, cooperators had one significant change, increasing their agreement that agricultural pesticides, if used as directed, are not a threat to the environment. Former cooperators made two significant changes from 1992, increasing their level of agreement that savings made in more precise applications are not worth the added time and effort, while disagreeing more with the statement they 'would like to use some means other than chemicals to protect crops from weeds, insects and diseases'. The neighbor/random sample had no significant changes on their attitudes over the three years.

A significant decrease in proportion of net family income derived from farming occurred in all three groups, from 1989 to 1992 (Table 5).

In the three years, where did the significant changes occur, and with which groups? Operator and farm characteristics changed in similar patterns among all three groups. However, significant changes did take place with ICM, and attitudes towards these practices. While the differences between the groups was minimal in 1989, at the end of the project, differences in these ICM practices were statistically significant. Cooperators were the only group to significantly decrease their rate of nitrogen/acre, and make positive changes in all pest management and record keeping practices consistent with ICM. Changes in former cooperator' attitudes over time are also significant. While in 1989 this group was more favorable to the statement that savings made in more precise fertilizer/pesticide applications was worth the added time and effort, in 1992 they disagreed with this statement. As a group they also disagreed much more in 1992 that they would like to use some means other then chemicals to protect crops from weeds, insects and diseases.

This change in attitude may provide an explanation to the third question posed; why did 54 percent of the original cooperators choose to no longer participate in the project? Both the qualitative and quantitative indicators discussed earlier provide some explanation for this. Assessment of IMFDP also lends some clues. Former cooperators were asked to indicate their reasons for no longer wishing to be involved in the project. The two primary reasons cited were economically related. Sixty-four percent indicated they did not see an economic benefit to being in the project, and 62 percent indicated they could no longer afford the service. This perception of the economic benefit of the project differs

distinctly from the cooperators, 77 percent of whom indicated the economic benefits of the program were worth the added time and costs.

Through examination of the case study, it appears that recognition of the opportunities for on-farm refinements and the economic benefits of making these refinements were primary motivators for the cooperator in their choosing to remain in the project, even as user fees increased. The importance of record keeping in assisting with making these refinements was also noted by cooperators. When asked how they have benefited from keeping field based, cost of production yield, and profit information, many responses were similar to those given below:

"Am able to make more precise decisions."

"Can make better decisions in management practices."

"Gives me better management decisions on both purchasing and management practices."

These cooperators have identified the association between several factors; opportunities for on-farm refinements, intensive management, the importance of record keeping, and the economic benefits of utilizing these practices.

Discussion and Conclusion

IMFDP provided an environment of continuous dialogue between the project crop consultant and individual producer. The crop consultant assisted in revealing opportunities for on-farm refinements, and provided the interpretation and analysis necessary for successful changes. The survey data suggests that these changes led to increased profit levels for cooperators. This increase in profit was clearly a motivating factor keeping them in the project, and reveals the success this continuous dialogue has over passive educational programs. Through the use of a professional crop consultant, cooperators were able to use more farm generated information, and, as a result, see opportunities for, and make definitive changes in parts of their operation.

Two years after the project's end, interest is still high and the cooperators have hopes for continuation of this type of intensive management assistance. In a 1995 follow-up phone survey with the cooperators, 97 percent indicated they currently practice ICM on their farm. Ninety-one percent indicated they would like to be contacted if another ICM program is initiated, and 55 percent indicated they would be willing to pay $3.00 per acre to continue receiving ICM assistance. This implies the cooperators are still identifying an economic benefit to this type of assistance. These results reveal the incremental fee approach used in Model Farms was a successful incentive program.

We are left with several questions. Why did some producers' accept the consultant's advice (with apparently successful results), while others did not? Perhaps the consultants did not accurately recognize constraints of the former cooperators. If so, what are these constraints and how can they be removed? Perhaps the former cooperators did not fully understand the potential for increased profits. If so, why did this occur and how can it be changed? For some producers, it will take more than one year's involvement in an ICM project for the benefits to materialize. How do we encourage 'sticking with it'? More detailed analysis, which this data could not provide, may lend some answers to these questions.

