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ECONOMIC IMPACTS OF THE CROP MANAGEMENT PROGRAM ON WESTERN NEW YORK DAIRY PRODUCERS

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ABSTRACT

The Crop Management Program has been in existence in Chautauqua and Cattaraugus County in New York State since 1983. This Program, which compliments Integrated Pest Management techniques, is designed to use crop inputs as efficiently as possible by scouting fields, monitoring crop records, and using past information on fields. In this analysis, we tried to determine how this program impacts crop production economically. Economic impacts found in this program were most evident for fertilizer costs; Chautauqua County had a $9 per acre decrease while Cattaraugus County had a $6 per acre decrease. Input costs decreased in both counties with the exception of chemical costs which increased in Cattaraugus County. This increase may be explained partially by shorter crop rotations. Dairy Farm Business Summary (DFBS) records were compared to Crop Management records to see if DFBS records could serve as a substitute for missing information. That comparison showed a difference of 20 percent; therefore, DFBS records were not used. Although yield effects and comparisons could not be quantified, Crop Management producers have experienced a trend of lower input costs since 1984.

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By
Joanne Waldorph and William Lazarus*

INTRODUCTION

Falling milk prices and rising fertilizer and fuel costs in the early 1980's prompted dairy producers to look for alternative management methods in order to deal with declining profits. Extension personnel in New York State recognized this problem and organized a series of "Cost-Price Squeeze" seminars to provide dairy producers with information to help them survive the increased input costs and falling milk prices. From these workshops came the idea to start a Crop Management Program in New York State (NYS).

The Crop Management Program was implemented in 1983 in Chautauqua and Cattaraugus Counties through the efforts of Andy Dufresne (Program Leader for Farm Management in Chautauqua County) and John Deibel (formerly Program Leader for Farm Management in Cattaraugus County and now manager of the Southwest New York Crop Management Association), and Joan Petzen (Program Leader for Farm Management in Cattaraugus County). Originally, the purpose of this program was to improve the management of crop production by keeping records for each field throughout the growing season. Each record includes a field by field account of input costs and applications. This record keeping method provides the Crop Management Associates and farmers with a case history on each field to help producers assess problems more efficiently and to keep track of how much they are producing (Deibel 1985).

After the first year of this project, the Statewide Integrated Pest Management Program (IPM) appropriated funds for the employment of field scouts. The purpose of IPM's funding was to promote their philosophy of limiting the number of applications of chemicals such as pesticides, fertilizers, etc. in order to preserve the quality of the environment. The IPM approach tries to accomplish this in two ways: 1) judicious use of agricultural chemicals by only applying them when necessary, and 2) when possible, avoid agricultural chemicals by using alternative pest control methods (Apple and Smith 1975). To use these two methods, fields need to be scouted on an individual basis so specific problems can be identified and treated in a timely manner.

Today, the Crop Management Program has evolved into a Crop Management Information System. This approach evaluates past crop records and combines these findings with current research information to assist in evaluating each producers present crop situation. According to Hehnan and Waldron(1987), this approach, supported by more complete data, gives a producer a more complete picture of their field crop situation, therefore, improving the

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probability of selecting the best management option. This type of approach can be very helpful because it looks at many factors that may affect field crop production.

This approach encompasses economic data with crop production data giving a total farm analysis of the producer's crop production therefore heading off potential problems and increasing the potential of making the best use of available resources.

PURPOSE AND OBJECTIVES

The purpose of this analysis is to analyze and document the economic impacts of the Crop Management Program for Chautauqua and Cattaraugus Counties. Since the Crop Management Program follows IPM philosophies of monitoring and managing fields on a individual basis, i.e. examination of economic impacts would be a preliminary analysis of the economic impacts of IPM in New York State field crops. According to preliminary analyses by John Deibel (1985) and Andy Dufresne, the efficiency of Crop Management Programs can be seen by reductions in input costs and increases in net returns. These findings support previous economic research (Virginia CES 1987) which states that IPM programs reduce input costs.

The impacts of this program were measured in three ways:

1. Analysis of input costs of fertilizers, lime, seed, and chemical sprays because these inputs would be affected by a scouting approach.

2. Comparison of crop yields to determine if timely treatment of field problems has an effect on crop yields.

3. Examine changes in net returns between Non-Crop and Crop Management farms to estimate the possible economic benefits of the Crop Management Program.