Many factors at the national and global levels are contributing to the demise of the farm economy and the environment. But responsibility of this also lies with the producer, who must find a satisfactory method of handling the management intensiveness of the farm operation. Several farmer types emerge from this analysis; those who view intensive management as economically and environmentally beneficial, and are willing to learn refined management concepts and/or pay for assistance with this management, purchasing it as they would any other input. These producers are open and ready for change. Others will never acknowledge that perhaps they need assistance in the area of intensive management (and perhaps some do not), and therefore will not seek training nor purchase assistance. Some may seek other advice, or seek out this advice once structural barriers have been removed. However, for those who do, it appears intensive management; whether learned through a project such as Model Farms or provided by crop consultants, will be a successful technique for surviving in what has become a tumultuous agricultural environment.

Tables

Table 1. Case Study Comparison of Cooperator and Former Cooperator

	Farmer # 1 (cooperator) remained in program three years	**Farmer # 2 (former cooperator)** dropped out after one year in program
Farm Operation Characteristics		
• Acres farmed	360	360
• Acres owned	0	0
• Livestock	No livestock	No livestock
• 1989 N rate on corn after soybeans	160	130
• 1992 N rate on corn after soybeans	110 (varies rates by field, based on CSR, credit from legume)	146 (does not vary rates by field)
• 1989 N rate on corn after corn	175	No corn/corn rotation
• 1992 N rate on corn after corn	140	
Farm Operator Characteristics		
• Age	47	28
• Years farming	16	4
• Education level	College graduate or more	College graduate or more
• Employment off farm	Spouse held part-time job	Did not work off farm
• % of income from farm	40%	100%
Changes in Pesticide Management since 1989:		
• Use of "restricted use" pesticide products	Decreased	No change
• Use of post-emergence herbicide products	Increased	Increased
• Use of commercial applicators	No change	No change
• Use of banding	Increased	Decreased
• Scouting before treatment	Increased	No change
• Using less than 'label' rates	Increased	No change
Changes in farming operation since 1989 as a result of scouting:		
• Use of spot treating rather than broadcasting	Increased	No change
• Change in rate application	Decreased	No change
• Use of rotary hoe/cultivator	No change	No change
• Choose a less toxic product	Increased	No change

Table 1. Case Study Comparison of Cooperator and Former Cooperator *(continued)*

	Farmer # 1 (cooperator) remained in program three years	**Farmer # 2 (former cooperator)** dropped out after one year in program
Record keeping		
• Keep detailed, field based, cost of production and profit information	Yes (have benefited from keeping these records by *"better appreciation of true cost so can control cost"*, will continue keeping records *"to save money"* and *"help me manage my inputs"*)	No
Attitudinal items		
I'm confident that agricultural pesticides, if used as directed, are not a threat to the environment	Strongly Agree	Strongly Agree
We already have too much regulation on the use of agricultural pesticides	Agree	Agree
I worry about the quality of my drinking water	Disagree	Agree
For me, the savings made in more precise fertilizer or pesticide applications are not worth the added time and effort	Disagree	Disagree
I would like to use some means other than chemicals to protect crops from weeds, insects and diseases	Agree	Disagree
Costs saved from detailed farm records are worth the added time and effort	Agree	Undecided
A project such as Model Farms is best administered through the Extension Service, or another public sector agency	Agree	Agree
Although manure has significant nutrient value, the cost of utilizing this may outweigh the return	Strongly Disagree	Agree

Table 1. Case Study Comparison of Cooperator and Former Cooperator *(continued)*

	Farmer # 1 (cooperator) remained in program three years	**Farmer # 2 (former cooperator)** dropped out after one year in program
Increased Profit	$11,002	$2354
Model Farms Assessment	Responded 'yes'	Reasons dropped out
	• Would participate again as a cooperator. • Would recommend the program to other farmers • Economic benefits of the program worth the added time and costs. • Staff well informed in areas needed. • Learned enough from program to continue ICM on own.	• I can no longer afford the service. • My present practices/equipment are too inflexible
	What practices or services are you likely to continue as a result of Model Farms?	Individual service elements willing to continue to pay for:
• Scouting at Model Farms Frequency	No	NA
• Regular but less frequent scouting	Yes	Yes
• Soil testing by soil type	Yes	No
• Paid consultant on nutrient or pest management	Yes	No
• Assistance with enterprise records and overall farm management planning	Not Sure	No