Changes in crop costs, net returns, and yields give an indication of the economic benefits other producers may expect from utilizing a Crop Management Program. Reducing crop costs would support IPM theories that monitoring fields lowers input costs. Deibel(1985) and Waldron(1986) state that Crop Management Programs improve crop quality and yields. The actual benefit of lowered costs and better yields should result in a higher net return than received by producers who do not use IPM practices.

METHODOLOGY

The analysis is divided into three sections. The first section is the comparison of the input costs for Dairy Farm Business Summary (DFBS) versus the Crop Management Program. The second section involves comparing input expenses from the Crop Management Program by year and by crop. The third section is the breakdown of input expenses for length of rotation.

Data for the Crop Management Program were obtained from Chautauqua and Cattaraugus Counties. Since the program is very new, methods to collect and record data have only recently been defined. For this reason, only two years of data and few farms were available from both counties. Data were available from Chautauqua County for 1985 and 1986 and from Cattaraugus County in 1984 and 1986. Farms that were in the program for the years indicated totaled 12 for Chautauqua and 4 for Cattaraugus County.

The economic impacts in this analysis exclude yield effects and focus only on crop input costs and their effect on net returns. Yields were not included because producers can only estimate what they harvest since yields usually are unrecorded. Without yield information, the impacts of the Crop Management Program on crop quality and yield can only be estimated by subtracting input costs from revenues received from milk and crop sales. Although prices will vary from year to year, the main consideration is how the net returns from non-Crop Management farms might compare to the net returns from Crop Management farms.

Milk and crop sales are not recorded in the Crop Management Program; therefore, they were obtained from DFBS records (Lazarus and Putnam, 1986). DFBS records were chosen because the DFBS program is the closest source of benchmark data to compare to the Crop Management program.

DFBS is a recordkeeping program in New York State which has been in existence since the 1950's. DFBS differs from the Crop Management Program since DFBS records crop input expenses on a per farm basis instead of separating costs field by field. DFBS records do include overall crop yields, however, these yields may also suffer from yearly differences and estimation errors.

Comparing Crop Management farms to non-Crop Management farms are accomplished by using DFBS records. Obtaining crop input information from farms not involved in a record keeping program is extremely time consuming and difficult. Therefore, farms participating in the DFBS but not in the Crop Management program were chosen as a replacement.

Comparisons between DFBS and the Crop Management Program

Farms involved in both programs were used to determine the difference between Crop Management figures and DFBS figures. Input costs for both programs should be the same; however, it is possible that they are not because each program calculates input costs by different methods. If the difference in input costs is large, data from the DFBS can not be substituted for missing data in the Crop Management records.

Farms which participated in the Crop Management Program and the DFBS program totaled 12 in 1985 for Chautauqua County and 11 in 1986. Cattaraugus County had only two farms for years 1984 and 1986. Input costs from each county are averaged for all farms. The yearly average is subtracted to determine the difference between the mean cost from each program. This difference is divided by the average yearly input cost from the DFBS. This value is multiplied by 100 to get the percent difference.

Input costs were also compared by average absolute value difference. The absolute value difference was calculated since DFBS and Crop Management farms were paired. A pair consists of DFBS input cost figures and Crop Management input cost figures for the same farms. The following equation was used to calculate this difference:

$$|((A_i - B_i)|/N = M$$

A_i = The cost for an individual farm from the DFBS records

B_i = The cost for an individual farm from the Crop Management records

N = Number of farms

M = The averaged absolute value difference

The percent difference for the number represented by M is calculated by dividing the sum for each input cost from the average DFBS cost. The equation is:

$$(M/E)*100 = D$$

E = The average DFBS cost over all DFBS farms

D = The percent difference for the absolute value

The mean difference and the absolute average difference is figured for each input cost for each year.

Comparison by Year and Crop

Input costs from the Crop Management Program records were broken down by crop and year. The input costs examined were fertilizer, lime, seed, chemicals, and other costs. These input costs were broken down into crop categories of hay (alfalfa, grasses, birdsfoot trefoil, clover, etc. and mixes with grass and alfalfa), new seedings, corn, and other forages (oats, wheat, barley).