Table 2. Farmland Inventory: 1989 to 1992

	1989	1992	Mean Difference
Total Acres			
Cooperators (n=74)	517.5	541.8	24.3
Former Cooperators (n=74)	494.8	502.9	8.1
Neighbor/Random (n=261)	403.1	415.0	11.9
Total acres owned			
Cooperators (n= 48)	267.2	259.8	-7.4
Former Cooperators (n=59)	256.0	287.6	31.6
Neighbor/Random (n=147)	185.3	168.8	-16.5
Total acres rented			
Cooperators (n=61)	368.6	394.8	26.2
Former Cooperators (n=57)	358.4	332.8	-25.6
Neighbor/Random (n=181)	320.2	310.1	-10.1
Corn for Grain Acres			
Cooperators (n=72)	240.9	271.0	30.1*
Former Cooperators (n=74)	236.7	252.3	15.6
Neighbor/Random (n=255)	182.1	208.0	25.9*
Corn Yield			
Cooperators (n=72)	142.8	161.9	19.1***
Former Cooperators (n=71)	142.5	160.1	17.6***
Neighbor/Random (n=251)	138.4	158.8	20.4***
Soybean Acres			
Cooperators (n=70)	190.3	203.9	13.6
Former Cooperators (n=72)	175.1	196.5	21.4**
Neighbor/Random (n=225)	161.6	169.3	7.7
Soybean Yield			
Cooperators (n=72)	44.4	47.9	3.5***
Former Cooperators (n=71)	45.0	49.0	4.0***
Neighbor/Random (n=238)	42.8	45.2	2.4**
Oat/Wheat Acres			
Cooperators (n=21)	27.2	19.0	-8.2*
Former Cooperators (n=20)	28.4	19.0	-9.4
Neighbor/Random (n=33)	22.3	24.2	1.9

* $p < .05$
** $p < .01$
*** $p < .001$

Table 3. Nitrogen Management Practices: 1989 to 1992

Rate of Nitrogen/Acre on:	1989	1992	Mean Difference
Corn after soybean			
Cooperators (n=66)	119.2	113.8	-5.4*
Former Cooperators (n=71)	115.4	117.3	1.9
Neighbor/Random (n=218)	120.0	114.8	-5.2
Corn after corn in crop rotation			
Cooperators (n=34)	143.7	141.3	-2.4
Former Cooperators (n=32)	126.8	138.3	11.5*
Neighbor/Random (n=63)	141.0	139.7	-1.3

* $p < .05$

Table 4. Comparison of Attitude Items: 1989 to 1992[1]

		Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree	Mean	Mean Diff.
		Percentages						
I'm confident that agricultural pesticides, if used as directed, are not a threat to the environment								
Cooperators (n=74)	1989	1	24	15	50	10	3.4	
	1992	*1*	*11*	*19*	*51*	*18*	*3.7*	0.3**
Former Cooperators (n=72)	1989	3	19	11	58	8	3.5	
	1992	*1*	*19*	*23*	*51*	*5*	*3.4*	-0.1
Neighbor/Random (n=261)	1989	8	26	10	45	12	3.3	
	1992	*2*	*23*	*14*	*53*	*9*	*3.4*	0.1
For me, the savings made in more precise fertilizer or pesticide applications are not worth the added time and effort								
Cooperators (n=74)	1989	38	45	10	7	1	1.9	
	1992	*36*	*51*	*5*	*5*	*1*	*1.8*	-0.1
Former Cooperators (74)	1989	40	49	5	5	0	1.8	
	1992	*8*	*68*	*8*	*16*	*0*	*2.3*	0.5***
Neighbor/Random (n=262)	1989	22	48	10	15	4	2.3	
	1992	*13*	*60*	*14*	*12*	*1*	*2.3*	0.0
I would like to use some means other than chemicals to protect crops from weeds, insects and diseases								
Cooperators (n=74)	1989	0	10	15	57	19	3.8	
	1992	*0*	*12*	*23*	*47*	*18*	*3.7*	-0.1
Former Cooperator (n=74)	1989	0	4	14	65	18	4.0	
	1992	*4*	*18*	*20*	*53*	*5*	*3.4*	-0.6***
Neighbor/Random (n=262)	1989	1	6	14	66	12	3.8	
	1992	*1*	*9*	*18*	*58*	*15*	*3.8*	0.0

** $p < .01$
*** $p < .001$

[1]Based on Likert scale where 1 = Strongly Disagree to 5 = Strongly Agree

Table 5. Operators' Characteristics: 1989 to 1992

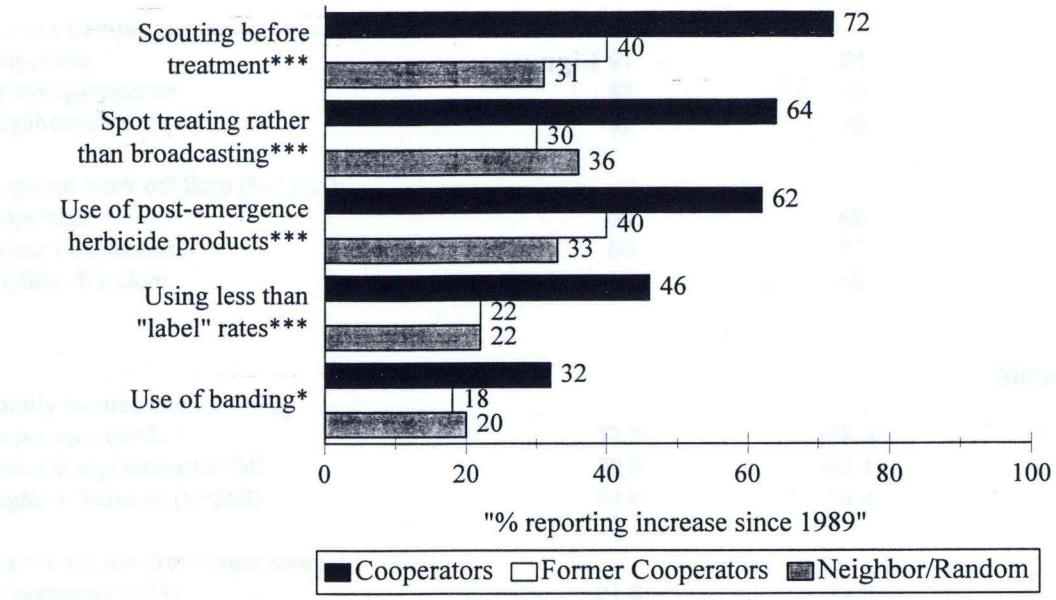
	1989	1992	% Difference
% Indicating farming is primary occupation			
Cooperator	91	84	-7
Former Cooperator	82	76	-6
Neighbor/Random	82	76	-6
You or spouse work off farm (% 'yes'):			
Cooperator	60	68	8
Former Cooperator	60	57	-3
Neighbor/Random	56	60	4
			Mean difference
% net family income from farming			
Cooperators (n=73)	77.2	68.0	-9.2*
Former Cooperators (n=74)	79.9	67.1	-12.8*
Neighbor/Random (n=260)	84.0	76.4	-7.6***
% net family income from other sources			
Cooperators (n=73)	21.8	22.8	1.0
Former Cooperators (n=74)	18.4	22.4	4.0
Neighbor/Random (n=260)	16.0	19.0	3.0

* $p < .05$
*** $p < .001$

Figures

Figure 1.