Input costs for each of these crops were calculated by weighting averages by acreage. All input costs were adjusted to 1986 prices so changes in costs could be attributed to changes in the amount of inputs applied instead of shifts in prices. Prices were adjusted by multiplying the per acre costs by the ratio of the 1986 price index over the index for the year of the per acre cost. The equation is:

$$\text{(Per acre cost of input)} * \frac{\text{1986 input index}}{\text{(year of input index)}}{\text{(input index for year of cost)}}$$

These price indexes were obtained from the New York Crop Reporting Service (1986).

Crop Rotations

Crop rotations in this analysis are defined as the number of years that a particular crop is grown on the same field. Crop rotations are shortened to reduce the fertilizer usage for corn production and to reduce pest problems. According to Deibel (1988), shortening rotations can reduce pest problems and improve soil fertility often with a minimal number of chemical applications.

This section examines if increased pesticide costs are due to shortened crop rotations. Shorter rotations may increase chemical spray costs initially due to the required use of more expensive herbicides which do not carry over in the soil to the next year.

Input costs were averaged and divided by the number of farms. The per acre and per farm cost were calculated for number of years each crop category has been grown on the same field.

RESULTS AND DISCUSSION

Results and discussion are divided into three sections. The first section is a comparison of crop input expenses for DFBS and the Crop Management Program. The second section compares input expenses among crop type and years for Cattaraugus County and Chautauqua County. The third section compares Chautauqua County data by crop rotation.

Comparison of DFBS and the Crop Management Program

Input cost data from DFBS should be similar to Crop Management figures. The difference between the two programs is the method they use to calculate those figures. DFBS calculates the total dollar amount for the whole year minus the change in input inventories while the Crop Management Program calculates costs by the amount applied for each field. The Crop Management Program method has the potential for introducing error since more calculations are required. The DFBS method introduces error because yearly costs are sometimes estimated or not calculated correctly from farm expenses. Farm expenses often have inputs combined so producers may not always record them correctly.

Chautauqua County

Chautauqua County Crop Management cost records varied substantially from DFBS cost records for 1985 and 1986 (Table 1). Percentage differences in 1985 were close to 30 percent. The range of percent differences for individual farms were widespread in both years. Widespread ranges show that DFBS figures and Crop Management figures are quite different.

The largest variation from DFBS records occurred with sprays and other costs. The average difference in the 1985 per farm cost for this input was only 5%; however, absolute average differences among farms were at 93 percent (Table 1). This latter calculation indicates when the same farms are compared by both methods their cost figures do not match.

Similarities among costs figures did not improve in 1986. Average cost differences increased to more than 20% and the same was true for the absolute value difference. With percentage differences close to 20% or more rejects the possibility that DFBS data can be used to replace missing Crop Management data.

Cattaraugus County

Similar conclusions occurred in the Cattaraugus County analysis. The percent difference for total crop expenses in 1984 was 9% and in 1986 the percent difference was 21% (Table 2). A percentage difference of 9% is more reasonable than the figures from Chautauqua County; however, this percent is still high. When compared to the results of the average absolute difference, cost figures differ by 18 percent in 1984 and 21% in 1986.

The input expenses in this county did not exhibit low percent differences between the two programs for either year. Fertilizer and lime costs in 1984 and 1986 had percent differences greater than 2 percent. The average absolute difference for these inputs increased by almost 10 percent. Sprays and other costs had a difference and absolute value difference of 66% and 44% for 1984 and 1986 respectively. DFBS records from this county cannot replace Crop Management records.

Table 1. Comparison of Crop Expense Data From Dairy Farm Business Summaries and Crop Records, Chautauqua County, 1985 and 1986

	Average Per Farm				Percent Difference on Individual[d] Farms - Range	Absolute Value Averaged from All Farms[c]	
	DFBS	Crop Records	Difference[a]	Difference as Percent of DFBS[b]		Difference From DFBS	Difference Percent of DFBS
1985	(A)	(B)	(C)	(D)			
Farms (no.)	12	12					
Tillable Acres	272	261					
Fertilizer & Lime	9,613	7,934	1,700	18	(93) - 52	3,631	38
Seeds & Plants	3,876	3,010	866	22	(49) - 79	1,417	36
Spray & Other Crop	3,450	3,640	(190)	(9)	(17) - 86	3,229	93
Total Crop Expenses	16,839	14,584	2,255	13	(1) - 56	5,778	42
1986							
Farms (no.)	11	11					
Tillable Acres	274	275					
Fertilizer & Lime	8,928	6,158	2,776	31	3 - 50	2,755	31
Seeds & Plants	4,280	3,124	1,156	27	(1) - 59	1,156	27
Spray & Other Crop	3,504	2,214	1,290	37	(3) - 93	1,279	36
Total Crop Expenses	16,712	11,496	5,216	31	5 - 54	5,190	31

[a](A-B)

[b](C x 100/A)

[c]The absolute value for individual farm differences are summed and divided by number of farms. The percent difference is figured by dividing the absolute value difference from the averaged DFBS figure in column (A).