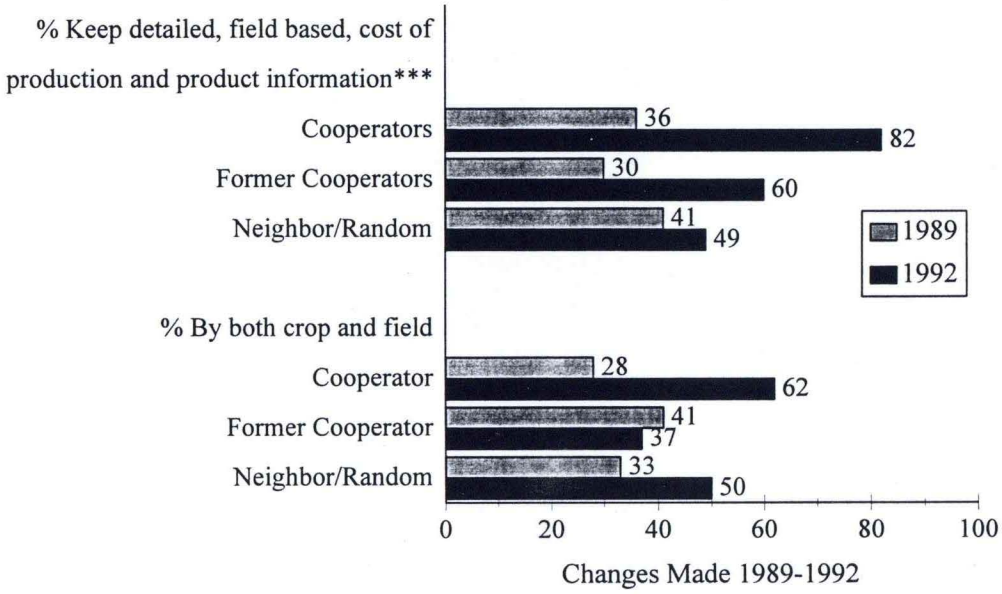
Pesticide Practices



* Significant at $p < .05$
*** Significant at $p < .001$

Figure 2.

Record Keeping



*** Significant at $p < .001$

Appendix

Summary characteristics of 1989 survey data

	Cooperators (n=74)	Former Cooperators (n=74)	Neighbor/ Random (n=262)	Mean Difference[1]	Mean Difference[2]
Acres					
Total acres farmed	517.5	494.8	402.2	-22.7	-115.3
Total owned	278.3	255.3	189.1	-23.0	-89.2***
Total rented	364.5	341.9	315.4	-22.6	-49.1
Corn acres	240.9	236.7	180.4	-4.2	-60.5*
Corn Yield	142.7	142.6	144.3	-0.1	1.6
Soybean acres	190.3	175.8	159.3	-14.5	-31.0
Oats/wheat acres	25.3	22.6	23.5	-2.7	-1.8
Age	41.5	44.6	45.5	3.1	4.0***
Years in farming	19.2	22.2	23.2	3.0*	4.0***
Income					
Percentage from farm	77.2	79.9	84.0	2.7	6.8*
Percentage from other sources	21.8	18.4	16.0	-3.4	-5.8
Nitrogen Usage (lbs/acre)					
Corn after soybeans	119.9	118.0	119.6	-1.9	-0.3
Corn after corn	143.6	130.6	139.6	-13.0	-4.0
Education					
Some high school	4	10	14		
High school graduate	38	49	51		
Vocational school	7	6	9		
Some college	18	17	18		
College graduate or more	34	18	8		
Keep detailed, field based, cost of production and profit information					
Yes	37	30	41		
No	63	70	59		
Heard of Integrated Pest Management (IPM)					
Yes	85	81	57		
No	15	19	43		
Do you systematically scout and count insect infestation levels?					
Yes	45	44	35		
No	55	56	65		

* $p < .05$
*** $p < .001$

[1] Mean Difference between cooperators and former cooperators.
[2] Mean Difference between cooperators and neighbor/random sample.

Summary characteristics of 1989 survey data[1] *(continued)*

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree	Mean	Mean Diff.✧
I'm confident that agricultural pesticides, if used as directed, are not a threat to the environment							
Cooperators (n=74)	1	24	15	50	10	3.42	
Former Cooperators (n=72)	3	19	11	58	8	3.50	0.08
Neighbor/Random (n=262)	8	26	10	45	12	3.30	-0.12**
For me, the savings made in more precise fertilizer or pesticide applications are not worth the added time and effort							
Cooperators (n=74)	38	45	10	7	1	1.89	
Former Cooperators (n=74)	40	49	5	5	0	1.76	-0.13
Neighbor/Random (n=262)	22	48	10	15	4	2.30	0.41
I would like to use some means other than chemicals to protect crops from weeds, insects and diseases							
Cooperators (n=74)	0	10	15	57	19	3.85	
Former Cooperators (n=74)	0	4	14	65	18	3.96	0.11*
Neighbor/Random (n=262)	1	6	14	66	12	3.80	-0.05

* $p < .05$
** $p < .01$

[1]Based on Likert scale where 1 = Strongly Disagree to 5 = Strongly Agree

✧First Mean Difference is between cooperators and former cooperators.
Second Mean Difference is between cooperators and neighbor/random sample.