[d]Parentheses represent negative numbers.

Table 2. Comparison of Crop Expense Data From Dairy Farm Business Summaries and Crop Records, Cattaraugus County, 1984 and 1986

	Average Per Farm				Percent Difference on Individual[d] Farms - Range	Absolute Value Averaged from All Farms[c]	
	DFBS	Crop Records	Difference[a]	Difference as Percent of DFBS[b]		Difference From DFBS	Difference Percent of DFBS
1984	(A)	(B)	(C)	(D)			
Farms (no.)	2	2					
Tillable Acres	260	258					
Fertilizer & Lime	6,112	7,912	(1,800)	(29)	(11) - 50	1,799	29
Seeds & Plants	3,412	3,931	(519)	(15)	(3) - 50	647	19
Spray & Other Crop	5,613	1,918	3,695	66	32 - 70	3,695	66
Total Crop Expenses	15,137	13,761	1,376	9	14 - 21	2,800	18
1986							
Farms (no.)	2	2					
Tillable Acres	191	183					
Fertilizer & Lime	4,303	3,410	893	21	13 - 49	1,401	32
Seeds & Plants	2,869	2,934	(65)	(2)	(25) - 26	733	25
Spray & Other Crop	2,555	1,348	1,207	47	20 - 65	1,206	47
Total Crop Expenses	9,727	7,692	2,035	21	6 - 32	2,035	21

[a](A-B)

[b](C x 100/A)

[c]The absolute value for individual farm differences are summed and divided by number of farms. The percent difference is figured by dividing the absolute value difference from the averaged DFBS figure in column (A).

[d]Parentheses represent negative numbers.

Comparison by Crop Category

Only Crop Management recorded expenses were compared by crop categories since DFBS figures did not compare to Crop Management figures. Comparisons by crop cateogry were performed to understand what field crops may influence changes in input costs. The categories were hay and haylage, newly seeded fields, corn silage, ear corn, dry shelled corn, and other forages (barley, oats, wheat).

Chautauqua County

Total crop expenses for Chautauqua County fell $4,476 per farm from 1985 to 1986 (Table 3). A drop in per acre costs of fertilizer and chemical sprays for the county contributed to the fall in total crop expenses. Fertilizer costs fell $9 per acre producing a $2,671 drop per farm and chemical costs fell $5 per acre lowering chemical costs $769 dollars per farm.

Examining the results, newly seeded fields and corn fields had marked reductions in fertilizer costs (Appendix A5-9). Newly seeded fields had the largest reduction in fertilizer costs, falling $11 per acre (Table 4). Corn fields had the second highest reduction in fertilizer costs falling $6 per acre (Table 4).

Fertilizer reductions per acre for corn production and new seedings is most likely the result of better fertilizer management. The Crop Management Program stresses monitoring of soil fertility, the use of manure, and shorter crop rotations especially on newly seeded fields and corn fields. Applying fertilizer only when necessary and supplementing commercial fertilizer with manure would decrease this input's per acre cost. Preliminary observations by Waldron, Deibel, and Virginia CES (1986, 1986, and 1987, respecitvely) support the reduction in fertilizer costs when rotation monitoring and manure are used instead of yearly applications of fertilizer.

Chemical costs have also declined from 1985 to 1986 (Appendix A5-9). Reduced chemical costs support earlier findings which conclude that monitoring fields on an individual basis reduces pesticide usage (Deibel 1985; Virginia CES 1987). Chemical costs averaged over all 12 farms dropped $2 per acre producing a $769 fall in per farm costs (Table 3). Fields managed for corn production contributed the most to this reduction in chemical costs falling $3 per acre.

Newly seeded fields showed increases for chemical and seed costs. Chemical costs increased $4 per acre and seed costs increased $7 per acre (Table 4). Increased seed costs for newly seeded fields is due partially to the usage of seed that is disease resistant. Disease in alfalfa can only be treated by resistant seed which is more expensive (Deibel 1988). Increased chemical costs may partially be due to a higher incidence of potato leaf hopper in 1986 (Deibel 1988).

Table 3. Crop Expenses by Farm and by Acre for Twelve[a] Chautauqua County Farms from 1985-1986

Year	Average Acres Per Farm	Fertilizer	Lime	Seed	Chemicals	Other	Total Expenses
				$ per farm			
1985[b]	347	8,924	2,418	4,370	3,473	840	20,025
1986	331	6,256	1,742	4,317	2,704	530	15,549
Difference between 85-86	16	-2,671	-676	-53	-769	-310	-4,476
				$ per acre			
1985		27.76	6.99	12.62	10.05	2.49	59.91
1986		18.94	8.25	13.10	5.26	2.37	47.92
Difference between 85-86		-8.82	1.26	0.48	-4.79	-0.12	-11.99

[a]The twelve farms are participants in the Crop Records Program in New York State.

[b]The 1985 prices are adjusted, by price indexes, to 1986.

Table 4. Changes for Fertilizer and Chemical Costs in Chautauqua County from 1985 to 1986[a]

Crop	Fertilizer Costs $/acre	Fertilizer Costs $/farm	Chemical Costs $/acre	Chemical Costs $/farm
Hay	(2)	(231)	(1)	(99)
New Seedings	(11)	(99)	4	192
Total Hay	(3)	(359)	0	49
Corn Silage	(7)	(716)	(3)	(427)
Ear Corn	(16)	(1,806)	(2)	(313)
Dry Shell Corn	(4)	157	(7)	(116)
Total Corn	(6)	(1,953)	(3)	(1,137)

[a]The cost figures represent differences between the years. The parentheses represent negative numbers.

Cattaraugus County

Four farms were in the Crop Management Program from 1984 to 1986. Data for 1985 was not included because this information was unavailable or could not be deciphered. Total crop expenses for these four farms fell $8 per acre and $2,585 per farm from 1984 to 1986 (Table 5). Declines in fertilizer costs contributed the most to this drop.

Overall, fertilizer expenses fell $7 per acre and $1,696 per farm. All field crops experienced decreases in fertilizer costs (Appendix A1-4). In particular dry shelled corn fields had the largest reduction in fertilizer costs lowering these costs $23 per acre (Table 6). Corn production in general had decreased fertilizer costs $8 per acre (Table 6) with most of this decrease occuring on combined corn.

Corn production requires good soil fertility to maintain yields. The drop in fertilizer costs would support monitoring fields individually as a beneficial method for reducing fertilizer costs. Lower fertilization costs could be attributed to applying fertilizers only when necessary and supplementing some of the recommended fertilizer with manure (Deibel 1988).

Although total crop expenses decrease, not all crop input expenses contributed to this decrease. Chemical expenses increased $722 per farm and $3 per acre (Table 5). The category with the largest increase was dry shelled corn. Dry shelled corn increased $14 per acre and $1,415 per farm (Appendix A1-4). These chemical cost increases might be explained by shorter crop rotations.

With shorter crop rotations, pesticides with low soil residual would be necessary. Herbicides such as atrazine which are almost always applied to corn fields to control grasses will carry over on New York soils to the following growing season. Atrazine is toxic to broadleaf crops such as legumes; therefore, it cannot be used on corn fields which will be rotated to legumes the next year. Fields which will be rotated the following years will have to use more expensive herbicides such as cyanazine in place of atrazine. If crop rotations are being shortened, then herbicides costs may increase.

Table 5. Crop Expenses by Farm and by Acre for Four[a] Cattaraugus County Farms from 1984 and 1986

Year	Average Acres	Fertilizer	Lime	Seed	Chemicals	Total Expenses
				per farm		
1984[b]	251	5,531	1,192	4,995	1,950	13,669
1986	238	3,835	871	3,706	2,672	11,084
Difference between 84-86	-13	-1,696	-321	-1,290	722	-2,585
				per acre		
1984		22.07	4.75	19.93	7.79	54.54
1986		16.12	3.67	15.58	11.22	46.60
Difference between 84-86		-5.95	-1.08	-4.35	3.43	-7.94

[a]The four farms are participants in the Crop Records Program in New York State.

[b]The 1984 costs are adjusted, by price indexes, to 1986.

Table 6. Changes for Fertilizer and Chemical Costs in Cattaraugus County from 1984 to 1986[a]

Crop	Fertilizer Costs		Chemical Costs	
	$/acre	$/farm	$/acre	$/farm
Hay	(1)	(170)	(1)	(52)
Corn Silage	(3)	(279)	(3)	(196)
Dry Shell Corn	(23)	(497)	14	1,420
Total Corn	(8)	(451)	7	(932)
Other Forages	6	60	17	164

[a]The cost figures represent the difference occurring between years. Parentheses represent negative values.

Crop Rotations

Since chemicals applied were not available, crop rotations for each crop were analyzed in order to see if there is a link between increases in crop expenses and changes in crop rotations. Shortening crop rotations may be an explanation for part of the increase in chemical costs for Cattaraugus County.

Number of years in a rotation are examined for Chautauqua County by comparing the number of years of continuous production for the same crop on the same field. Cattaraugus County was not included in this analysis since information on crop rotations were not available for 1984. Crop rotations for Chautauqua County were examined to help explain increases in chemical expenses for Cattaraugus County.

Acreage changes reflect changes in crop rotations. Examining acreage from 1985 to 1986 showed that acreage for new seedings has increased (Table 7). Increased acreage for new seedings suggests that crop rotations may be shortening. Examining acreage changes per farm for each year that a crop is grown on the same field resulted in acreage decreasing for crops grown on the same field more than two years (Table 8). It appears that crop rotations are being shortened since crops appear to be grown on the same fields no more than two to three years.

Table 7. Percentage of Acres for Each Field Crop From 1985-1986 on Twelve Participating Chautauqua County Farms

Crop	1985			1986		
	No. of Farms	Acres	Percentage of Total Acres (%)	No. of Farms	Acres	Percentage of Total Acres (%)
Grass	12	710	23	12	643	20
Legume	12	842	27	12	964	30
New Seeding	12	289	9	10	339	11
Total Hay Crop		1,841	59		1,946	61
Corn Silage	11	772	25	12	726	22
Ear Corn	6	119	4	3	91	3
Corn Grain	2	128	4	3	69	2
Total Corn Crop		1,019	33		886	27
Other Forage	7	207	6	9	195	6
Idle Land & Other Crops	7	63	2	6	208	6
Total		3,130	100		3,235	100

Table 8. Acreage Averaged Per Number of Farms for Crop Rotation Years from Chautauqua County 1985-1986

Crop & Rotation Year	Number of Farms	1985 Average Acres/Farm	Number of Farms	1986 Average Acres/Farm	Difference Between Acres From 1985-1986
Grasses					
Year 2	3	12	4	12	0
Year 3	6	10	4	13	3
Year 4	8	24	7	15	(9)
Year 5 or later	10	42	10	42	0
Total		97		82	(15)
Legumes					
Year 2	12	25	12	30	5
Year 3	8	29	12	28	(1)
Year 4	10	23	8	21	(2)
Year 5 or later	4	17	7	14	(3)
Total		94		93	(1)
New Seedings					
Total	12	24	11	34	10
Corn					
Year 1	8	23	11	26	3
Year 2	7	27	5	23	(4)
Year 3	8	40	8	30	(10)
Year 4 or later	10	32	8	29	(3)
Total		122		108	(14)

LIMITATIONS

Data availability was the limiting factor in this analysis. The data was limited by a small number of participant farms per county, few years for comparison, inability to use yield data, and lack of non-participant farms.

The low number of farms had a greater impact on averaged costs. When number of observations are low, variations in crop costs have a much greater impact on averaged values therefore biasing the true average. If number of observations are larger then averages would be closer to the true average and variations between farms would bias the results to a lesser degree.

Yearly data were confined to two years for each county due to the newness of the Crop Management Program. Lack of comparison years, brings in the problem of variations between years. Measuring changes in crop expenses between two years does not give as tight an argument had five years been compared.

Comparisons between participant and non-participant farms would have provided a stronger anlysis by providing a comparison group. A comparison group provides a check so changes in costs can be attributed more to the program's affect than to changes in growing seasons.

SUMMARY

The purpose of this analysis was to document the economic impact of the Crop Management Program in Chautauqua and Cattaraugus Counties. The objectives were to examine the changes in crop input costs, crop yields, and net returns; however, since yield and non-program farm costs were unavailable, only crop input costs were examined.

DFBS records were considered to compensate for any missing data. Before DFBS records could be used, they had to be compared to Crop Management records to determine if figures calculated in both programs were similar. This comparison resulted in crop input costs differing by near 20 or more percent. With this large a difference, DFBS records cannot be substituted or compared to Crop Management Program records.

Comparison by crop categories for each county showed impacts of decreased input expenses. The largest decrease was fertilizer costs which decreased $6 per acre for Cattaraugus County and $9 per acre for Chautauqua County. Chemical costs were the exception in Cattaraugus County increasing $3 per acre. The most probable cause for this increase was shorter crop rotations and more selective herbicides which have less carry over.

In the crop rotation analysis, acreage increased for newly seeded fields and legume fields while it decreased for fields growing corn more than two years. This gives support to a change in the length of a crop rotation. Shortened crop rotations may explain the increase in chemical costs for Cattaraugus County.

Overall, the largest impact of this program that appeared to be occurring for input costs was for fertilizer. This impact suggests that monitoring soil fertility by field and applying manure will reduce the costs of this input. From this analysis, Crop Management Programs appear to benefit producers economically by reducing input costs, especially for fertilizer.

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APPENDIX

Appendix A1. Crop Expenses for 1984,[a] Averaged Per Acre, From Four[b] Cattaraugus Farms

Crop	Fertilizer	Chemicals	Seed	Lime	Total
			$ per acre		
Hay	10.08	0.28	5.14	6.40	21.91
Other Forage	16.92	28.46	18.38	0.00	63.76
Corn Silage	29.04	15.62	19.38	1.65	65.68
Corn Grain	46.47	10.21	22.43	4.26	83.37
Ear Corn	29.07	12.49	16.09	0.00	57.65
Other Crops	23.80	2.98	52.37	9.14	88.29
New Seeding	36.74	5.83	63.51	8.53	114.61
Average all crops	22.07	7.79	19.93	4.75	54.54

[a]The 1984 prices are adjusted to 1986 prices by price indexes.

[b]These four farms are participants in the Dairy Farm Business Summaries and the Crop Records Programs in New York State.

Appendix A2. Crop Expenses for 1986 Averaged Per Acre, From Four[a] Cattaraugus County Farms

Crop	Fertilizer	Chemicals	Seed	Lime	Total
	- - - - - - - - - - - - - - - - - -		$ per acre	- - - - - - - - - - - - - -	
Hay	8.76	0.85	0.00	4.24	13.86
Other Forage	10.75	10.94	35.73	11.49	68.90
Corn Silage	26.12	12.78	18.59	0.00	57.49
Corn Grain	23.71	24.41	24.34	0.68	73.14
Other Crops	22.96	26.60	24.00	0.00	73.56
Average all crops	16.12	11.22	15.58	3.67	46.60

[a]These four farms were participants in the Dairy Farm Business Summaries but are presently involved in the Crop Records Programs in New York State.

Appendix A2. Crop Expenses for 1986 Averaged Per Acre, From Four[a] Cattaraugus County Farms

Crop	Fertilizer	Chemicals	Seed	Lime	Total
	- - - - - - - - - - - - - - - - - - $ per acre - - - - - - - - - - - - - - - - - -
Hay	8.76	0.85	0.00	4.24	13.86
Other Forage	10.75	10.94	35.73	11.49	68.90
Corn Silage	26.12	12.78	18.59	0.00	57.49
Corn Grain	23.71	24.41	24.34	0.68	73.14
Other Crops	22.96	26.60	24.00	0.00	73.56
Average all crops	16.12	11.22	15.58	3.67	46.60

[a]These four farms were participants in the Dairy Farm Business Summaries but are presently involved in the Crop Records Programs in New York State.

Appendix A4. Crop Expenses for 1986 Averaged Per Farm, From Four[a] Cattaraugus County Farms

Crop	Farms	Average Acres	Fertilizer	Chemicals	Seed	Lime	Total
			- - - - - - - - - - - - - $ per farm - - - - - - - - - - - - -				
Hay	4	94.5	828	80	0	400	1,308
Other Forage	2	37	398	405	1,322	425	2,550
Corn Silage	3	36	940	460	669	0	2,069
Corn Grain	3	68	1,612	1,660	1,655	46	4,973
Other Crops	2	2.5	57	67	60	0	184
Average all crops		238	3,835	2,672	3,706	871	11,084

[a]These four farms were participants in the Dairy Farm Business Summary Program at one time but are participants in the Crop Records Programs in New York State.

Appendix A5. Crop Expenses for 1985[a] Averaged Per Acre From Twelve[b] Chautauqua County Farms

Crop	Fertilizer	Chemicals	Seed	Lime	Other	Total
	- - - - - - - - - - - - - - - - - - - $ per acre - - - - - - - - - - - - - - - - - - -					
Hay	14.21	1.63	0.00	1.21	0.00	17.05
New Seeding	27.10	5.85	36.42	12.72	1.21	83.24
Other Forage	19.04	9.54	23.05	17.64	1.65	70.92
Corn Silage	31.99	23.08	20.53	15.11	1.17	92.16
Ear Corn	45.91	12.58	13.65	0.00	10.53	83.08
Corn Grain	25.30	23.35	17.97	14.74	2.92	84.29
Other Crops	27.11	0.00	15.09	6.00	0.00	48.21
Average all crops	27.76	10.05	12.62	6.99	2.49	59.91

[a]The 1985 prices have been adjusted to 1986 by price indexes.

[b]These twelve farms are participants in the Dairy Farm Business Summaries and in the Crop Records Programs in New York State.

Appendix A6. Crop Expenses for 1986 Averaged Per Acre From Twelve[a] Chautauqua County Farms

Crop	Fertilizer	Chemicals	Seed	Lime	Other	Total
	- - - - - - - - - - - - - - - - - - $ per acre - - - - - - - - - - - - - - - - - - -
Hay	12.07	0.84	0.49	1.28	0.02	14.69
New Seeding	15.92	9.78	42.63	10.76	0.31	79.40
Other Forage	25.03	7.31	20.19	5.48	6.09	64.08
Corn Silage	25.39	19.81	19.53	13.25	0.08	78.05
Ear Corn	30.09	14.32	18.47	5.64	16.15	84.68
Corn Grain	29.85	16.56	19.37	4.62	8.79	79.16
Other Crops	15.56	3.57	6.73	0.46	0.00	26.32
Average all crops	18.94	8.25	13.10	5.26	2.37	47.92

[a]These twelve farms were chosen because they participated in the Chautauqua Crop Records program and the Dairy Farm Business Summary.

Appendix A7. Crop Expenses for 1985[a] Averaged Per Farm From Twelve[b] Chautauqua County Farms

Crop	Farms Total	Average Acres	Fertilizer	Chemicals	Seed	Lime	Other	Total
					$ per farm			
Hay	12	130	1,847	212	0	157	0	2,216
New Seeding	12	24	650	140	874	305	29	1,998
Other Forage	7	28	533	267	645	494	46	1,985
Corn Silage	11	70	2,239	1,615	1,437	1,058	82	6,431
Ear Corn	2	59	2,709	742	805	0	621	4,877
Corn Grain	6	21.3	539	497	383	314	62	1,795
Other Crops	4	15.0	407	0	226	90	0	723
Total all crops		347	8,924	3,473	4,370	2,418	840	20,025

[a]The 1985 prices are adjusted to 1986 by price indexes.

[b]The twelve farms are participants in the Dairy Farm Business Summaries and the Crop Records Programs in New York State.

Appendix A8. Crop Expenses for 1986 Averaged Per Farm From Twelve[a] Chautauqua County Farms

Crop	Farms	Average Acres	Fertilizer	Chemicals	Seed	Lime	Other	Total
					$ per farm			
Hay	12	134	1,616	113	65	172	0	1,966
New Seeding	10	34	541	332	1,449	366	41	2,729
Other Forage	9	22	551	161	444	121	36	1,313
Corn Silage	12	60	1,523	1,188	1,172	795	70	4,748
Corn Grain	3	23	696	381	445	106	67	1,685
Ear Corn	3	30	903	429	554	169	316	2,371
Other Crops	7	28	436	100	188	13	0	737
Average all crops	12	331	6,256	2,704	4,317	1,742	530	15,549

[a]These twelve farms were chosen because they participate in the Chautauqua Crop Records Program and the Dairy Farm Business Summary.